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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 part of this prestigious 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 enrich your experience. 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.

You’ll have access to an innovative range of professional development courses within our Graduate School throughout your time here, as well as opportunities to meet students from across the College at academic and social events – see page 6 for more information.

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 (following an annual fee of £30 in 2018-19) across our campuses.

As one of the best universities in the world, we are committed to inspiring the next generation of scientists, engineers, clinicians and business leaders by continuing to share the wonder of what we do through public engagement events. Postgraduate students, alongside our academics and undergraduate students, make a significant contribution to events such as our annual Imperial Festival and our term-time Imperial Fringe events – if you’re interested in getting involved then there will be opportunities for you to do so.
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
Welcome from the Graduate School

Professor Sue Gibson,
Director of the Graduate School

The Graduate School has several roles but our main functions are to provide a broad, effective and innovative range of professional development workshops and to facilitate interdisciplinary interactions by providing opportunity for students to meet at academic and social events. Whether you wish to pursue a career in academia, industry or something else, professional skills development training will improve your personal impact and will help you to become a productive and successful researcher.

Professional development courses for Master’s students are called “Masterclasses” and they cover a range of themes, for example, presentation skills, academic writing and leadership skills (http://www.imperial.ac.uk/study/pg/graduate-school/professional-skills/masters/). All Masterclasses are free of charge to Imperial Master’s students and I would encourage you to take as many as you can to supplement your academic training. The Graduate School works closely with the Graduate Students’ Union (GSU) and is keen to respond to student needs so if there is an area of development training, or an activity that you would like us to offer, but which is not currently provided, please do get in touch (graduate.school@imperial.ac.uk).

The Graduate School also runs a number of exciting social events throughout the year which are an opportunity to broaden your knowledge as well as to meet other students and have fun. You should regularly check the Graduate School’s website and e-Newsletters to keep up to date with all the events and development opportunities available to you.

Finally, I hope that you enjoy your studies here at Imperial, and I wish you well.

Sue Gibson

Dr Janet De Wilde,
Head of Postgraduate Professional Development

I would like to welcome you to the Graduate School programme for postgraduate professional development. Our team of tutors come from a wide variety of experiences and we understand just how important it is to develop professional skills whilst undertaking postgraduate studies and research. Not only will this development improve success during your time at Imperial College, but it will also prepare you for your future careers. We are continually working to develop the courses we offer and over this year you will see a range of new courses including face-to-face workshops, interactive webinars and online self-paced courses. I encourage you to explore and engage with the diverse range of opportunities on offer from graduate school and I wish you well in your studies.

Janet De Wilde
The Graduate School

You automatically become a member of the Graduate School when you register as a postgraduate student at Imperial.

The Graduate School has been set up to support all postgraduate students at the College through:

- Training and development courses
- Networking activities, social and academic events to encourage cross-disciplinary interactions
- Forums to represent the views of postgraduate students throughout the College

‘Masterclass’ professional skills courses

You can see the full range of free professional skills courses for postgraduate students on the Graduate School website:

[www.imperial.ac.uk/study/pg/graduate-school/professional-skills/masters](http://www.imperial.ac.uk/study/pg/graduate-school/professional-skills/masters)

All courses can be booked online.

Contact us

- Level 3, Sherfield Building, South Kensington Campus
- 020 7594 1383
- graduate.school@imperial.ac.uk
- [www.imperial.ac.uk/graduate-school](http://www.imperial.ac.uk/graduate-school)
Welcome from the Graduate Students’ Union (GSU)

I am delighted to welcome you to Imperial College! Let me introduce you to the Graduate Students’ Union (GSU). We are the representative body defending your interests as a postgraduate student in major decisions taken by the College. Beyond that, we work towards building a thriving postgraduate community that spans faculties and where students effectively communicate in an interdisciplinary way. Our committee is comprised of motivated postgraduate students like yourself, who have been appointed in university-wide elections and volunteer to make your experience at Imperial as fulfilling and enjoyable as possible.

So, what are we up to for this coming year 2018/19? We are going to focus on three major areas of action:

• Continue improving post-graduate well-being by increasing the quality of supervision and by creating strategies to tackle common mental health challenges in higher education.
• Develop the GSU to become central to the postgraduate community by improving the two-way flow of information, between the GSU and you.
• Organise exciting events around the topics of well-being, interdisciplinary research, and entrepreneurship.

As the GSU president, I would like to emphasise that Imperial College London is relying on its postgraduate students to maintain its position as a front-runner in world-class research and teaching. For us, the GSU, to be successful we need to receive as much of your input as possible. We want to work with you, for you!

Finally, I hope that you have a fantastic time here at Imperial and take advantage of the richness of opportunities that awaits you. If ever you have questions or ideas to share with us, please do not hesitate to get in touch with us and we are looking forward to seeing you at our events!

Ute Thiermann, GSU President 2018/19

gsu.president@imperial.ac.uk
1. Introduction to the Department

Welcome from the Head of Department

Dear Colleague,

Welcome to the Department of Mathematics at Imperial College.

I hope that your time here as a postgraduate student is both productive and fruitful.

Best wishes with your studies.

Prof David van Dyk

Welcome from the Director of Postgraduate Studies

Dear New MSc Students,

Welcome to the Mathematics Department at Imperial. The Department is eager to help you make your year of study a satisfying period of learning and creativity.

Please read on. Your success and comfort will depend on your familiarity with the essentials of being an MSc student. I know you may experience a degree of information overload initially. But read at least this page and keep the welcome pack within reach for reference.

(1) Engage: Mathematics and science are social activities. Your fellow students across the department and throughout the college are wonderful resources of help, friendship, inspiration and creative stimulation, so get involved.

(2) Academic and administrative support: The intention is that you develop a constructive, and hopefully friendly and fulfilling, relationship with the lecturers of the courses and your project supervisor.

(3) Depth and breadth: Good mathematics and science needs the right balance between depth and breadth. One inevitably needs a thorough knowledge of ideas, methods and techniques from as broad a field as practically possible. Through breadth one may become aware of existing approaches that can turn out to be helpful when working on specific problems. Breadth is also needed in order to know what today’s interesting and important open problems are. On the other hand, depth is needed to ensure that one’s level of understanding is sufficiently detailed to allow one to make creative contributions.

During your MSc study it is a good idea to attend seminars and the department colloquia, participate in discussion groups, etc. and in general feed your curiosity.

I sincerely wish the next year may lead you to the insights and achievements you are hoping for,

Prof Henrik Jeldtoft Jensen
Welcome from the Programme Director

Welcome to the MSc in Statistics at Imperial. This year we are proud to introduce four specialised research streams: Applied Statistics, Theory and Methods, Statistical Finance and Biostatistics, in addition to our general MSc in Statistics course. Through this year you will be exposed to statistical theory, methodology and areas of applications that will provide you with the necessary skillset for a successful career in statistics.

The course is run by the Statistics Section of the Department of Mathematics. The Statistics Section has an international reputation for conducting methodological and applied statistical research at the highest level. Particular areas of current activity include statistical genetics and biostatistics, statistical methods in retail financial services, time series and signal processing, statistical theory, Bayesian methods and computation, and statistical machine learning, with many interactions and overlaps between these areas of research. The Section is one of the leading statistics groups in the UK. I strongly encourage you to engage as much as possible with the academics of the Section either through your lectures, personal tutor and project supervisor meetings as well as at our weekly statistics seminars and social events. You can find a list of academic staff in the Statistics Section at imperial.ac.uk/statistics/people.

