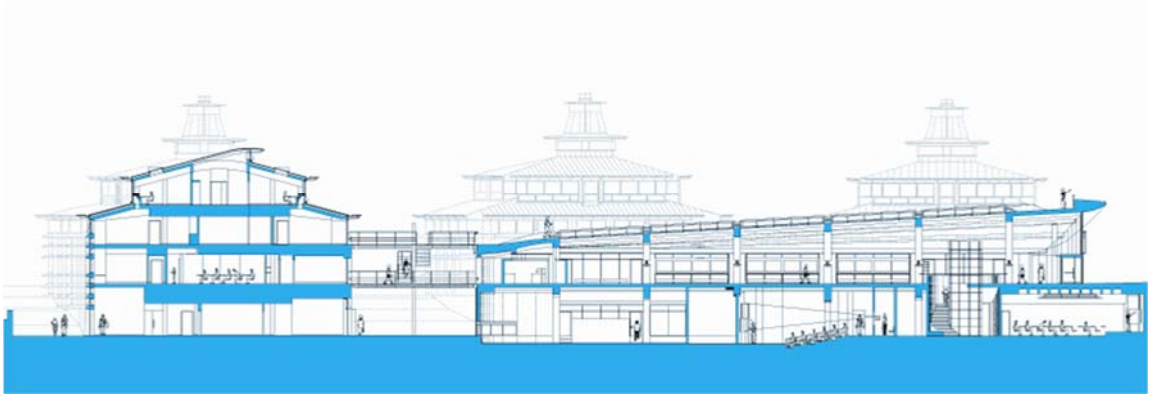
UNIVERSITY OF CAMBRIDGE
Faculty of Mathematics

Mathematical Tripos
Part III Handbook 2019-2020



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1. Introduction

Part III is run by the Faculty of Mathematics, which is composed of the Department of Applied Mathematics and Theoretical Physics (DAMTP), and the Department of Pure Mathematics and Mathematical Statistics (DPMMS). The Statistical Laboratory (Stats Lab for short) is a self-contained part of DPMMS composed of those staff who work on mathematical statistics and probability.

All official Part III activity takes place at the Centre for Mathematical Sciences (CMS) in Clarkson Road, where there are lecture theatres, common rooms and a large Part III room. The latter is specifically provided for the use of Part III students. All members of DPMMS are located in Pavilions C, D and E at the CMS. All members of DAMTP are based in Pavilions B, F, G and H.

This handbook provides administrative and other important information for Part III students and those responsible for advising them. In addition to this handbook students should consult the following documents. These are published alongside forms and links to other important information on https://www.maths.cam.ac.uk/part-iii-current.

Notes for New Part III Students
This document outlines important arrangements for the start of the year, including information about the Introductory Meeting. All Part III students are issued with a copy prior to the start of Michaelmas term and it is also posted on the website at http://www.maths.cam.ac.uk/part-iii-current/notesnewstudents.pdf.

Part III Guide to Courses
This guide is updated annually and provides descriptions and information about all Part III lecture courses offered in any given year. It is available both online and in hardcopy. The online version is populated over the course of the summer as course descriptions become available. It can be found at https://www.maths.cam.ac.uk/part-iii-current/part-iii-guide-courses. It may be updated over the course of the year as required. A hardcopy is distributed to students at the Introductory Meeting.

Part III Essay Booklet
This booklet is published towards the end of Michaelmas term and provides information on essay topics offered in the current year. See *Section 9 – Essays* for further information.

There are many people who can offer advice and help to Part III students. See *Section 4 – Points of Contact* and *Appendix I*.

2. Introductory and Welcome Meetings

At the start of the year, the Faculty holds two meetings: a "Welcome to CMS" meeting for Part III students who were not Cambridge undergraduates and an Introductory Meeting for all Part III students. The Welcome meeting is usually held on the first Tuesday of full Michaelmas term, with the Introductory Meeting being held on the first Wednesday. The purpose of the Welcome meeting is to greet incoming students and acquaint them with Part III in general and the Centre for Mathematical Sciences, while the purpose of the Introductory Meeting is to provide important information to all students about the courses on offer as well as administrative arrangements. Both meetings are also an opportunity to meet other students and members of academic staff.

In 2019/20 the **Welcome Meeting for incoming students** will start at **10.00 am on Tuesday 8th October** and last for approximately two hours including brief tours of the CMS, while the **Introductory Meeting for all students** will start at **9.30 am on Wednesday 9th October** in the CMS and last most of the day. **All Part III students are expected to attend the Introductory Meeting.** The timetable for both meetings is included in the *Notes for New Part III Students*. If for any reason you are unable to attend the Introductory Meeting, you must contact the Graduate Office to ensure that you have obtained all relevant information.

