UNIVERSITY OF CAMBRIDGE

Programme Specification 2024-25

PART III OF THE MATHEMATICAL TRIPOS
Master of Mathematics (MMath)
Master of Advanced Studies in Mathematics (MASt)

Awarding body	University of Cambridge
Teaching institution	Faculty of Mathematics
Accreditation details	None
Name of final award	Master of Mathematics or Master of Advanced Studies in Mathematics (for students new to Cambridge)
Programme title	Mathematical Tripos Part III
HECoS code(s)	100403 (Mathematics)
Relevant QAA benchmark statement(s)	Mathematics, Statistics and Operational Research
Qualifications framework level	7 (Masters)
Date specification was produced	August 2024

Aims and Objectives

The Master in Mathematics (MMath) for students continuing their studies, and Master of Advanced Studies in Mathematics (MASt) for students new to Cambridge is also known as 'Part III of the Mathematical Tripos'. It is a one-year taught Master's course in mathematics. This course is excellent preparation for mathematical research and it is also a valuable course in mathematics and in its applications for those who want further training before taking posts in industry, teaching, or research establishments.

The aims of the Faculty for Part III of the Mathematical Tripos are

- to provide a challenging and interesting course in mathematics and its applications for a range of students that include some of the best both in this country and the world;
- to provide a course which, whilst mainly aimed at students preparing to do research, can be useful to appropriate students going into other careers;
- to give students a background which will enable them to make an appropriate choice of research subject and to prepare them for research in that subject;
- to provide an integrated system of teaching which can be tailored to the needs of individual students;
- to develop in students the capacity to follow and to expound long and complex mathematical arguments;
- to continue to attract outstanding students from all over the world;
- to produce high-calibre students with skills sought after by leading graduate schools and businesses throughout the world;
- to provide an intellectually stimulating environment in which future leading mathematicians from many countries can have the opportunity to develop their talents and enthusiasm together to their full potential;
- to maintain and extend the position of Cambridge as a leading international centre for research and teaching in mathematics.

The objectives of Part III of the Mathematical Tripos are such that after completing the course, students should

- have a good background in their chosen field;

- be well on their way to becoming independent learners, expositors and thinkers.

Students will be expected to have

- studied advanced material in the mathematical sciences to a level not normally covered in a first degree;
- further developed the capacity for independent study of mathematics and problem solving at a higher level;
- undertaken an extended essay selected from a list of approved topics covering a wide range of subject areas.

Transferable Skills

At Cambridge, as at any institution of higher education, the mathematical skills acquired by students are highly transferable. The courses arranged by the Statistical Laboratory are perhaps the most immediately transferable, but mathematics underpins all the Natural Sciences, Computer Science, Engineering, Economics, Business and Management Studies and a whole range of industrial and commercial processes and enterprises.

In a wider context, the problem-solving skills students gain are also highly applicable to challenges outside of mathematics. Students learn how to immerse themselves into difficult new subject areas, identify the important points and structure their learning in an efficient way.

In addition to transferable skills acquired as a consequence of the course, Part III students also receive talks on subjects such as how to prepare a talk, how to read a mathematical paper, or how to write a mathematical essay.

Learning, Teaching and Assessment Methods

Learning in Part III takes place primarily via lecture courses, which students select from the very wide range offered by both the Department of Pure Mathematics and Mathematical Statistics (DPMMS) and the Department of Applied Mathematics and Theoretical Physics (DAMTP). The structure of Part III allows students to explore and develop their interests by studying a slightly larger set of courses than can be offered for examination credit (see below), and to decide on their final choices for the examination in light of their progress. In addition to following lecture courses, students also work during the year on an extended essay, written on an approved topic and submitted for examination credit equivalent to one (24-hour) lecture course.

General information on the structure and organization of the course is covered in the *Part III Handbook*. The Faculty also produces a *Guide to Courses* which is updated annually with descriptions and information relating to all the Part III lecture courses offered in any given year (the Faculty also publishes a full list of the courses available annually in the *Reporter*). In addition, an *Essay Booklet* provides a list of approved essay titles and descriptions, covering a wide range of subject areas, along with guidance on the processes involved in selecting preferred topics, writing, and then submitting the essay.

Every Part III student must formally register with either DPMMS or DAMTP at the start of the academic year. They may, however, take courses offered by either Department irrespective of their registration and are advised to register with the Department which most closely aligns with their academic interests (i.e. the Department which offers the majority of courses that the student intends to take). If a student finds the balance of their choice of courses changes it is possible, though not essential, to change registration.

Lecture courses in Part III consist either of 24 lectures or of 16 lectures. Each course takes place in one of the three terms, with lectures given over an eight-week period in each of the Michaelmas

and Lent terms and over a four-week period in the Easter term. Lectures take place every day except Sunday and are held at the Centre for Mathematical Sciences (CMS).

There is no requirement that students restrict their choices of courses to those given by one Department. Most students take courses from a small number of subject areas, but some take a wider variety. Courses may be selected freely from those available, within the constraints of the lecture timetable, which is arranged carefully to avoid, as far as possible, clashes between related courses.

Lectures proceed at a brisk rate, and a complete understanding of the material during the lectures themselves is not expected. Students should try to appreciate the general outline of the material as each lecture progresses, and then work through the details afterwards. The depth of understanding required in Part III is greater than in earlier parts of the Mathematical Tripos or most undergraduate mathematics or physics degree courses elsewhere.