The Department of Mathematics at Imperial College London is an internationally renowned department within one of the world’s most prestigious universities. The principal aim of the Department is to train professional mathematicians to pursue the study of scientific and technological problems by mathematical methods, and to undertake research in various branches of the subject, for which it has achieved outstanding results in the most recent government research assessment exercise.

I hope you will enjoy your MSc study and have a fantastic time at Imperial.

Academic and Administrative staff

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Dr Tony Bellotti  
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pgr.welfare@imperial.ac.uk  

Prof Henrik Jeldtoft Jensen  
Director of Postgraduate Studies  
1201, 12th Floor, Electrical Engineering  
0207 594 9853  
pgr.director@imperial.ac.uk
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/pg/apply/requirements/english

For information on English language support available while you’re here, see English Language Support section.

Attendance and absence

You must inform your Senior Postgraduate 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. If you miss an examination through illness you must contact your Senior Postgraduate 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.

Key dates 2018-19

Term dates

Autumn Term: 29 September - 14 December 2018
Spring Term: 5 January - 22 March 2019
Summer Term: 27 April- 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

Key events

Deadline for project submission TBA
Project oral presentation TBA
Postgraduate Awards Ceremonies: May 2020
Imperial Festival and Alumni Festival: May 2019
2. Programme Information

Aims/Objectives/Learning Outcomes

Here is what you can broadly expect from the programme:

1. You will improve your understanding of the probabilistic background to statistics. This will be mainly achieved through one of the core modules.
2. You will learn about the theoretical and methodological foundations of statistics. Besides a core module, you can choose to specialise in methodological aspects of statistics through appropriate choice of optional modules as well as through the choice of project.
3. You will become proficient in modern computational methods for statistics. A minimal level will be achieved through a core module, which will be improved upon by the optional modules as well as the project.
4. You will become confident in using statistical methods to solve practical problems. This will be achieved through the core module “Applied Statistics”, through the use of the statistical software R throughout the course, through the range of optional modules and through the individual project. You will get proficient in the statistical language R.
5. You will learn about the breadth of statistical applications. This will be achieved through the wide range of optional modules, which allow you to specialise in more methodological aspects as well as in a diverse range of modern applications. Furthermore, there will be talks by practising statisticians, called “Statistics in Practice”, in the Summer term. This will help you with your career choice.
6. You will learn to tackle, analyse and solve realistic statistical problems independently. This will be mostly achieved through the research project.

Programme Structure

In addition to the general MSc in Statistics, four additional streams are offered this year: Applied Statistics, Biostatistics, Theory and Methods and Statistical Finance. The general MSc in Statistics stream enables you to choose modules across a variety of topics, whereas the specialist streams focus on a specific theme. The formal qualification received will include the name of the specialist stream, for example: MSc Statistics (Applied Statistics). It might be possible to switch between streams at the beginning of the Spring term but this is subject to approval by the Course Director.

A common set of core modules in the Autumn term ensures that all students obtain advanced knowledge in the fundamental areas of probability theory, statistical inference and applied and computational statistics. A large and diverse set of optional modules is offered in the Spring term, which provides the flexibility for you to develop your own specialist interests. During the Summer term, you complete a research project with a member of academic staff on a state-of-the-art research problem that suits your interests.
### Autumn Term

<table>
<thead>
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<th>Week 1</th>
<th>Induction week</th>
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<tbody>
<tr>
<td>Week 2-11</td>
<td>Core Modules</td>
</tr>
<tr>
<td></td>
<td>M5MS01 Probability for Statistics</td>
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<td>M5MS02 Fundamentals of Statistical Inference</td>
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<td></td>
<td>M5MS03 Applied Statistics</td>
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<td></td>
<td>M5MS04 Computational Statistics</td>
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</table>

Week 1-11 M5S8 Time Series. This is an optional module and is equivalent to 7.5 ECTS.

Week 2-11 M5MF12 Algorithmic Trading and Machine Learning. This module is optional and numbers are limited and subject to approval by the Course Directors of the MSc in Statistics and the MSc in Mathematical Finance. It is equivalent to 5 ECTS.

### Spring Term

The modules you take will depend on which stream you are on, tables showing the combination for each stream are listed on pages 16-18. Outside of the Core modules offered in the Autumn term, your remaining modules will equal 30-32.5 ECTs, e.g. 6 modules of 5 ECTS each. This may include optional modules in the Autumn term. You are limited to taking at most two 7.5 ECTS modules (in other words: you must take at least four 5 ECTS modules).

<table>
<thead>
<tr>
<th>Week 1</th>
<th>Written exams for M5MS01, M5MS02</th>
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</thead>
<tbody>
<tr>
<td>Week 2-6</td>
<td>M5MS05 Advanced Statistical Theory</td>
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<td>M5MS08 Multivariate Analysis</td>
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<td>M5MS10 Machine Learning</td>
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<td>M5MS11 Introduction to Statistical Finance</td>
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<td>M5MS13 Biomedical Statistics</td>
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<td>M5MS15 Big Data</td>
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<td>M5S14 Survival Models and Actuarial Applications</td>
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<td>M5S17 Quantitative Methods in Retail Finance</td>
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<tr>
<td>Week 7-11</td>
<td>M5MS06 Bayesian Methods</td>
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<td>M5MS07 Non-parametric Smoothing and Wavelets</td>
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<td>M5MS09 Graphical Models</td>
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<td>M5MS12 Advanced Statistical Finance</td>
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<td>M5MS14 Statistical Genetics and Bioinformatics</td>
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<td>M5MS16 Advanced Simulation Methods</td>
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</table>
Summer Term

<table>
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<tr>
<th>Week 1-2</th>
<th>Written exams for optional 5 ECTS modules</th>
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<tbody>
<tr>
<td>Week 3-10</td>
<td>Project work</td>
</tr>
<tr>
<td>Week 9 or 10</td>
<td>Talks: Statistics in Practice and Project Poster Presentation</td>
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</tbody>
</table>

The exams for the 7.5 ECTS modules will take place in the Summer term. The precise dates will be announced in due course.

July-September

Work on Project. Projects must be handed in by the date mentioned in “Key Dates”. Presentation on the project shortly afterwards.

Accreditation

In previous years, the MSc in Statistics was accredited by the Royal Statistical Society. For you that means:

1. Students of the MSc in Statistics get a free one year student membership. You are very much encouraged to apply for this membership and get involved in the RSS.
2. Once graduated, the RSS will grant you “Graduate Statistician” status. This will allow you to use the postnomial designation of “Gradstat”.
3. When applying for Gradstat status, the RSS needs confirmation that you are indeed a graduate. Only registry can issue such a confirmation. Please send an e-mail to records@imperial.ac.uk, stating that a confirmation of degree should be posted to the RSS, giving the address of the RSS (if in doubt ask the RSS for the precise address).

Please note that the Royal Statistical Society has introduced a new accreditation scheme from 2018 entry onwards, and all accredited universities had to re-apply for their accredited status. The Department has applied for accreditation post-2018 and expects to be accredited into the future. Details to follow.

Royal Statistical Society

The Royal Statistical Society (RSS) is one of the world’s most distinguished and renowned statistical societies. It is both a learned society for statistics and a professional body for statisticians.

It was founded in 1834 as the Statistical Society of London and became the Royal Statistical Society by Royal Charter in 1887. Today the Society has more than 7000 members around the world, of whom some 1500 are professionally qualified as Chartered Statistician. The RSS is active in a wide range of areas both directly and indirectly relevant to the study and application of statistics.