Following on from the Introductory Meeting on Wednesday, all Part III students are invited to attend the CMS Welcome Party in the Central Core and to take part in the annual Part III photograph.

3. Departmental Registration

Every Part III student ***must*** formally register with either DPMMS or DAMTP at the start of the academic year. Students may only register with one Department. Each Department is formally responsible for the students registered with it. Students may 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 that the balance of his/her choice of courses changes it is possible, though not essential, to change registration (contact the Graduate Office).

Registration is via an online form which will be available on **Wednesday 9th October** from computers within the Part III room. Students will be provided with instructions on how to access the online registration form at the Introductory Meeting. Students will be required to log-in using their Raven password (which they will receive from University Information Services) and complete the necessary fields before submitting the form. As well as confirming personal details, students will be asked with which Department they wish to register and to also provide an indication of their academic fields of interest.

It is ***vital*** that students complete the online registration process. If they do not they will be in administrative limbo and this may have serious consequences. The registration process allows us to ensure that we have accurate information about who is here and who is not, and to ensure that students are on the correct mailing lists and receiving important information and reminders.

Students re-joining the Part III course after a period of intermission must re-register. Those re-joining in Michaelmas term may do so via the online form as outlined above. Those re-joining in Lent or Easter term should contact the Graduate Office directly.

4. Points of Contact

There are many people involved in the delivery of the Part III course and in supporting Part III students. This section details the main points of contact for Part III students. A list of named contacts and email addresses can be found in *Appendix I*.

Students are encouraged to seek advice when they need it. For further guidance on what to do and who to speak to if you encounter a particular problem see *Section 16 – Resolving Problems.*

Subject Advisers
In each field there is a Subject Adviser. The primary responsibilities of the Subject Adviser are to co-ordinate lecture courses in their subject area and to act as a contact point for expertise in that area. Students are welcome to consult Subject Advisers as necessary. They are good people to approach for subject-specific advice, e.g. which universities are good for which specialities. If they do not know the answer they probably know who will.

Departmental Contact
Each Student will have a Departmental Contact. If you have registered with DAMTP, you will be notified by email in the first half of Michaelmas term of who your Departmental Contact is. If you have registered with DPMMS you will choose one of the Subject Advisers to be your Departmental Contact. S/he will be pleased to offer general advice and will be able to direct you to those with more detailed knowledge where appropriate. S/he is one of the people you might ask to write a reference for you. Your Departmental Contact will interview you twice during the year in order to check on your progress (see *Section 10 – Progress Interviews*).

Director of Studies
Your College will appoint a Director of Studies (DoS) for you. Your DoS can provide general mathematical advice, but his/her primary responsibilities are to check that you are making adequate progress. You ***must*** see your DoS at the beginning and end of each term. Copies of your progress interview forms will be sent to your DoS, and other reports on your progress may be sent to him/her by your Departmental Contact, and certain of the examples class instructors and supervisors. S/he is one of the people you might ask to write a reference for you. If your funding body needs a report on your progress, your DoS or College Tutor is the person to provide it. Your DoS must approve your choice of examination papers and essay (if you decide to write one) in Easter term.

College Tutor
Your College Tutor takes an overview of your time in Cambridge and an interest in all aspects of your well-being. Tutors are at their students' disposal for all administrative and financial matters. S/he can provide advice and guidance if you encounter personal difficulties and may also want to see you at the beginning and end of each term. S/he may also receive reports on your progress.

Part III Course Directors
Each Department provides a named Part III Course Director who takes overall responsibility for the course and the students in his/her Department. The Course Directors may be approached at any time if you are encountering any difficulties. If you have an urgent matter you should make an appointment to see your Course Director at your earliest convenience. They can be contacted using the department-specific email addresses partiii-director@damtp.cam.ac.uk or partiii-director@dpmms.cam.ac.uk.

Director of Taught Postgraduate Education
The Director of Taught Postgraduate Education (DTPE) within the Faculty of Mathematics is responsible for the operational and strategic development of Part III. She also coordinates the provision of academic support (see *Section 11 – Academic Support*). You should feel free to contact her at any

time with comments or concerns about structural issues and feedback on your general student experience using the specific email address director-tpe@maths.cam.ac.uk.

Part III Committee
The Part III Committee advises and makes recommendations to the Faculty Board on all aspects of Part III. A list of members is at http://www.maths.cam.ac.uk/facultyboard/part-iii-committee. There are two student representatives on the committee. A large part of the work of the Part III Committee is to monitor feedback (examiners' reports, questionnaires, etc.) and to make recommendations to the Faculty Board on the basis of this feedback. It also formulates policy recommendations at the request of the Faculty Board. If you have a suggestion or concern that you wish the committee to consider you can

- email feedback@maths.cam.ac.uk noting that you want your message to be passed (anonymously) to the Part III Committee;
- email the Chair of the Part III Committee directly at partiii-chair@maths.cam.ac.uk;
- write to the Chair of the Faculty Board of Mathematics who will pass your letter to the committee.

