

Programme Information		
Programme Title	Programme Code	HECoS Code
MSc in Statistics MSc in Statistics (Biostatistics) MSc in Statistics (Data Science) MSc in Statistics (Theory and Methods) MSc in Statistics (Statistical Finance) MSc in Statistics (Applied Statistics)	G3U1 G3U1B G3U1D G3U1T G3U1S G3U1A	For Registry Use Only

Award	Length of Study	Mode of Study	Entry Point(s)	Total Credits	
				ECTS	CATS
MSc	1 Calendar Year (12 months)	Full Time	Annually in October	90-92.5	180-185
PG Diploma	1 Calendar Year (12 months)	Full Time	N/A	60	120

The Postgraduate Diploma is an exit award that may be offered at the discretion of the Board of Examiners and is not available for entry. All students must apply to and join the MSc.

Ownership			
Awarding Institution	Imperial College London	Faculty	Faculty of Natural Sciences
Teaching Institution	Imperial College London	Department	Mathematics
Associateship	N/A	Main Location(s) of Study	South Kensington Campus

External Reference	
Relevant QAA Benchmark Statement(s) and/or other external reference points	Master's Award in Mathematics, Statistics and Operational Research
FHEQ Level	Level 7
EHEA Level	2nd Cycle

External Accreditor(s) (if applicable)			
External Accreditor 1:	Royal Statistical Society		
Accreditation received:	2019	Accreditation renewal:	2021

Collaborative Provision			
Collaborative partner	Collaboration type	Agreement effective date	Agreement expiry date
N/A	N/A	N/A	N/A

Specification Details	
Programme Lead	Dr Oliver Ratmann
Student cohorts covered by specification	2022-23 entry
Date of introduction of programme	October 21
Date of programme specification/revision	October 22

Programme Overview

Statistical reasoning, tools, and methods are used in almost all employment sectors, including banking and finance, government, medical and scientific research, the pharmaceutical industry, and the digital economy.

This one-year full-time programme provides outstanding training both in theoretical and applied statistics. A common set of core modules in the first term ensure 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 elective modules in the second term, coupled with programme streams in Biostatistics, Data Science, Statistical Finance, Applied Statistics, and Statistical Theory and Methods allow sufficient flexibility for students to develop their own specialist interests.

The project element of the programme runs full time from May to September and provides the student the opportunity to work with a member of academic staff on a state-of-the-art research problem that suits their interests and is suitable for their chosen stream.

In addition to obtaining advanced knowledge across a range of subjects within the field of statistical and mathematical science, the course will equip students with a range of transferable skills, including programming, problem-solving, critical thinking, scientific writing, project work and presentation, to enable them to take on prominent roles in a wide array of employment and research sectors.

Learning Outcomes

Upon successful completion of the programme, students should be able to:

1. Explain the fundamentals of Statistics as a living and unique discipline in its own right;
2. Evaluate, derive, compare, and justify statistical methods using the foundational mathematical framework of the discipline;
3. Apply and interpret statistical analyses using state-of-the-art computational techniques;
4. Clean and prepare data for analysis;
5. Program, perform data analysis, and solve problems using a state-of-the-art computing environment for statistical analysis;
6. Explain and deploy statistical reasoning for problem solving;
7. Assess the importance of the assumptions of a statistical method and the consequences of their violation;
8. Solve both open-ended problems and problems with well-defined solutions by formulating them in precise terms, identifying key issues, and trying different approaches in order to make progress;
9. Communicate effectively by listening carefully and presenting complex information in a clear and concise manner orally, on paper, and using IT;
10. Carry out extended statistical work both as an individual and a member of a group.

In addition, on completion of the MSc in Statistics programme you will be able to:

1. Extend program outcomes 2 and 3 in greater depth, in an area or set of areas of interest to the student, leading to current developments at the frontiers of the subject;
2. Carry out an independent investigation within the field of statistics using textbooks, scholarly articles, and other available literature, searching databases and interacting with colleagues and staff to extract important information.

In addition, on completion of the MSc in Statistics (Applied Statistics) programme you will be able to:

1. Develop a familiarity with a wide range of applied statistical techniques and their application in a variety of scientific, governmental, industrial, and/or commercial settings;
2. Extend program outcomes 2 and 3 in greater depth, as they pertain to applied statistical methods, leading to current developments at the frontiers of the subject;

3. Carry out an independent investigation within the area of applied statistics using textbooks, scholarly articles, and other available literature, searching databases and interacting with colleagues and staff to extract important information.