The RSS headquarters is located in 12 Errol Street (about 50 minutes on public transport from the Mathematics Department).

Throughout the year, the RSS organizes Ordinary Meetings, at which statistical papers are being presented and discussed. The Young Statisticians Section organizes Pre-Ordinary Meetings, held just before the Ordinary Meetings, which are aimed at giving an introduction to the area of the paper presented at the Ordinary Meeting. You might be interested in joining the RSS, in particular the Young Statisticians section.
Core Modules

**M5MS01 Probability for Statistics (Dr A Duncan)**

The module Probability for Statistics introduces the key concepts of probability theory in a rigorous way. Topics covered include: the elements of a probability space, random variables and vectors, distribution functions, independence of random variable/vectors, a concise review of the Lebesgue-Stieltjes integration theory, expectation, modes of convergence of random variables, law of large numbers, central limit theorems, characteristic functions, conditional probability and expectation.

The second part of the module will introduce discrete-time Markov chains and their key properties, including the Chapman-Kolmogorov equations, classification of states, recurrence and transience, stationarity, time reversibility, ergodicity. Moreover, a concise overview of Poisson processes, continuous-time Markov chains and Brownian motion will be given.

Assessment: 100% written exam.

**M5MS02 Fundamentals of Statistical Inference (Prof A Young)**

In statistical inference experimental or observational data are modelled as the observed values of random variables, to provide a framework from which inductive conclusions may be drawn about the mechanism giving rise to the data. This is done by supposing that the random variable has an assumed parametric probability distribution: the inference is performed by assessing some aspect of the parameter of the distribution.

This module develops the main approaches to statistical inference for point estimation, hypothesis testing and confidence set construction. Focus is on description of the key elements of Bayesian, frequentist and Fisherian inference through development of the central underlying principles of statistical theory. Formal treatment is given of a decision-theoretic formulation of statistical inference. Key elements of Bayesian and frequentist theory are described, focussing on inferential methods deriving from important special classes of parametric problem and application of principles of data reduction. General purpose methods of inference deriving from the principle of maximum likelihood are detailed. Throughout, particular attention is given to evaluation of the comparative properties of competing methods of inference.

Assessment: 90% written exam, 10% coursework.

**M5MS03 Applied Statistics (Prof N Adams)**

The module focuses on statistical modelling and regression when applied to realistic problems and real data. We will cover the following topics: The Normal Linear model (estimation, residuals, residual sum of squares, goodness of fit, hypothesis testing, ANOVA, model comparison). Improving Designs and Explanatory Variables (categorical variables and multi-level regression, experimental design, random and mixed effects models). Diagnostics and Model Selection and Revision (outliers, leverage, misfit, exploratory and criterion based model selection, Box-Cox transformations, weighted regression), Generalised Linear Models (exponential family of distributions, iteratively re-weighted least squares, model selection and diagnostics). In addition, we will introduce more advanced topics related to regression such as penalised regression and link with related problems in Time series, Classification, and State Space modelling.

Assessment: 100% coursework.

**M5MS04 Computational Statistics (Prof A Gandy)**

This module covers a number of computational methods that are key in modern statistics. Topics include: Statistical Computing: R programming: data structures, programming constructs, object system, graphics. Numerical methods: root finding, numerical integration, optimisation methods such
as EM-type algorithms. Simulation: generating random variates, Monte Carlo integration. Simulation approaches in inference: randomisation and permutation procedures, bootstrap, MCMC.

Assessment: 100% coursework.

Optional Modules

Module Choice

You must register for term 2 modules equivalent to 30-32.5 ECTS. The stream you are on will determine which term 2 modules are compulsory or optional. The tables below illustrate the permitted module combinations. MSc modules are worth 5 ECTS and modules shared with undergraduate students are worth 7.5 ECTS. You can only take the 7.5 ECTS modules if you not have taken these modules (or their equivalents for undergraduate students M3S8/M4S8,M3S14/M4S14 etc.) as part of a previous degree at Imperial.

At the discretion of the Course Director, students may be allowed to take other modules offered by the Department of Mathematics. To request to take a module from outside the MSc in Statistics Programme, you will need to complete the Module Request Form.

You will have to make a final optional module choice once the second wave of optional modules in the Spring term is running (probably in week 7 or 8 of the Spring term - precise date to be announced). However, you will be deemed to be officially registered on a module through the submission of coursework which (in total) is worth at least 15% of the final mark. Thus, once you have reached this point in a module, you will be committed to completing the module.

What does this mean for the Time Series module running in the Autumn term? The coursework in this module is worth at most 10% of the final mark, so you will not be officially registered on this module before making your final module choice.

<table>
<thead>
<tr>
<th>General Stream</th>
<th>30-32.5 ECTS with a maximum of two 7.5 ECTS modules</th>
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</thead>
<tbody>
<tr>
<td>5 ECTS</td>
<td>7.5 ECTS</td>
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<tr>
<td>M5MS05 Advanced Statistical Theory (5 ECTS)</td>
<td>M5S14 Survival Models and Actuarial Applications (7.5 ECTS)</td>
</tr>
<tr>
<td>M5MS06 Bayesian Methods (5 ECTS)</td>
<td>M5S18 Time Series (7.5 ECTS)</td>
</tr>
<tr>
<td>M5MS07 Non-parametric Smoothing and Wavelets (5 ECTS)</td>
<td>M5S17 Quantitative Methods in Retail Finance (7.5 ECTS)</td>
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<td>M5MS15 Big Data (5 ECTS)</td>
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<tr>
<td>M5MS16 Advanced Simulation Methods (5 ECTS)</td>
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<tr>
<td>M5MF12 Algorithmic Trading and Machine Learning (5 ECTS)</td>
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</table>
### Applied Statistics Stream

<table>
<thead>
<tr>
<th>Group A</th>
<th>Group B</th>
<th>Group C</th>
<th>Additional Module</th>
</tr>
</thead>
<tbody>
<tr>
<td>M5MS05 Advanced Statistical Theory (5 ECTS)</td>
<td>M5MS06 Bayesian Methods (5 ECTS)</td>
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<tr>
<td>M5MS09 Graphical Models (5 ECTS)</td>
<td>M5MS10 Machine Learning (5 ECTS)</td>
<td>M5S8 Time Series (7.5 ECTS)</td>
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<td>M5MS11 Introduction to Statistical Finance (5 ECTS)</td>
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<td>M5MS16 Advanced Simulation Methods (5 ECTS)</td>
<td>M5MS15 Big Data (5 ECTS)</td>
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</table>

### Biostatistics Stream

<table>
<thead>
<tr>
<th>Compulsory</th>
<th>Optional: A total of 12.5 – 15 ECTS with at most one module worth 7.5 ECTS</th>
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</thead>
<tbody>
<tr>
<td>M5MS13 Biomedical Statistics (5 ECTS)</td>
<td>M5MS05 Advanced Statistical Theory (5 ECTS)</td>
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<tr>
<td>M5MS14 Statistical Genetics and Bioinformatics (5 ECTS)</td>
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### Theory and Methods Stream

A total of 20-22.5 ECTS with at least one module from Group A and remaining Group B. Maximum of two 7.5 ECTS modules.