Although the Faculty Board is the ultimate decision-making body, it will normally send suggestions for changes to Part III to the Part III Committee for preliminary discussion.

The Committee also administers the Part III End-of-Year Questionnaire which all students are asked to complete. Whether you are dissatisfied or not, this is an opportunity to provide detailed feedback on the course and your experience of Part III. This contains a certain number of questions to help elicit your opinion, but you should feel free to add extra comments to anything you wish. The questionnaire results will be read carefully by the Heads of Department, the Part III Course Directors, the DTPE, and by all members of the Part III Committee.

Faculty Board
The Faculty Board of Mathematics is ultimately responsible for Part III. A list of Board members is available from www.maths.cam.ac.uk/facultyboard/. There are both undergraduate and graduate student representatives on the Board. The representatives maintain a number of webpages of useful information at https://www.maths.cam.ac.uk/student-representation.

Administration
Administrative support for the Part III course is currently shared between the Faculty's Undergraduate and Graduate Offices. Each office has specific responsibilities which are outlined in *Appendix I*. Routine enquiries should be directed to the relevant office. If you are uncertain where to direct your enquiry, please contact the Graduate Office in the first instance.

5. Lectures

Part III students take lecture courses, consisting either of 24 lectures (for a 3-unit course) or of 16 lectures (for a 2-unit course). Each course takes place in one of the three terms (Michaelmas, Lent, Easter). Examinations for all courses take place in the second half of the Easter term. Each student may take up to 19 units of courses for examination. Students may also submit an essay for examination credit. This counts as 3 units and is in place of a 3-unit lecture course. See *Section 8 – Examinations and Assessment* and *Section 9 – Essays* for further information.

Lectures are 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 begin at 9.00 am on Thursday 10 October.** Lectures are usually in the mornings and take place every day except Sunday (including Saturday). All Part III

lectures will be held at the CMS. Each lecture lasts for 50 minutes and starts at five minutes past the hour. **Please be on time.**

There is no requirement that students restrict their choice of courses to those given by one Department. Most students take courses from a small number of subject areas, but some take a wide 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. **It is therefore not possible for students to sit examination papers in two courses that are lectured at the same time** (see *Section 8 – Examinations and Assessment*)**.** The lecture timetable is published at www.maths.cam.ac.uk/lecturelists.

After a few lectures, your lecturer will hand out a form asking you your name, your college and email address. The main use of this list is to allow your lecturer to contact the class by email. Completing this form does not commit you to attending future lectures.

Lectures proceed at a brisk rate, and a complete understanding of the material during lectures is not expected. You should try and appreciate the general outline of the material during lectures, and then work through the details afterwards. It is very important that you understand the details so that you can develop understanding of the overall structure of the ideas, and a full appreciation of the relationships between them. The depth of understanding needed in Part III is greater than in earlier parts of the Mathematical Tripos or most undergraduate mathematics or physics degree courses elsewhere.

Further, you should take care to work through your lecture notes very soon after each lecture. At the beginning of each new lecture a good understanding of previous lectures will be assumed. Going through the lecture notes in detail shortly after each lecture will make it much easier to keep on top of the new material and to keep up with Part III. Most lecturers are happy to answer brief questions after lectures.

In exceptional circumstances, the Faculty Board can approve a reading course in addition to the advertised lecture courses. This needs to be proposed by a member of the Faculty who agrees to prepare a syllabus for the course and to examine it. The Faculty Board will only approve such courses where they are convinced that there is a clear and important gap in the range of courses available. If you wish such an additional course to be considered, you should contact the Subject Adviser in the relevant area as soon as possible in the Michaelmas term. All proposals must be submitted to the Faculty Board by the middle of the Michaelmas term. The deadline is **Thursday 7th November 2019** and is strictly observed.

Towards the end of the course your lecturer should hand out a questionnaire. Please complete it even if you feel that you have little to say, the fact that you have little to say is important in itself. The completed questionnaires are read by the lecturer and subsequently considered by the Part III Committee.

6. Examples Classes

Examples sheets are distributed by the lecturer and there are examples classes to help you understand the material. For each examples sheet, two (or more) questions will be highlighted. You are encouraged to submit your answers to these highlighted questions for marking, so that you can gain feedback on your understanding of the course and the appropriate way to answer questions. The lecturer will explain the particular procedures for handing in your work.