In addition, on completion of the MSc in Statistics (Biostatistics) programme you will be able to:

1. Develop and apply statistical theory and methods in a wide range of situations relevant to research and real problems arising in biology and medicine;
2. Extend program outcomes 2 and 3 in greater depth, as they pertain to statistical methods in biostatistics, leading to current developments at the frontiers of the subject;
3. Carry out an independent investigation within the area of biostatistics using textbooks, scholarly articles, and other available literature, searching databases and interacting with colleagues and staff to extract important information.

In addition, on completion of the MSc in Statistics (Statistical Finance) programme you will be able to:

1. Develop and apply statistical theory and methods in a wide range of situations relevant to research and real problems arising in commerce and finance;
2. Extend program outcomes 2 and 3 in greater depth, as they pertain to statistical methods in financial statistics, leading to current developments at the frontiers of the subject;
3. Carry out an independent investigation within the area of financial statistics using textbooks, scholarly articles, and other available literature, searching databases and interacting with colleagues and staff to extract important information.

In addition, on completion of the MSc in Statistics (Theory and Methods) programme you will be able to:

1. Develop a familiarity with a wide range of statistical methods and their underlying theory;
2. Extend program outcomes 2 and 3 in greater depth, as they pertain to statistical theory and methods, leading to current developments at the frontiers of the subject;
3. Carry out an independent investigation within the area of statistical theory and methods using textbooks, scholarly articles, and other available literature, searching databases and interacting with colleagues and staff to extract important information.

In addition, on completion of the MSc in Statistics (Data Science) programme you will be able to:

1. Develop a familiarity with a wide range of data science techniques and their application in a variety of scientific, governmental, industrial, and/or commercial settings;
2. Extend program outcomes 2 and 3 in greater depth, as they pertain to statistical methods in data science, leading to current developments at the frontiers of the subject;
3. Carry out an independent investigation within the area of data science using textbooks, scholarly articles, and other available literature, searching databases and interacting with colleagues and staff to extract important information.

Students exiting with the PG Diploma in Statistics will have accomplished at least learning outcomes 1. - 8.

The Imperial Graduate Attributes are a set of core competencies which we expect students to achieve through completion of any Imperial College degree programme. The Graduate Attributes are available at: www.imperial.ac.uk/students/academic-support/graduate-attributes

Entry Requirements

Academic Requirement	The minimum requirement is normally a 2:1 UK Bachelor's Degree with Honours in statistics, mathematics or a comparable qualification that is recognised by the College in a related subject, such as engineering, physics or computer science.
Non-academic Requirements	N/A
English Language Requirement	Higher requirement (PG) Please check for other Accepted English Qualifications
Admissions Test/Interview	N/A

The programme's competency standards documents can be found at: <https://www.imperial.ac.uk/media/imperial-college/study/public/pg/Maths-MSc-Competence-Standards.pdf>

Learning & Teaching Approach

Learning and Teaching Delivery Methods

The Global MSc programme will be delivered as a fully online option. The College's supported Virtual Learning Environment, Blackboard (or equivalent), will be used to deliver the programme. The programme will be structured by modules, which are the same as the in-house MSc in Statistics modules.

Teaching and learning on the programme will be delivered by members of the Statistics Section (Department of Mathematics) through a range of methods including lectures (in the form of asynchronous videos), tutorial sessions (that include problem classes, Q&A sessions and group tutorials), and practical computational sessions. The tutorial sessions will be recorded giving you the flexibility to follow them at your own time. In addition, an online discussion forum that encourages peer learning, and an office hour with the lecturer for addressing additional individual questions will support each module.

During the summer term and months that you work on your Statistics research project you will be meeting regularly with your project supervisor(s). You are encouraged to attend the Statistics research seminars throughout the academic year.

These features will allow you to participate in a seamless, flexible, and engaging learning experience and ensure the highest quality online learning environment.

Overall Workload

At Imperial, each [ECTS credit](#) taken equates to an expected total study time of 25 hours. Therefore, the expected total study time is 2250 hours per year, this being composed of roughly 1500 hours associated with modules and 750 hours with the research project. Your overall workload consists of face-to-face sessions and independent learning.

Each one of the four core modules of the MSc delivered in the Autumn term is worth 7.5 ECTS (187.5 hours of study) and each one of the elective modules is worth 5 ECTS (125 hours of study). In the Autumn term, you will spend in the order of 8% of your time in problem classes (around 60 hours of 750 hours in total) and in the order of 92% of your time on independent study that includes following the videos of the modules' lectures (around 45 hours of 750 hours in total).