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5 ECTS Modules

**M5MS05 Advanced Statistical Theory (Prof A Young)**

This module aims to give an introduction to key developments in contemporary statistical theory, building on ideas developed in the core module Fundamentals of Statistical Inference. Reasons for wishing to extend the techniques are several. Optimal procedures of inference, as described, say, by Neyman-Pearson theory, may only be tractable in unrealistically simple statistical models. Distributional approximations, such as those provided by asymptotic likelihood theory, may be judged to be inadequate, especially when confronted with small data samples (as often arise in various fields, such as particle physics and in examination of operational loss in financial systems). It may be desirable to develop general purpose inference methods, such as those given by likelihood theory, to explicitly incorporate ideas of appropriate conditioning. In many settings, such as bioinformatics, we are confronted with the need to simultaneously test many hypotheses. More generally, we may be confronted with problems where the dimensionality of the parameter of the model increases with sample size, rather than remaining fixed, or where the model used for the analysis is selected using the sample data, rather than decided on beforehand.

We consider in this module a number of topics motivated by such considerations. These include: developments in likelihood-based inference, driven by accurate analytic approximation techniques; objective Bayes and bootstrap approaches to inference in parametric problems; multiple testing and estimation; selective inference; theoretical notions involved in high-dimensional inference.

Assessment: 80% written exam, 20% coursework

**M5MS06 Bayesian Methods (Dr D Mortlock)**

Scientific inquiry is an iterative process of integrating and accumulating information. Investigators assess the current state of knowledge regarding the issue of interest, gather new data to address remaining questions, and then update and refine their understanding to incorporate both new and old data. Bayesian inference provides a logical, quantitative framework for this process.

In this module we will develop tools for designing, fitting, validating, and comparing the highly structured Bayesian models that are so quickly transforming how scientists, researchers, and statisticians approach their data. This will include: motivation of Bayesian methods, basic Bayesian tools, comparisons with likelihood methods; standard single-parameter models, conjugate, informative, non-informative, flat, invariant, and Jeffries prior distributions, summarizing posterior distributions, and the posterior as an average of the prior and data; multi-parameter models including Gaussian models and Gaussian linear regression, semi-conjugate prior distributions, evaluating an estimator, and nuisance parameters; hierarchical and multilevel models, finite mixture models, the two-level Gaussian model, shrinkage; model checking, selection, and improvement techniques, posterior predictive checks, Bayes factors, comparisons with significance tests and p-values.

Assessment: 80% written exam, 20% coursework

**M5MS07 Non-parametric Smoothing and Wavelets (Dr S Flaxman)**

Non-parametric methods, as opposed to parametric methods, are desirable when we cannot confidently assume parametric models for our observations. In such situations we need flexible, data driven methods for estimating distributions or performing regression. This module looks at a number of frequentist and Bayesian non-parametric methods. These will include:
Non-parametric density estimation: histograms, kernel estimators, window width, adaptive kernel estimators, and Dirichlet processes.
Non-parametric regression: regressograms, kernel regression, local polynomial regression, cross-validation, and Gaussian process regression.
Regularisation and Spline Smoothing: roughness penalty, cubic splines, spline smoothing, Reinsch algorithm, and Reproducing Kernel Hilbert Spaces.
Basis function approach: B-splines, wavelets, thresholding.

Assessment: 90% written exam, 10% coursework

M5MS08 Multivariate Analysis (Dr G Priyadarshini)

Multivariate Analysis is concerned with the theory and analysis of data that has more than one outcome variable at a time, a situation that is ubiquitous across all areas of science. Multiple uses of univariate statistical analysis is insufficient in this settings where interdependency between the multiple random variables are of influence and interest. In this module we look at some of the key ideas associated with multivariate analysis. Topics covered include: multivariate notation, the covariance matrix, multivariate characteristic functions, a detailed treatment of the multivariate normal distribution including the maximum likelihood estimators for mean and covariance, the Wishart distribution, Hotelling's $T^2$ statistic, likelihood ratio tests, principle component analysis, ordinary, partial and multiple correlation, multivariate discriminant analysis.

Assessment: 100% written exam

M5MS09 Graphical Models (Dr T Bedhiafi)

Graphical models are those probability models whose independence structure is characterised by a graph, the conditional independence graph. In this module we will look at some aspects of graphical modelling for both (a) a vector of random variables, and (b) vector-valued time series. We will look at models and their estimation. Topics covered include: dependence structure and graphical representation; Markov properties for undirected graphs; the conditional independence graph; decomposable models; graphical Gaussian models; model selection; acyclic directed graphical models; global directed Markov property; Bayesian networks; graphical modelling of time series; model selection for time series graphs.

Assessment: 100% written exam

M5MS10 Machine Learning (Dr B Calderhead)

This module will provide an introduction to Bayesian statistical pattern recognition and machine learning. The lectures will focus on a variety of useful techniques including methods for feature extraction, dimensionality reduction, data clustering and pattern classification. State-of-art approaches such as Gaussian processes and exact and approximate inference methods will be introduced. Real-world applications will illustrate how the techniques are applied to real data sets.

Assessment: 100% coursework
**M5MS11 Introduction to Statistical Finance (Dr M Pakkanen)**

The module “Introduction to Statistical Finance” introduces fundamental concepts in financial economics and quantitative finance and presents suitable statistical tools which are widely used when analysing financial data.

The module will start off with an introduction to risk-neutral pricing theory followed by a short survey on risk measures such as value at risk and expected shortfall which are widely used in financial risk management.

Next, an introduction to time series analysis will be given, where the main focus will be on so-called ARMA-GARCH processes. Such processes can describe some of the stylised facts widely overserved in financial data, including non-Gaussian returns and heteroscedasticity. Finally, methods for forecasting financial time series will be introduced.

Assessment: 90% written exam, 10% coursework

**M5MS12 Advanced Statistical Finance (Dr M Pakkanen)**

Advanced Statistical Finance focuses on modern statistical methods for analysis of financial data. During the last two decades, the increasing availability of large financial data sets has prompted development of new statistical and econometric methods that can cope with high-dimensional data, high-frequency observations and extreme values in data.

The module will first introduce the basics of extreme value theory, which will be used to develop models and estimation methods for extremes in financial data. The second part of the module will provide a concise introduction to the theory of stochastic integration and Itô calculus, which provide a theoretical foundation for volatility estimation from high-frequency data using the concept of realised variance. The asymptotic properties of realised variance will be elucidated and applied to draw inference on realised volatility.

The third part introduces some recently developed volatility forecasting models that incorporate volatility information from high-frequency data and demonstrates how the performance of such models can be assessed and compared using modern forecast evaluation methods such as the Diebold-Mariano test and the model confidence set.

The final part of the module provides an overview of covariance matrix estimation in a high-dimensional setting, motivated by applications to variance-optimal portfolios. The pitfalls of using the standard sample covariance matrix with high-dimensional data are first exemplified. Then it is shown how shrinkage methods can be applied to estimate covariance matrices accurately using high-dimensional data.

Assessment: 90% written exam, 10% coursework

**M5MS13 Biomedical Statistics (Dr O Ratmann)**

The students will be introduced to modern statistical approaches and tests performed when analyzing data collected from observational studies, such as case-control studies, longitudinal studies and clinical trial studies. The module will introduce central techniques for modelling and inference in biostatistics, from generalized linear regression models to complex Bayesian multi-level models for clinical, environmental and ecological data. Case examples will illustrate recent theoretical advances in action, covering variable selection, principles of handling missing data, meta-analysis, aspects of causal inference, and the effective design of biostatistical studies. Particular emphasis will be on state-of-the-
art computing, introducing students to the R tidyverse environment for data science, techniques for handling big data, and the Stan software for inference.