Attending these examples classes and submitting your answers for marking are both important parts of studying the course and valuable preparation for the examinations. You will gain much more from a class if you (a) prepare work in advance, (b) submit work for marking, (c) think about the course in general before the class and (d) take an active part in the class.

Examples classes are given either by the lecturer or by a PhD student or a post-doctoral researcher. In this handbook, the word "instructor" refers to whoever is giving the class.

Registering for examples classes
The arrangements for examples classes are made by the Faculty and not by the Colleges. You will be asked to indicate on Moodle which courses you wish to attend examples classes for by **midnight on Saturday, 19th October 2019**. You will be sent an email when registration for examples classes opens, and may change your selection of courses at any point leading up to the deadline. **It is essential that you register for the appropriate classes by the deadline.** The complete examples class timetable will be published on Moodle by the start of Week 3.

For most courses, if the examples classes are given in more than one group, the lecturer will tell you which group to attend. If you are taking one of the larger theoretical physics courses (Quantum Field Theory, General Relativity, Symmetries, Fields and Particles, Statistical Physics or Cosmology in Michaelmas, Lent courses to be confirmed), then you will be assigned to a specific examples class group at the time that the examples class timetable is drawn up. A list of students in each group will be published on Moodle. You must attend the examples class group to which you have been assigned. Except for exceptional circumstances, **it is not possible to change to a different examples class group**. **If you cannot attend a particular class, you must email the instructor at least 48h in advance of the class.**
If you wish to drop a course entirely, you should write to examplesclasses@maths.cam.ac.uk.

Any queries about the examples class timetable and groupings should be sent to examplesclasses@maths.cam.ac.uk.

Self-assessment forms
The instructor may ask you to hand in a completed self-assessment form before the examples class. A form can be downloaded from http://www.maths.cam.ac.uk/part-iii-current/saform.pdf. This is invaluable in letting the instructor know which questions have proved difficult and need more explanation during the class.

CamCORS reports
For some courses, the instructor writes a short report about each member of the class when he or she claims payment from the relevant Colleges. In this case, the instructor has to keep an attendance record for each class. At the beginning of each such class **you should give your name**, **College and CRSid** (i.e. the first part of your Cambridge email address) **for the instructor to record**. **You should do this even if the instructor omits to ask**. **For such classes, if you wish to drop out of the course or cannot attend a particular examples class for some reason, you *must* notify the instructor at least 48 hours in advance of the relevant examples class. If the examples class is to be held at the beginning of the following term, notification must be at least 48 hours before the end of the full term**. The instructor may use the information in your self-assessment form to help him or her write the short report on each student's progress. The purpose of such reports is to help Colleges identify potential difficulties so that appropriate support and help can be put in place.

Most Part III courses are challenging, so instructors may not be able to answer all your questions on the spot. They will probably appreciate an email about any questions you may have in advance of the class. You are encouraged to discuss the lectures with other members of the class both on a formal and informal basis (see *Section 11 – Academic Support* for information about study groups).

Please note that, although examples sheets and examples classes are very useful in helping you to learn the material in the course, they do not contribute to your formal assessment or to your final classification in Part III. Their sole purpose is to help you learn, so it is a good strategy to make the most of them. In

particular, any work you hand in for marking will not "count" towards your mark for the course. Handing in work is nevertheless very helpful for you to obtain feedback on your progress and on the appropriate way to structure mathematical answers to questions.

There is an opportunity to leave feedback on examples classes on the lecture course questionnaires at the end of each term.

7. Managing Your Workload

In order to balance your workload throughout the year, you are recommended to prepare approximately nine units of lectures for examination in each of the Michaelmas and Lent terms. Of course you are welcome to attend more than this number of lectures, and at the beginning of term you are certainly recommended to start more than nine units of lectures before deciding which courses to concentrate on after two weeks or so. If you intend to write an essay you should be aware that it is very tempting to spend more time on this than an equivalent three-unit lecture course. For this reason there may be some advantage in taking slightly more units in Michaelmas term. Most students spend the Easter term preparing for the examination, though there are a limited number of examinable Part III courses given during this term.

8. Examinations and Assessment

The following guidelines have been drawn up by the Chair of the Part III Committee in consultation with the Chair of Examiners. If you need clarification or have questions you are strongly recommended to consult your College Director of Studies, your Departmental contact or the Chair of the Part III Committee directly.

The examinations are held at the CMS over a two-week period in the Easter term. There is no continuous assessment. Each lecture course has its own examination paper, normally set and marked by the lecturer. However, the examinations are overseen by a group of Examiners who are formally independent from those giving the lecture courses.