Candidates are assessed by means of written examination papers taken at the CMS over a two-week period in the latter half of the Easter term and by means of an essay submitted by a deadline early in the Easter term. There is no continuous assessment.

Each lecture course has its own examination paper, set and marked by a designated Assessor (usually the lecturer). Each essay title is also set and marked by a designated Assessor. The setting and marking of all examination papers and essays is overseen by a panel of Examiners who are formally independent of the Assessors and lecturers.

Papers for lecture courses count for 2 units or 3 units of examination credit for courses consisting of 16 or 24 lectures, respectively, while the essay counts for 3 units of examination credit. Candidates are allowed to offer a maximum of 16 units of credit from papers for lecture courses and an additional 3 units from the essay, giving a maximum of 19 units of credit in total. Candidates are normally best advised to offer between 17 and 19 units for the examination (including the essay).

Based on the full sets of marks provided by the Assessors, the Examiners grade candidates by placing them in one of the following categories: Distinction, Merit, Pass or Fail. A Merit or above is the equivalent of a First Class in other Parts of the Mathematical Tripos.

Support for Students and Their Learning

The Faculty produces an annual Guide to Courses for all students, which is available on the Faculty website. Students also have access to the Part III Handbook, which sets out the course expectations and gives details of the student support mechanisms in place in any given year.

Students have access to appropriate textbooks and other materials through the University and College libraries. Students are able to access many of these resources remotely.

Each Part III student has a member of academic staff as their departmental contact. There is a meeting between student and departmental contact in each of the Michaelmas and Lent Terms to monitor progress. A written report of each meeting is sent to the Part III Departmental Course Director and to the Director of Studies of the student's College. Students also have termly meetings with their College Tutor and/or Director of Studies to monitor and review their progress in Part III.

Support for lecture courses is normally provided in the form of examples classes. There is the opportunity to submit specific questions for marking before the examples classes, so that students can obtain pedagogical feedback on the quality of their answers. Support for work on the essay is provided in the form of (typically three) meetings with the essay setter during the

course of preparation and submission, as well as two talks given in the Michaelmas and the Lent term providing general guidance on structuring and writing a mathematical essay.

The talks on essays form part of a series of presentations given over the course of the year. Other presentations cover topics such as PhD applications, general careers support, exam preparation, and preparing and delivering mathematical seminars.

Throughout the year students are supported in a variety of more informal ways by academic staff and PhD students. There are usually some workshops at the start of the academic year enabling incoming students from a large variety of backgrounds to be aware of and, if necessary, catch up with pre-requisites for Part III courses in various areas. There are several opportunities for students to seek informal help from PhD students on lecture content through scheduled “drop-in” sessions. Students are strongly encouraged to support each other in their learning through study groups. In special cases and with the agreement of a student's College, individual or small-group supervisions can be arranged for more in-depth support.

Criteria for Admission

Non-Cambridge graduates (MASt) are normally required to have at least a first-class honours degree in mathematics, physics, statistics or engineering, or an equivalent qualification with significant advanced mathematical content. Candidates from the Cambridge Mathematical Tripos (MMath) who obtain a First in Part II of the Tripos are automatically allowed to progress to Part III. Other candidates from the Cambridge Mathematical Tripos may apply for permission to proceed to Part III according to a formal procedure (conducted by the “Permissions Committee”).

Management of Teaching Quality and Standards

The University ensures high quality of teaching and learning in the following ways:

- Scrutiny of the External Examiners Reports for all teaching programmes
- Encouraging student engagement at both the local level, through involvement in Faculty and Departmental Committees, and at a central level by participation in nationally-benchmarked surveys
- Participation in the biennial Education Monitoring and Review Process to explore provision, share good practice and suggest constructive courses of action
- Mentoring, appraisal, and peer review of staff, and encouraging staff participation in personal development programmes

In addition to assisting the University with the above processes, the Faculty has a Part III Committee, which regularly reviews the syllabus and content of this part of the Mathematical Tripos, student feedback and comments from External Examiners. The External Examiners’ reports for Part III are responded to by the Faculty Board in consultation with the Part III Committee. Students have representation on both the Faculty Board and the Part III Committee.

The Faculty’s Director of Taught Postgraduate Education (DTPE) has strategic and operational oversight of Part III. Either the DTPE or the Chair of the Part III Committee is normally on the Faculty Board and invited to the twice-yearly meetings of Directors of Studies for items involving Part III.

Graduate Employability and Career Destinations

The Careers Service maintains links with relevant employers and takes into account employer needs and opinions in the services which it provides for students. The Careers Service also allocates a Careers Adviser to each College, Faculty and Department to act as a point of contact.

Every effort has been made to ensure the accuracy of the information in this programme specification. At the time of publication, the programme specification has been approved by the relevant Faculty Board (or equivalent). Programme specifications are reviewed annually, however, during the course of the academical year, any approved changes to the programme will be communicated to enrolled students through email notification or publication in the *Reporter*. The relevant faculty or department will endeavour to update the programme specification accordingly, and prior to the start of the next academical year.

Further information about specifications and an archive of programme specifications for all awards of the University is available online at: https://www.camdata.admin.cam.ac.uk/