Assessment: 60% written exam, 40% coursework

M5MS14 Statistical Genetics and Bioinformatics (Dr G Priyadarshini)

Advances in biotechnology are making routine use of DNA sequencing and microarray technology in biomedical research and clinical use a reality. Innovations in the field of Genomics are not only driving new investigations in the understanding of biology and disease but also fuelling rapid developments in computer science, statistics and engineering in order to support the massive information processing requirements. In this module, students will be introduced into the world of Statistical Genetics and Bioinformatics that have become in the last 10-15 years two of the dominant areas of research and application for modern Statistics.

In this module we will develop models and tools to understand complex and high-dimensional genetics datasets. This will include statistical and machine learning techniques for: multiple testing, penalised regression, clustering, p-value combination, dimension reduction. The module will cover both Frequentist and Bayesian statistical approaches. In addition to the statistical approaches, the students will be introduced to genome-wide association and expression studies data, next generation sequencing and other OMICS datasets.

Assessment: 60% written exam, 40% coursework

M5MS15 Big Data (Dr M Briers)

The emergence of Big Data as a recognised and sought-after technological capability is due to the following factors: the general recognition that data is omnipresent, an asset from which organisations can derive business value; the efficient interconnectivity of sensors, devices, networks, services and consumers, allowing data to be transported with relative ease; the emergence of middleware processing platforms, such as Hadoop, InfoSphere Streams, Accumulo, Storm, Spark, Elastic Search, ..., which in general terms, empowers the developer with an ability to efficiently create distributed fault-tolerant applications that execute statistical analytics at scale.

To promote the use of advanced statistical methods within a Big Data environment - an essential requirement if correct conclusions are to be reached - it is necessary for statisticians to utilise Big Data tools when supporting or performing statistical analysis in the modern world. The objective of this module is to train statistically minded practitioners in the use of common Big Data tools, with an emphasis on the use of advanced statistical methods for analysis. The module will focus on the application of statistical methods in the processing platforms Hadoop and Spark.

Assessment: 100% coursework

M5MS16 Advanced Simulation Methods (Dr N Kantas)

Modern problems in Statistics require sampling from complicated probability distributions defined on a variety of spaces and setups. In this module we will visit popular advanced sampling techniques, such as Importance Sampling, Markov Chain Monte Carlo, Sequential Monte Carlo. We will consider the underlying principles of each method as well as practical aspects related to implementation, computational cost and efficiency. By the end of the module the students will be familiar with these sampling methods and will have applied them to popular models, such as Hidden Markov Models, which appear ubiquitous in many scientific disciplines.

Assessment: 100% coursework
M5MF12 Algorithmic Trading and Machine Learning (Dr Di Graziano)

A limited number of students will be allowed on this module which is part of the MSc in Mathematical Finance. The Course Administrator will send you an e-mail in September about how you can express your interest in such a place. Allocation of places is at the joint discretion of the Course Director of the MSc in Statistics and the Course Director of the MSc in Mathematics and Finance.

The aim of the module is to present a series of cutting-edge topics in the area of “Algorithmic trading” in a unified and systematic fashion. For each of the problems presented, we try to emphasize both the mathematical theory as well as industry applications. The module consists of two main parts: 1) Optimal Execution Problems and 2) Machine Learning in Finance. Optimal execution techniques are particularly relevant for market makers and quantitative brokers whereas machine learning is often used by hedge fund and prop desks to generate trading signals. However, machine learning algorithms can be also applied as part of optimal execution tools, for example in order to choose order types or speed of execution. The basic optimal execution problem consists of an agent (e.g. a bank or a broker) who needs to buy or sell a pre-specified number of units of a given asset within a fixed time frame (e.g. an hour, a day, etc). Assuming that the purchase or sale of the asset will have an impact on its price, what is the execution policy which minimizes market impact? Having decided on the execution schedule, what type of order (market or limit order) is better to submit? The first problem can be formulated as a trade-off between the expected execution cost and the price risk due to exogenous factors. We shall solve the optimization problem for different types of

Price dynamics (ABM vs GBM, with drift or without drift);
Market impact type (temporary, transient, permanent);
Exogenous Risk functions (variance, VaR).

Machine learning techniques are becoming increasingly popular in the financial industry. They are typically used to help predict asset price patterns, volatility regimes, etc. The module starts by formalizing the concept of “learning” and providing an overview of various learning techniques. The subsequent lectures analyze in detail some of the most popular machine learning algorithms such as neutral networks and support vector machines. We then introduce various smoothing tools (kernel regression, wavelets, HHTs) which have historically been developed for signal processing applications but have found their way into finance over the last few years. Those methods can be used as stand alone or jointly with other learning algorithms, e.g. SVM. Finally, we shall analyze issues related to model selection and how to combine different models to improve the learning outcome. Trading applications using real market data will be presented during the module.

Assessment: 100% written exam in January

7.5 ECTS Modules

M5S8 Time Series (Dr E Cohen)

Time series analysis is an important area of statistics with applications in finance, engineering and many physical sciences plus areas such as neuroscience in medicine. This module covers introductory ideas in both the time domain and frequency domain areas of the subject. Topics:
Real examples, stationarity, autocovariance sequences, covariance matrices for segments, examples of discrete stationary processes, trend removal and seasonal adjustment, the general linear process, spectral representation, sampling and aliasing, linear filtering, estimation of mean and autocovariance, spectral estimation via the periodogram, tapering for bias reduction, autoregressive processes and estimation of their parameters, parametric and non-parametric bivariate time series, coherence, forecasting.

Assessment: 90% written exam, 10% coursework

**M5S14 Survival Models and Actuarial Applications (Prof A Gandy)**

Survival models are fundamental to actuarial work, as well as being a key concept in medical statistics. This module will introduce the ideas, placing particular emphasis on actuarial applications. Concepts of survival models, right and left censored and randomly censored data. Estimation procedures for lifetime distributions: empirical survival functions, Kaplan-Meier estimates, Cox model. Statistical models of transfers between multiple states, maximum likelihood estimators. Counting process models. Actuarial Applications: Life table data and expectation of life. Binomial model of mortality. The Poisson model. Estimation of transition intensities that depend on age. Graduation and testing crude and smoothed estimates for consistency.

For M4S14/M5S14: All of the above and additionally, masters level material to be self-studied (based on master level textbook/research monograph/paper).

Assessment: 90% written exam, 10% coursework

**M5S17 Quantitative Methods in Retail Finance (Dr A Bellotti)**

Profitability and behavioural models are introduced for credit risk, based on survival and Markov transition models. Profit and expected profit models are derived based on these formulations, allowing for risk-based pricing and optimization on profit.

State-of-the-art fraud detection methods are introduced such as artificial neural networks and anomaly detectors, along with the use of social network data. Assessment methods for fraud are also discussed.

Evaluation methods based on cross-validation and bootstrap are given, along with a critique of AUC, widely used in retail finance, and derivation of the H-measure.

Capital requirement calculations are given, based on the Basel Accord. In particular, the one-factor Merton model is derived. This leads to models for LGD estimation and panel model methods for estimating asset correlations.

Assessment: 75% written exam, 25% coursework
The Project

Allocation

You will receive a list of available projects in the Spring term. We aim to get this list to you very early in the Spring term. You are then encouraged to discuss the projects which interest you with the corresponding supervisors – special sessions will be set up for this purpose. By a certain date in the Spring term (which will be announced in due course), you will have to submit a ranked list of your top preferred projects. Students following one of the specialised streams are asked to select only projects suitable for their stream. Allocation (a version of the marriage algorithm) will then be determined as follows:

• If multiple students have selected a given project, the algorithm will choose one and offer the project to them (taking into account their performance in the core modules and the supervisor’s preference).
• If a student receives multiple offers, they automatically get assigned the top-ranked one.
• The two steps above are iterated.
• If a student receives no offers, they may be asked on short notice to add more projects to their list of preferred projects, and/or be put through a clearing round.