Candidates are allowed to offer up to 19 units of credit for the examination. 16-lecture courses have a 2-hour paper, counting as 2 units; 24-lecture courses have a 3-hour paper, counting as 3 units. An examination may be of 'open book' type (meaning that approved lecture notes or similar material may be brought into the examination), in which case the lecturer will announce this before the end of the lecture course. The lecturers may give information on the form of the examination to their lecture class as a whole but, of course, cannot give such information on an individual basis. The rubrics for the examinations are normally available on the web in advance. An essay, written during the year, may be submitted and counts as 3 units. Each candidate may submit at most one essay. See *Section 9 – Essays* for further information.

The examination timetable will normally be organised according to the lecture timetable, i.e. courses for which lectures are given in the same time slots will also have their examination papers in the same time slot. **It is therefore not possible for a candidate to take two such courses for examination.** At the beginning of Easter term you will receive a letter from the Chairman of Examiners including a form on which to indicate your choice of examination papers and essay (if appropriate) and information on how examinations are organised.

The final deadline for choice of examination papers is noon on the second Thursday of Easter Full term: this year **Thursday 30th April 2020**. The deadline for submitting essays is the same, i.e. **noon on Thursday 30th April 2020**, the second Thursday of Easter Full term.

The examinations will take place during the period **28th May 2020 to 9th June 2020** (inclusive) although this period may be subject to minor change.

Results are expected to be available to you *only* via CamSIS in the late afternoon of **Wednesday 17th June 2020**, and will be formally announced on **Thursday 18th June 2020**. A list of students in each degree class will be read out by the Chair of Part III Examiners in a ceremony in the Senate House that day, and printed copies of the class list will be posted outside the Senate House. You are able to opt out of appearing on the class list by visiting https://www.cambridgestudents.cam.ac.uk/your-course/examinations/publication-results between the start of Easter term and 1st June. You will receive a certificate and transcript through your College in due course. Please contact undergrad-office@maths.cam.ac.uk for all Part III examination and essay queries.

The Faculty of Mathematics has approved a document outlining the aims and objectives of Part III and advising the Examiners on the examinations and the classification of results. This is the Faculty Board Advice to Examiners and is reproduced in *Appendix III*. As outlined there, when examination papers are marked each candidate is given a numerical mark and a quality mark on each paper. On each paper the numerical mark is a percentage, while quality marks are alpha (highest), beta or gamma (lowest), moderated by plus or minus. An alpha quality mark signifies a performance of Distinction standard, while a beta quality mark signifies a performance of at least Honours standard. (Note that, unlike in Parts IA, IB and II of the Mathematical Tripos, the quality mark is given for the paper, not for individual questions.) Marks may be moderated by the Examiners to take into account the difficulty of the examination paper. Essays are marked similarly, and the Faculty Board has approved the wording of descriptors to be used as broad guidance for Assessors (i.e. the academics who have set and mark the essays) to determine the appropriate quality mark for an essay. These descriptors are also reproduced in *Appendix III*.

The Examiners consider the performance of each candidate and classify candidates into groups. These are 'Distinction', 'Merit', 'Pass' and 'Fail' The Faculty Board has recommended that the primary classification criterion is the Optimum Mark (the formula for the Optimum Mark is given in the Faculty Board Advice to Examiners). **However, candidates at borderlines between the groups are considered individually and very carefully; decisions are not made by applying a simple formula.**

As a rough guideline, in 2019 Distinctions were awarded to candidates with an Optimum Mark of at least 75% and at least twelve units of distinction standard, and Merits were awarded to candidates with an Optimum Mark of at least 67%. The *approximate* minimum sufficient performance in 2019 to achieve Honours was an Optimum Mark of at least 30%.

While the criteria in 2020 are expected to be similar to those above, it is emphasised that exact criteria for classification vary from year to year and are at the discretion of the Examiners.

In the past almost all candidates who obtained Distinctions or Merits submitted 17-19 units for examination, while candidates who obtained Passes have usually submitted 12-19 units. The Examiners recommend submitting a minimum of 12 units to obtain a Pass, and further recommend that a minimum requirement for a Pass is to obtain β- or above in at least two examinations, or one examination and an essay.

Transcripts

The Examiners officially do no more than place each candidate in one of the categories Distinction, Merit, Pass, Fail or 'Other'. ('Other' may include, for example, candidates who were ill for part of the examination.) In addition, the Faculty produces an overall mark to be given, via CamSIS, to each candidate. This mark is obtained by a piecewise linear scaling of Optimum Marks (see *Appendix III* for how the Optimum Mark is calculated) within each category. The Distinction/Merit, Merit/Honours and Honours/Fail boundaries are mapped to 74.5%, 69.5% and 59.5% respectively. The overall mark for

each candidate is then rounded appropriately to integer values. The Faculty also produces a rank for each candidate, ordering candidates by Optimum Mark within each category.