In the Spring term, you need to choose modules for a total of 30-32.5 ECTS. You will have around 50 hours of tutorial sessions and practical computational sessions (depending on your module choices) for these modules across the term. For each module there will be on average 10 hours of video content to follow, and on average 10 hours of problem classes to follow. Similarly, to the Autumn term, the remaining time will be spent on independent study.

Assessment Strategy

Assessment Methods

The format of assessments will vary according to the aims, content and learning outcomes of each module.

The assessment methods that the modules will use include:

- Written open-book examinations. The open-book material allowed during the examinations consists of any material provided by the lecturers and annotated by the students, i.e. annotated lecture notes, annotated slides, and annotated problem class sheets. Books and electronic devices are not allowed.
- Group assessments
- Enhanced coursework assessments
- Tests, including online quizzes and in-class tests
- Oral examinations

All these assessments are designed to support the students in meeting the learning outcomes of each module and of the overall degree. In addition, formative assessments including mock courseworks, tests, quizzes, and multiple-choice questions will be used by the lecturers for supporting the student's learning.

The research project component of the MSc will be assessed via a written thesis worth 90% and an oral presentation worth 10%. Further, you will prepare a poster presentation of your project work at the end of the Summer term where you will receive individual feedback from academics of the Statistics Section.

Academic Feedback Policy

Module Feedback:

Both formative and assessed courseworks of modules will be marked and returned to the students promptly. General feedback for each coursework will be given during the tutorials by the lecturers. Students are given access to lecturers both informally and through a formal office hours system. This gives them a ready opportunity to discuss any difficulties they encounter with the module lecturer.

Lecturers will also use formative tests to track student learning, for example through online quizzes and questions on Blackboard and Mentimeter. Such tests allow prompt feedback and are also an opportunity for both lecturers and students to identify areas that need more attention.

Research Project Feedback:

During the Summer term and months while the students work on their research projects, they meet regularly with their project supervisors. These meetings allow for feedback on the project work and discussion of future directions. The project supervisor also provides feedback to a draft of the written thesis. In addition, each student receives feedback on their research work (and project) from other academics of the Statistics Section during the poster presentations. Each thesis and oral presentation of the research projects receives written feedback by the examiners at the end of the degree.

Degree Feedback:

Students meet regularly with their personal tutors during the year. These meetings allow for feedback on individual progress toward the degree, for advice on the choice of modules and project to complement their future career plans.

Meetings of the entire MSc student cohort with the Programme Director are held in December and March with the aim of giving students an open forum for discussing general questions and concerns about the programme requirements, expectations, workload, assessment, and feedback. Provisional marks (subject to change by the Board of Examiners) in letter form for the Autumn term modules are released in February and for the Spring term modules are released in July.

The College's Policy on Academic Feedback and guidance on issuing provisional marks to students is available at:

www.imperial.ac.uk/about/governance/academic-governance/academic-policy/exams-and-assessment/

Re-sit Policy

The College's Policy on Re-sits is available at: www.imperial.ac.uk/student-records-and-data/for-current-students/undergraduate-and-taught-postgraduate/exams-assessments-and-regulations/

Mitigating Circumstances Policy

The College's Policy on Mitigating Circumstances is available at: www.imperial.ac.uk/student-records-and-data/for-current-students/undergraduate-and-taught-postgraduate/exams-assessments-and-regulations/

Additional Programme Costs
No additional costs are anticipated.

Important notice: The Programme Specifications are the result of a large curriculum and pedagogy reform implemented by the Department and supported by the Learning and Teaching Strategy of Imperial College London. The modules, structure and assessments presented in this Programme Specification are correct at time of publication but might change as a result of student and staff feedback and the introduction of new or innovative approaches to teaching and learning. You will be consulted and notified in a timely manner of any changes to this document.