We aim to announce the allocation before the end of the Spring term.

Students with a strong desire to work on a specific topic or dataset may approach a potential supervisor during the Autumn term to suggest their own project idea.

Working on the project

The work on the project is done under the direction of a Supervisor, who need not be your Personal Tutor. In case of projects done with external partners, you will still have a supervisor from within the Mathematics Department, who has overall responsibility.

You should start with initial work on the project as soon as the topic is allocated. Aim to meet your supervisor before the Easter break. Particularly, try to resolve any issues with regards to access to data as soon as possible.

You should work essentially full-time on the project after the exams for the optional modules are finished. During the Summer term, immediately after the exams, the project should be defined and refined, so that the scope is clear by the end of the Summer term. Make use of this time period during which your supervisor will be generally available for meetings in person.

You can expect regular face-to-face interaction during terms, usually every two weeks. After the Summer term, you can only expect less frequent interactions (not necessarily face-to-face).

Continued documentation is good practice and it will help greatly when the final thesis is being prepared. Appropriate referencing is essential.

The purpose of the project is largely to train and test your ability to work independently. The supervisor will give general guidance on the work for the project and the writing of the thesis. You are strongly advised to pass a first draft of the thesis to the supervisor at least a month before the submission deadline. Advice on the suitability or otherwise of particular sections of the thesis cannot be expected.

At the end of the Summer term, you are expected to present a poster. The poster should clearly state and describe the underlying question and the scope of your project. This is an excellent opportunity to get feedback, both from members of staff as well as from your fellow students. This is a compulsory, but non-assessed part of the course.

There is no need to spend a lot of time dressing up the poster, and no need to overload the poster with material. It is mainly intended to encourage you to clarify (and to explain) the scope of the project. It may very well be that you cannot present any results of your own yet, but you may want to address what results you hope to achieve.
On a practical side: A template for posters will be available in Blackboard. The Department owns a poster printer which can be used for this. Precise details and timings will be circulated in due course.

**The Thesis**

You have to submit a thesis, a substantial written thesis normally not exceeding 12000 words. This is a guideline: the appropriate length is a function of the project itself and its subject matter. Excess length disproportionate to the content may be penalised.

The thesis should be on A4-sized paper and typed (ideally using LaTeX), and words or paragraphs must not be crossed out. They should be in a simple binding; a ring or springback binder is sufficient. It is important that students sign the declaration "The work contained in this thesis is my own work unless otherwise stated". Each thesis should include (i) a brief summary, (ii) an introduction (iii) the main body of the thesis, and (iv) a bibliography.

Two printed copies of the thesis must be submitted to the MSc Administrator before the deadline listed in the Key Dates section. An electronic copy of the thesis (one PDF document) must also be submitted via the Virtual Learning Environment. Late submission may be penalised and will normally delay consideration of the thesis to the following year.

The thesis is worth 90% of the project mark.

**Oral Presentation**

An integral part of the project will be an oral examination, consisting of a 20 minute presentation and 10 minute questioning on the project. The oral examination will be worth 10% of the total project mark.

The presentation will usually take place shortly after the submission deadline of the thesis, precise dates are listed in the Key Dates section.

The audience will consist of two faculty members.

You are strongly advised to prepare your oral presentation carefully, as it is an integral part of your training. Bear in mind that you only have 20 minutes, and that you should not assume or expect that the audience are experts in the area of your project. The purpose of the oral is not only to test your technical mastery of the material, but also to see how you can convey main ideas and results in your work to a general statistical public.

A few more suggestions:

1. Spend enough time at the beginning on setting the scene to make sure that the audience is on board. They have not been working on this for the last 4 months.
2. Be selective about what you present. You can always add a slide at the end ("other things I have been doing"). Having more slides than minutes is usually never a good idea (imagine sitting through a few high-speed talks in a row).
3. The presentation aims at a reasonably educated statistician - essentially your fellow students. You do not have to introduce very basic material.
4. Switch off your mobile phone during the presentation (including yours!) – Last year somebody's phone rang during their own talk....

**Guide to the Presentation of the Thesis**

The following are guidelines only and need to be taken with common sense and adapted for the needs of your particular presentation.

The recommended structure consists of an abstract, a Table of Contents (Chapter/Section numbers), an introduction, a middle section presenting the results and a conclusion and summary section followed by a bibliography. Sections should be numbered, as should pages, graphs/tables and equations. The
graphs and tables should appear at their natural location in the text. Any long program listings should be put in appendices at the end.

It is important that references to other research work consulted or results borrowed or shared should be properly documented and you should copy the style of reference of one of the research articles you consult, i.e. with referencing also included within the text as well as at the end. It is also a good idea to acknowledge the help that your supervisor has given you!

The abstract should be a brief statement of the aims and outcomes of the project, to summarise/advise even for a casual reader!

The introduction should attempt to set your work in the context of other work done in the field. It should demonstrate that you are aware of what you are doing, and how it relates to other work. It should show that you have referenced other work.

The main sections should guide the reader through your results, analysing them and explaining them. It should show both your successes and your failures in trying to solve your problem (your unsuccessful attempts should be discussed, especially if you have ideas or explanations as to why they failed). Graphs and simple diagrams (especially when they are neat) can sometimes be far more effective in presenting results than lots of numbers and/or lots of words.

The conclusion section should summarise what you have learned. If you would have done more, given more time, you should indicate where your effort would have gone. If your work has raised any unsettled questions, you should address them and indicate what further work needs doing.

Any programs in the appendices should be representative. A copy of every single version of every code is unnecessary. Programs should be documented with many comment lines and a discussion of the input necessary to drive them and the output resulting from them as appropriate. Large tables of results should be organised in reference form (as should large sets of graphs) with indices and tables of contents to guide the interested reader through them. Appendices do not count towards the word limit.

The title page is your own design however it should include your name, CID, project title, supervisor’s name. You may want to include the wording: “Submitted in partial fulfilment of the requirements for the MSc in Statistics of Imperial College London”. You should not be using the Imperial crest, but you can use the Imperial logo:

http://www.imperial.ac.uk/brand-style-guide/visual-identity/the-college-crest/

http://www.imperial.ac.uk/brand-style-guide/visual-identity/the-imperial-logo/

The second page must contain a signed and dated plagiarism statement, “The work contained in this thesis is my own work unless otherwise stated”. It is sufficient if you sign the hard copies.

While the exact form of binding is unimportant, it should be neat and robust so that your work may be read many times by several people. You should use generous margins and least an 11pt font.

Before submitting the thesis, make sure you read the thesis in its entirety. There should be no half-finished sentences. Also, use a spell-checker.

Make sure that you have a proper introduction, that (1) describes the topic of your thesis (aiming at a reasonably educated statistician), (2) gives an overview of the thesis and, very crucially, (3) clearly points out what your main contribution is (what bits are your own doing / what is the best part).

When you present background material, make sure you reference the sources you have used. Try not to rely on Wikipedia - you are expected to go to the underlying textbooks/scholarly articles.

Include an acknowledgement.

Figures: The best place is at the top or at the bottom of a page. If this is not possible they should go on a separate page. In LaTeX this can be achieved by

\begin{figure} [tbp]
...