Examination Preparation
Each lecture course normally holds a revision class in Easter term. A talk on *Revision Strategies* will be held in Lent term (see *Appendix II*), and one or more exam practice sessions will be organised in Easter term. Copies of past Part III examination papers are available from http://www.maths.cam.ac.uk/part-iii-current/examinations-and-essays and bound copies are provided in the Part III room. These bound copies should not be removed from the Part III room.

Data Protection
To meet the University's obligations under the data protection legislation, the Faculty deals with data relating to individuals and their examination marks as follows:

- Marks for Papers and Essays are released routinely to individual candidates and their Colleges after the examinations. The final examination mark book is kept indefinitely by the Undergraduate Office.
- Scripts and Essays are kept, in line with the University policy, for six months following the examinations (in case of appeals). Scripts and essays are then destroyed.
- Neither the General Data Protection Regulation nor the Freedom of Information Act entitle candidates to have access to their scripts. Data appearing on individual examination scripts is technically available on application to the University Information Compliance Officer. However, such data consists only of a copy of the examiner's ticks, crosses, underlines etc. and the mark subtotals and totals.

9. Essays

In place of a 3-hour examination paper you may submit an essay written during the year. A list of approved essay titles is announced towards the end of the Michaelmas term. Some titles are clearly associated with Part III lecture courses, some are not. You are allowed both to take a lecture course for examination and to write an essay that is associated with that course. An essay associated with a lecture course is expected to go beyond the material presented in the lectures. A student may request that an additional essay title is set. (Such a request is usually made in co-operation with a suitable member of the academic staff who will act as an assessor.) The deadline for this is **31st January 2020** and must be strictly observed.

Details of essay titles will be made available in an essay booklet that will be available on the Part III webpages in the second half of the Michaelmas term. The booklet will include general guidelines and instructions about writing the essay, including advice concerning plagiarism[1] and the declaration of any relevant work that you have undertaken before the start of Part III. There is no prescribed length for the essay in the University Ordinances, but the Faculty Board Advice to Examiners (see *Appendix III*) suggests that 5,000-8,000 words is a normal length, and exceptionally long essays (i.e. more than twice this maximum) are discouraged.

Many students write their essay during the Easter vacation, though there is no reason why essay writing should not start in the Christmas Vacation or in the Lent term (although be careful not to spend disproportionately too much time on the essay). Most Colleges will look sympathetically on requests to stay in College accommodation for part of the vacation to work on the essay (since library and computer access will often be easier in Cambridge than at home), though applications to do this should be made

[1] See also the University's statement on plagiarism at http://www.plagiarism.admin.cam.ac.uk/what-plagiarism/universitys-definition-plagiarism and the Faculty Guidelines on plagiarism at www.maths.cam.ac.uk/facultyboard/plagiarism/.

well in advance and in many Colleges extra rent will be payable. Please remember that essay assessors are not necessarily in Cambridge during vacations.

In the past the great majority of Part III students have chosen to write an essay: the work is an enjoyable change and is valuable training for research.

There will be two sessions on Wednesday afternoons aimed specifically at students intending to submit an essay (see *Appendix II*). In addition, an unofficial guide to writing an essay can be found at www.dpmms.cam.ac.uk/~twk/Essay.pdf.

10. Progress Interviews

Each Part III student has a Departmental Contact who is a member of academic staff in the Faculty. The Faculty requires each Part III student to have two interviews during the academic year with their Departmental Contact, one in each of the Michaelmas and Lent terms. **The two interviews are mandatory.** In preparation for these interviews, the student is asked by email to complete an interview form which asks about the courses they are taking, whether or not they plan to write an essay, their future plans, and any feedback on Part III. The completed form and any other questions about Part III are discussed during the interview. The Departmental Contact completes their section of the interview form by writing comments about the interview itself. The completed forms are considered by the Course Directors and then a copy is sent to the Director of Studies in College. A copy of the completed form is kept by the Faculty.

As well as providing an opportunity for individual discussion of progress in Part III, the interview process and forms are helpful in allowing the Faculty and College to identify problems so that any necessary help and support can be put in place. If a student does not attend an interview, then a reminder email is sent. If the student does not attend after this, then the College and Course Director are notified of their failure to attend, with the recommendation that the College should follow this up as a matter of urgency.

The procedure and timing of the progress interviews are the same for both DAMTP and DPMMS, although the method of allocation of Departmental Contacts differs between the two departments. The dates and deadlines for interviews are given in the Part III Calendar (*Appendix II*). Students are sent an email by the Graduate Office to let them know when to complete the interview forms (blank forms will be available on the web) and when to arrange the interview with their Departmental Contact.