Programme Structure ¹					
Year 1 – FHEQ Level 7 Students study all core modules independent of specialisation stream.					
Code	Module Title	Core/ Compulsory/ Elective	Group	Term	Credits
MATH70082	Probability for Statistics	Core		Autumn	7.5
MATH70078	Fundamentals of Statistical Inference	Core		Autumn	7.5
MATH70071	Applied Statistics	Core		Autumn	7.5
MATH70093	Computational Statistics	Core		Autumn	7.5
MATH70088	Statistics Research Project	Core		Summer	30
<p>MSc in Statistics (General Stream): Students choose 6 Elective modules for a total of 30-32.5 ECTS.</p> <p>MSc in Statistics (Specialisation Streams): Students need to follow the rules of their specialisation stream, complete the core modules of their stream and complete in total 30-32.5 ECTS worth of elective modules.</p>					
<p>MSc in Statistics (Data Science) Students study three four modules from the Data Science modules group below and students must choose any other elective modules from the elective modules to ensure they take a total of 30-30.25 ECTS worth of elective modules:</p>					
Code	Module Title	Core/ Compulsory/ Elective	Group	Term	Credits
MATH70091	Machine Learning	Core		Spring	5
MATH70072	Big Data	Core		Spring	5
MATH70076	Data Science	Core		Spring	5
<p>MSc in Statistics (Theory and Methods) Students choose at least two modules from the Theory and Methods modules group below and students must choose any other elective modules from the elective modules to ensure they take a total of 30-32.5 ECTS worth of elective modules:</p>					
Code	Module Title	Core/ Compulsory/ Elective	Group	Term	Credits
MATH70081	Nonparametric Statistics	Elective		Spring	5
MATH70090	Bayesian Methods	Elective		Spring	5
MATH70092	Multivariate Analysis	Elective		Spring	5

¹ **Core** modules are those which serve a fundamental role within the curriculum, and for which achievement of the credits for that module is essential for the achievement of the target award. Core modules must therefore be taken and passed in order to achieve that named award. **Compulsory** modules are those which are designated as necessary to be taken as part of the programme syllabus. Compulsory modules can be compensated. **Elective** modules are those which are in the same subject area as the field of study and are offered to students in order to offer an element of choice in the curriculum and from which students are able to select. Elective modules can be compensated.

MATH70013	Advanced Simulation Methods	Elective		Spring	5
MSc in Statistics (Biostatistics)					
Students study all two modules from the Biostatistics modules group below and students must choose any other elective modules from the elective modules to ensure they take a total of 30-30.25 ECTS worth of elective modules:					
Code	Module Title	Core/ Compulsory/ Elective	Group	Term	Credits
MATH70073	Biomedical Statistics	Core		Spring	5
MATH70083	Statistical Genetics and Bioinformatics	Core		Spring	5
MSc in Statistics (Statistical Finance)					
Students study all three modules from the Statistical Finance modules group below and students must choose any other elective modules from the elective modules to ensure they take a total of 30-30.25 ECTS worth of elective modules:					
Code	Module Title	Core/ Compulsory/ Elective	Group	Term	Credits
MATH70079	Introduction to Statistical Finance	Core		Spring	5
MATH70070	Advanced Statistical Finance	Core		Spring	5
MATH70089	Stochastic Processes	Core		Spring	5
MSc in Statistics (Applied Statistics)					
Students choose at least four modules from the Applied Statistics modules group below and students must choose any other elective modules from the elective module groups to ensure they take a total of 30-32.5 ECTS worth of elective modules:					
Code	Module Title	Core/ Compulsory/ Elective	Group	Term	Credits
MATH70091	Machine Learning	Elective		Spring	5
MATH70076	Data Science	Elective		Spring	5
MATH70090	Bayesian Methods	Elective		Spring	5
MATH70013	Advanced Simulation Methods	Elective		Spring	5
MATH70073	Biomedical Statistics	Elective		Spring	5
MATH70079	Introduction to Statistical Finance	Elective		Spring	5
Other elective modules:					
Code	Module Title	Core/ Compulsory/ Elective	Group	Term	Credits
MATH70046	Time Series Analysis	Elective		Autumn	7.5
MATH70048	Survival Models	Elective		Spring	7.5
MATH70131	Consumer Credit Risk Modelling	Elective		Spring	7.5