When generating plots from R it is usually best to export them as pdf or eps for inclusion in LaTeX. To get Greek letters, sub and superscripts into labels use eg `xlab=expression(alpha^5)`.

List of references: Using author (year) style notation is good practice (the reader may know the paper, but she will definitely not know the number in your reference list). To achieve this in LaTeX you can use BibTeX together with the package natbib. If citing several references together, use `.citep{ref1,ref2,ref3}`. Use a coherent style - either all authors get their first full names or none gets their full names. Books need the name of the publisher, journal articles need the name of the journal. When using BibTeX for generating references, make sure that appropriate capitalisation is used, eg it should be Monte Carlo and not monte carlo. To achieve this in BibTeX, use `{M}onte `{C}arlo`.

Maths: In formulas use, for example, `\exp` and not `exp`, or `\sin` and not `sin`.

Submission

Two hard copies of the thesis must be submitted; a single copy will NOT be accepted. One of the copies will be returned to you.

You also have to submit an electronic copy of the thesis (in PDF format) through the online learning system (bb.imperial.ac.uk .. M5MS00 .. Project). Please name this file in the following format: “Surname Firstname Thesis.pdf”. Note that this electronic copy may be checked for plagiarism via online plagiarism detection services (e.g. Turnitin).

The thesis submission deadline is a very hard deadline since the assessment process has then to be completed on a very short timescale.

Computing

The Mathematics Department has several research computing resources - discuss with your supervisor if you need to use those.


Marking Guidelines

See separate document, available on Blackboard.

Further Elements of the Course

Introduction to R and LaTeX

There will be an introduction to R & LaTeX in the first week of the Autumn term. The goal is to enable you to use these tools with confidence and to produce reports as well as presentations.

Talks “Statistics in Practice”

These are talks given by statisticians from various industries (e.g. pharmaceutical, consulting, official statistics, academia) about their career in particular and about typical problems in their industry. This will show students the various career paths that are open to them.
Most of these talks will take place in the Summer term (most likely combined with the poster presentation).

Attendance is expected, even though there will not be an examination on this.

**The Statistics Research Seminar**

The Statistics Section organizes regular research seminars. Seminars are advertised by e-mail and at imperial.ac.uk/statistics/seminars.

Attendance is strongly encouraged. Speakers are specifically instructed to “start gently”, to allow MSc students to follow at least parts of the talks.

**Professional Skills Development**

Working as a practical statistician will involve several skills, a lot of these will be trained during the year.

Some of your lecturers may allow some of the coursework to be done in groups, which usually will be randomly assigned. This is supposed to train your teamwork abilities.

You will train your problem-solving skills throughout the course. In particular, it is very important that you work through the problem sheets that you will be given. Furthermore, the project will enable you to work thoroughly on a major problem.

Presentation skills are very important for your future career. You will have the opportunity to train these in the presentation of your project. Furthermore, some lecturers may require you to present your coursework.
**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 Master’s level study. More than just a study guide, it is packed with advice created especially for Imperial Master’s 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

General

The MSc in Statistics programme specification can be found on the course website, along with the competency standards for all taught mathematics masters programmes imperial.ac.uk/mathematics/postgraduate/current-students/msc

The entire MSc course will be worth 90 ECTS. It consists of two elements. The first element consists of the taught modules and is worth 60 ECTS. The second, the project, is assigned 30 ECTS.

The individual modules taken by the students will be assessed through coursework or individual exams.

M5MS coded modules

The core modules M5MS03 Applied Statistics and M5MS04 Computational Statistics will be examined through three single-day courseworks only. Some of the optional modules in the Spring term will also be examined through coursework, while others will be examined both through coursework and written exams. Written exams will either take in the first week of the Spring term or in the Summer term. 30 hour modules will normally be examined by a 2 hour exam, 20 hour modules by a 1.5 hour exam.

Imperial College has the “College Scale” on which all marks across the college are standardised and student’s final marks are awarded, i.e. the marks on the student’s final transcript will be College Scale marks. The College Scale boundaries are as follows:

<table>
<thead>
<tr>
<th>Pass with Distinction</th>
<th>[70,100]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pass with Merit</td>
<td>(60,70)</td>
</tr>
<tr>
<td>Pass</td>
<td>(50,60)</td>
</tr>
<tr>
<td>Fail</td>
<td>(0,50)</td>
</tr>
</tbody>
</table>

We feel that the college scale is too restrictive in its discriminatory power between degree classifications and therefore use a mapping that will be used to convert the student’s raw marks to College Scale marks. Assessments are set by the modules lecturers with this mapping in mind.

For an individual module, raw marks for all coursework and exam elements are appropriately weighted and combined to give a raw mark out of 100 for the module. A piecewise linear mapping is then applied on this raw mark with the following default fixed points:

<table>
<thead>
<tr>
<th>Raw Mark</th>
<th>College Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>80</td>
<td>70</td>
</tr>
<tr>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>40</td>
<td>50</td>
</tr>
<tr>
<td>30</td>
<td>40</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
Lecturers still have the academic freedom and judgement to adjust the raw mark mapping points as they see fit. As such, this is not fixed but acts as a guide so students can gauge approximately what is required on their assessment to get a particular College Scale mark.

**M5S coded modules**

For modules run by the undergraduate teaching system (M5S8, M5S14, M5S17, M5A44), then marks are calibrated and moderated together with the undergraduate students.

When sitting exams for these modules there will be a 5th "mastery" question that MSc and the M4 (4th year) undergraduate students are required to take on top of the other four questions. This will be harder than the other 4 questions. Students will be given an extra half an hour for this question (M3 students have 2hrs for the whole exam, MSc and M4 students have 2.5hrs for the exam) and it has the same mark weighting as questions 1-4.

The marks for the entire group of students (undergraduate and postgraduate) sitting the module are collated and then scaled and converted to the College Scale as a whole (details can be found undergraduate handbook). A postgraduate student is required by College to obtain 50% (college scale) to pass the course.

**Project**

The second course element, the project, will be examined as follows. Students have to submit a thesis, a substantial written report normally not exceeding 12000 words. The thesis must be submitted by the deadline specified above. The thesis is worth 90% of the project mark. An integral part of the project will be an oral examination, consisting of a 20 minute presentation and 10 minute questioning on the project. The oral examination will be worth 10% of the total project mark.

**Degree Classifications**

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

In line with usual practice, the MSc in Statistics has an external examiner, meaning an examiner external to the university whose main role it is to uphold standards and to ensure that the assessment process is fair and rigorous. More details of the role of the external examiner are available from the website of the registry. Our current external examiner is Professor Jim Griffin from the University of Kent.

**Pass**

A student must:

- Achieve an aggregate mark of at least 50% in each module.
- A student may be compensated in modules up to the value of 15 ECTS with a qualifying mark of at least 40%;
- Achieve a mark of at least 50% in the 'Statistics Research Project';
- Achieve an aggregate mark of at least 50% for the programme.

**Merit**

A student must:

- Achieve an aggregate mark of at least 50% in each module. A student may be compensated in modules up to the value of 7.5 ECTS with a qualifying mark of at least 40%.
- Achieve an aggregate mark of at least 57.5% in either all taught modules, or the Statistics Research Project;
• Achieve an aggregate mark of at least 60% in the remaining component (either all taught modules or the Statistics Research Project).
• Achieve an aggregate mark of at least 60% for the programme.