Students may also consult their Departmental Contacts for advice at other times outside the two interviews. Students may ask their Departmental Contact to write a reference for them.

Allocation of your Departmental Contact
Students registered with DAMTP are assigned a Departmental Contact by the Course Director using the subject interests identified by the students during the registration process. Every attempt is made to assign a Departmental Contact whose scientific interests match those of the student. Students are notified of their Departmental Contacts by email during the first half of the Michaelmas term. Students registered in DAMTP should contact the DAMTP Course Director for queries about their Departmental Contacts.

In DPMMS the appointed Subject Advisers act as Departmental Contacts and every student registered with DPMMS must register with one of the Subject Advisers as their Departmental Contact. Early in the Michaelmas Term, all students registered with DPMMS will receive an email from the Graduate Office specifying that they must sign-up with one of the Subject Advisers on a list outside the Graduate Office. In DPMMS, a student may change their Departmental Contact at any time provided that the

student informs both the old contact and the new one, and that the student lets the Graduate Office know by email to partiii-secretary@maths.cam.ac.uk. In DPMMS, any Subject Adviser may be consulted for technical help or advice about courses or about future plans.

11. Academic Support

A variety of events are run throughout the year with the aim of supporting Part III students and helping them with the decision of what to do next. This section provides a summary of the main activities. Further information can be found online at http://www.maths.cam.ac.uk/part-iii-current/academic-support. You are strongly encouraged to take advantage of these opportunities.

Preparatory Workshops
These workshops are held at the beginning of the Michaelmas term and primarily aimed at Part III students who have come to Cambridge from other institutions. They cover the necessary prerequisites in several core areas, including General Relativity, Quantum Mechanics, Fluid Mechanics, Statistics, Measure Theory, Rings and Modules, Foundations, Number Theory, Algebraic Geometry, Differential Geometry, and Algebraic Topology. These lectures take place in the afternoons from 2pm to 4pm and from 4pm to 6pm in the first week of Michaelmas, starting **Tuesday 8th October**. The precise subjects and times will be emailed to students and made available on the Part III web pages before the start of term.

Drop-In Sessions
Throughout the Michaelmas and Lent terms we arrange for graduate students in each subject area to be available on a drop-in basis. In this informal setting Part III students have the opportunity to ask questions on both lecture and background material which they may not be comfortable approaching the lecturer with. If you feel you need more in-depth support, you should contact your College Director of Studies at the earliest possible opportunity.

Study Groups
Students are encouraged to form study groups to review lecture material and work on examples sheets. While many study groups naturally form on their own, we also facilitate their formation via a sign-up sheet early on in the term. Details of the process will be explained to students during the Introductory Meeting.

Part III Seminar Series
Students have the opportunity to give a short mathematical presentation in front of an audience of peers at the end of the Michaelmas and Lent terms. These seminars are grouped by subject and led by a graduate student, who will chair the session and be able to provide guidance during the preparation phase. In Michaelmas, talks usually focus on some aspect of a lecture course, or explore closely related material. In Lent students often choose to present on their Part III essay topic.

Wednesday Afternoons
We host several talks and panel discussions throughout the year, usually on Wednesday afternoons. These are designed to support students in their transition from undergraduate student to independent researcher and include an opportunity to socialise at the Part III Café afterwards. Topics covered include PhD applications, research opportunities, advice on how to prepare a talk, etc. For further information see *Section 17 – Research Careers* and the Part III Calendar (*Appendix II*).

Part III Café: Every Wednesday between 5 and 6pm during full term (regardless of whether a Wednesday afternoon event is scheduled) the Faculty offers refreshments in the Central Core. Part III students are encouraged to use the opportunity to socialise or meet with their study groups.

12. Seminars and General Interest Lectures

You are welcome at any lecture course or seminar organised by the departments. Indeed, you are welcome at most lectures and seminars organised throughout the University. All lectures in the University are listed at timetable.cam.ac.uk. Notices announcing seminars in DAMTP, DPMMS and other select departments will be placed on central noticeboards and information screens at the CMS. Students may also wish to consult the departmental websites and talks.cam.ac.uk, where it is possible to subscribe to talk information for individual seminar series using ical/vcal, or sign up to email reminders.

13. Student Representation

There are two student representatives on the Part III Committee, whose role is to monitor all aspects of Part III and to make suggestions for improvements (see *Section 4 – Points of Contact*). One representative is usually a PhD student who has taken Part III in a previous year. The other is normally a Part III student recruited from the current cohort. If you are interested in this role, please respond to the request for expressions of interest which will be sent out by email in Week 1.