MATH70101	Deep Learning	Elective		Spring	7.5
Credit Total					90-92.5

Progression and Classification															
<p>Degree classification is based on assessment results from each of the modules and project mark (each of these assessment results is on the 0-100 scale). These results are then combined following the programme weightings below to produce the overall weighted average which is used for the purpose of degree classification.</p> <p>Programme Weightings:</p> <table border="1"> <thead> <tr> <th>Module</th> <th>% Weighting</th> </tr> </thead> <tbody> <tr> <td>Probability for Statistics</td> <td>8.33%</td> </tr> <tr> <td>Fundamentals of Statistical Inference</td> <td>8.33%</td> </tr> <tr> <td>Applied Statistics</td> <td>8.33%</td> </tr> <tr> <td>Computational Statistics</td> <td>8.33%</td> </tr> <tr> <td>Elective modules to the value of 30-32.5 ECTS. Each module weighted in proportion to its ECTS.</td> <td>33.33%</td> </tr> <tr> <td>Statistics Research Project</td> <td>33.33%</td> </tr> </tbody> </table>		Module	% Weighting	Probability for Statistics	8.33%	Fundamentals of Statistical Inference	8.33%	Applied Statistics	8.33%	Computational Statistics	8.33%	Elective modules to the value of 30-32.5 ECTS. Each module weighted in proportion to its ECTS.	33.33%	Statistics Research Project	33.33%
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<p>Award and Classification for Postgraduate Students</p> <p>Award of a MSc Degree</p> <p>To qualify for the award of the MSc in Statistics a student must have:</p> <ol style="list-style-type: none"> 1. accumulated credit to the value of no fewer than 90 credits at level 7 or above of which no more than 15 credits may be from credit level 6; 2. and no more than 15 credits as a Compensated Pass; <p>For the specialisation streams a student must have met the specific requirements of their chosen specialisation as outlined above.</p> <p>Classification of Postgraduate Taught Awards</p> <p>The College sets the class of Degree that may be awarded as follows:</p> <p>Distinction:</p> <ol style="list-style-type: none"> a. The student has achieved an overall weighted average of 70.00% or above across the programme. b. The student must normally achieve a distinction (70.00%) mark in the Statistics research project. <p>Merit:</p> <ol style="list-style-type: none"> a. The student has achieved an overall weighted average of above 60.00% but less than 70.00% b. The student must normally achieve a merit (60%) mark in the Statistics research project. <p>Pass:</p> <ol style="list-style-type: none"> c. The student has achieved an overall weighted average of 50.00% but less than 60.00%. <p>Exit Degree:</p> <p>Award of a Postgraduate Diploma (PG Dip)</p> <p>To qualify for the award of the PG in Statistics a student must have passed:</p> <ol style="list-style-type: none"> 1. Accumulated credit from modules to the value of no fewer than 60 credits at Level 7 (this may include a maximum of 15 credits from Level 6 where this is approved as part of the award); 2. and no more than 10 credits as a Compensated Pass; <p>Overall weighted averages 0.5% from the degree borderlines will be automatically rounded up in accordance with item 13.19 in the 2020-2021 regulations. The board of examiners will consider other borderline cases, as they are defined in items 13.20–13.22 of the Regulations for Taught Programmes of Study 2020-2021.</p>															
Programme Specific Regulations															
N/A															

Supporting Information

The Programme Handbook is available at:

<https://www.imperial.ac.uk/mathematics/postgraduate/msc/statistics/current/>

The Module Handbook is available at:

<https://www.imperial.ac.uk/mathematics/postgraduate/msc/statistics/prospective/>

The College's entry requirements for postgraduate programmes can be found at:

www.imperial.ac.uk/study/pg/apply/requirements

The College's Quality & Enhancement Framework is available at:

www.imperial.ac.uk/registry/proceduresandregulations/qualityassurance

The College's Academic and Examination Regulations can be found at:

www.imperial.ac.uk/about/governance/academic-governance/regulations

Imperial College is an independent corporation whose legal status derives from a Royal Charter granted under Letters Patent in 1907. In 2007 a Supplemental Charter and Statutes was granted by HM Queen Elizabeth II. This Supplemental Charter, which came into force on the date of the College's Centenary, 8th July 2007, established the College as a University with the name and style of "The Imperial College of Science, Technology and Medicine".

www.imperial.ac.uk/admin-services/secretariat/college-governance/charters/

Imperial College London is regulated by the Office for Students (OfS)

www.officeforstudents.org.uk/advice-and-guidance/the-register/

This document provides a definitive record of the main features of the programme and the learning outcomes that a typical student may reasonably be expected to achieve and demonstrate if s/he takes full advantage of the learning opportunities provided. This programme specification is primarily intended as a reference point for prospective and current students, academic and support staff involved in delivering the programme and enabling student development and achievement, for its assessment by internal and external examiners, and in subsequent monitoring and review.

Modifications

Description	Approved	Date	Paper Reference
Click or tap here to enter text.		dd/mm/yy	e.g. PC.2016.120