**Distinction**

A student must:

• Achieve an aggregate mark of at least 50% in each module. A student may be compensated in modules up to the value of 7.5 ECTS with a qualifying mark of at least 40%
• Achieve an aggregate mark of at least 67.5% in either all taught modules, or the Statistics Research Project;
• Achieve an aggregate mark of at least 70% in the remaining component (either all taught modules or the Statistics Research Project);
• Achieve an aggregate mark of at least 70% for the programme.

**Release of Results**

The exam board, which will take place after the course has finished, will have final authority to decide your results. This board will, among other things, consider borderline cases and take mitigating circumstances into account. You will receive your final results from registry (in October/November after your course has finished).

During the year, you will receive indications of your performance in the various courses you have taken - these are provisional and subject to confirmation by the exam board. Specifically, in Blackboard, under the "course" M5MS00, you will find rough indications of your results on the College Scale (under "My Grades"). The following code will be used:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
<th>Mark Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+</td>
<td>high distinction</td>
<td>[80,100]</td>
</tr>
<tr>
<td>A</td>
<td>distinction range</td>
<td>(70,80)</td>
</tr>
<tr>
<td>B+</td>
<td>in the merit range</td>
<td>(65,70)</td>
</tr>
<tr>
<td>B-</td>
<td>in the merit range</td>
<td>(60,65)</td>
</tr>
<tr>
<td>C+</td>
<td>in the pass range</td>
<td>(55,60)</td>
</tr>
<tr>
<td>C-</td>
<td>in the pass range</td>
<td>(50,55)</td>
</tr>
<tr>
<td>D</td>
<td>in the fail range</td>
<td>(40,50)</td>
</tr>
<tr>
<td>F</td>
<td>Bad fail (&lt;40)</td>
<td></td>
</tr>
</tbody>
</table>

**Past exam papers**

Past examination papers will be made available for exam-based modules (precise location will be announced but are usually posted on the Blackboard module page by the module lecturer).

For modules which are shared with BSc/MSci students (M5S8, M5S14) past exam papers are available at [https://bb.imperial.ac.uk/webapps/blackboard/content/listContentEditable.jsp?content_id=1037069_1&course_id=7508_1&mode=reset](https://bb.imperial.ac.uk/webapps/blackboard/content/listContentEditable.jsp?content_id=1037069_1&course_id=7508_1&mode=reset)
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.

Instructions for exam candidates can be found here:


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 authorised 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.
4. Board of Examiners

Board of Examiners

Lecturers from the Statistics Section

External Examiners

Prof Jim Griffin, University of Kent

It is common for Master’s level students to have some form of academic or social interaction with their external examiners at some point during or after their studies as well as during the assessment process itself.

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. 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
London - SW7 2AZ
This is based on the South Kensington Campus

Facilities

Level 2
MSc Student computer room - 215

Level 4
Mathematics Learning Centre – 416 contains 64 computers, two study desks fitted out with audio-visual facilities for project presentations, two printers and a range of additional study areas.

Level 6
MSc Administrator Office – 652 open Monday-Friday 9:00-17:00
The printing room is located opposite the lifts

Lockers
There is a (limited) number of lockers in Level 1 of the Huxley building

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
**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 supervisor or Personal/Senior Personal Postgraduate 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.

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.

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**6. 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 Statement can be found at:


Your Departmental safety contact is:

- Andy Pope
  - 131 Huxley
  - 020 7594 8544
  - a.pope@imperial.ac.uk
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

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

7. 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:


Students will obtain feedback via:

- Marked coursework
- Meetings with research project supervisors
- Meetings with personal tutor
- Meetings with course director

Feedback from students via:

- Departmental Postgraduate Staff-Student Committee (meets three times a year)
- Individual Course Survey (PGSole)
- Research project supervisors meeting their students
- Personal tutors meeting their students
- Meetings between course director and students, particularly their elected representative
- The Postgraduate Tutor being approached by students

It is very important that you provide us with your feedback (I am sure you are aware of the bias that can be caused by missing data):

- If something is great we definitively want to know.
- If something does not work well - we can only fix it if we know about it.

An annual course review will take place taking into account the student feedback.

**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:


**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:

[https://www.imperial.ac.uk/media/imperial-college/administration-and-support-services/registry/academic-governance/public/academic-policy/marking-and-moderation/Late-submission-Policy.pdf](https://www.imperial.ac.uk/media/imperial-college/administration-and-support-services/registry/academic-governance/public/academic-policy/marking-and-moderation/Late-submission-Policy.pdf)
Academic Misconduct Policy and Procedures
It is important that you learn how to properly attribute and acknowledge the work, data and ideas of others. Plagiarism is scientific misconduct, and students whose assessments can be shown to contain plagiarism are subject to penalties as outlined in the College’s Misconduct Policy and Procedures.

www.imperial.ac.uk/about/governance/academic-governance/academic-policy/complaints-appeals-and-discipline

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

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/

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/

Use of IT Facilities
View the Conditions of Use of IT Facilities:

http://www.imperial.ac.uk/admin-services/ict/self-service/computers-printing/staff-computers/conditions-of-use-for-it-facilities/
8. 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

Departmental support and College tutors
Your 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 Postgraduate Tutor
The Department’s Personal Postgraduate Tutor can offer pastoral support and advice. You can arrange to have a meeting with them at any time during your studies – what you discuss will be completely confidential.

If necessary they will direct you to an appropriate source of support.

Mathematics Department PG Welfare Officer
Dr Tony Bellotti
522 Huxley
pgr.welfare@imperial.ac.uk

Advice services
The tutor system is complemented by a College-wide network of advice and support. This includes a number of specialist 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

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 support and tuition fees

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.

http://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

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 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
Health 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

Disability Support

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.
Mathematics Department Disability Officer
Dr Tony Bellotti
522 Huxley
pgr.welfare@imperial.ac.uk
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:


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

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. There is a student-run Islamic prayer room on campus and separate areas available for male and female Muslims.

- www.imperial.ac.uk/chaplaincy
**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.

![www.imperial.ac.uk/academic-english](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](www.imperial.ac.uk/study/international-students)
9. 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
10. **Work-life Balance**

The pace and intensity of postgraduate 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)

**Graduate Students’ Union**

The Graduate Students’ Union is the postgraduate arm of Imperial College Union. The GSU works alongside the Imperial College Union President to ensure that the requirements of postgraduate students are catered for. It also organises a number of academic and social events during the year.

**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)
11. 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.

Examples of where student feedback has made a positive impact on the MSc in Statistics include: managing coursework lengths and deadlines to minimise stress placed on students, holding more social events, streamlining administrative processes, creating greater transparency in the assessment process.

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

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
12. 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:

- PG SOLE lecturer/module Survey or departmental equivalent
- Student Experience Survey (SES)

The PG SOLE lecturer/module survey runs at the end of the Autumn and Spring terms. This survey is your chance to tell us about the modules you have attended and the lecturers who taught them.

For PG 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 make personal, discriminatory or abusive remarks as these may cause offence and may be removed from the results. Whilst 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 Postgraduate Taught Experience Survey (PTES) is the only national survey of Master’s level (MSc, MRes, MBA and MPH) students we take part in. This is the only way for us to compare how we are doing against the national average and to make changes that will improve our Master’s students’ experience in future. PTES covers topics such as motivations for taking the programme, depth of learning, organisation, dissertation and professional development. PTES last ran in Spring term 2018 and will next run in Spring 2020.

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.

As a result of feedback to previous surveys, we have, for example, changed lecturing delivery style and speed, made better use of the Panopto system, modified module curricula, improved assessments

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](http://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/pg-student-surveys](http://www.imperial.ac.uk/students/academic-support/student-surveys/pg-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)
13. 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