There are also three student representatives (one graduate, two undergraduate) on the Faculty Board, which oversees all teaching in the Faculty of Mathematics (see *Section 4 – Points of Contact*). You will be advised of the election process by email, normally in the second half of Michaelmas term.

14. Feedback

Constructive feedback is welcomed by everyone concerned with Part III. There are a number of different feedback routes:

- The Faculty distributes a short Week-2 questionnaire by email to enable students to give immediate feedback on each lecture course.
- Each lecturer hands out a paper questionnaire towards the end of the course, which includes questions on the course content and the quality of the lectures and examples classes.
- Students are sent an online end-of-year questionnaire in May/June. This includes general questions on the Part III experience as well as the opportunity to give feedback on individual lecture courses.
- Students can email feedback@maths.cam.ac.uk at any time. Such emails will be forwarded to the Chair of the Teaching Committee who then forwards them in anonymised form to the appropriate person (a lecturer, for example, or the Chair of the Part III Committee). Students will receive an email response.
- If a student wishes to be entirely anonymous and does not need a reply, the web-based comment format https://things.maths.cam.ac.uk/undergrad/feedback/ can be used.

The lecture and end-of-year questionnaires are particularly important in shaping the future of Part III and the Faculty Board urges all students to respond.

15. Equality, Diversity and Inclusion

The Faculty of Mathematics, like the wider University, is committed to a pro-active and inclusive approach to equality, which supports and encourages all under-represented groups, promotes an inclusive culture, and values diversity. We recognise that diversity promotes innovation and

creativity, and provides exposure to a wider range of ideas, skills and experiences which we can all benefit from, as well as helping us to attract and retain the best talent from around the world.

The Faculty expects all staff and students to be equally valued and treated with respect, courtesy and consideration, irrespective of, for example, race, disability, faith, gender or sexual orientation. As a member of our community you have a personal responsibility to behave professionally and you have the right to expect professional behaviour from others.

The Faculty has a zero tolerance approach to harassment and bullying and supports the University's Breaking the Silence campaign, which provides support and guidance to members of the University affected by sexual misconduct (https://www.breakingthesilence.cam.ac.uk/).

If you have concerns about any such matter, you are encouraged to approach, in confidence:

- either one of the Faculty Equality and Diversity contacts, Dr Orsola Rath-Spivack or100@cam.ac.uk (G0.09), or Dr Rajen Shah rds37@cam.ac.uk (D1.15);
- the Director of Taught Postgraduate Education, Dr Julia Wolf director-tpe@maths.cam.ac.uk;
- your College Tutor or Director of Studies.

The Faculty's Women in Maths pages at www.maths.cam.ac.uk/women-mathematics contain a wealth of information about and for female mathematicians at Cambridge. The Emmy Noether Society, a student society, aims to promote women studying mathematical sciences and hosts talks from female mathematicians and informal events between students and academics, from both Cambridge and other universities see http://emmynoethersoc.tumblr.com/.

The Faculty has also developed an LGBT+ Action Plan (2019-2022). The Maths LGBT+ mailing list can be joined at http://lists.cam.ac.uk/mailman/listinfo/soc-maths-lgbt and there are regular social events. The majority of toilets on site are gender neutral with one set of gendered toilets on the ground floor of every Pavilion and at the bottom of the stairs in the core. The Faculty has a quiet room available for reflection or prayer in Pavilion F.

The Equality and Diversity Committee is responsible for both staff and students and oversees a programme of initiatives aimed at enhancing the inclusivity of the environment in which we work and study. We encourage you to share your experiences (both positive and negative) and ideas for improvements via our suggestion box (located at the bottom of the main stairs leading to the lecture theatres), or by emailing inclusivity@maths.cam.ac.uk. More information on equality, diversity and inclusion can be found at can be found at https://www.maths.cam.ac.uk/equality-diversity-inclusion.

16. Resolving Problems

Part III is a challenging and intensive course. From time to time, Part III students may find that they are having problems or difficulties. This section offers guidance for dealing with various types of difficulty. Your main contacts are your Departmental Contact and the Departmental Course Director in the Faculty, and your Director of Studies in your College. Cambridge terms are short, and it is especially important to act without delay if you find that you are having problems or difficulties of any kind.

Problems with a particular course

If you have a problem with a particular lecture course, the simplest way of dealing with it is to contact the lecturer directly. He or she will be happy to explain difficult points or recommend supplementary reading. If your problem cannot be resolved by contacting the lecturer, then you may wish to consult the relevant *Subject Adviser* or *Part III Course Director*, or email feedback@maths.cam.ac.uk (see *Appendix I* for contact details).

If you are having problems mastering a course, it is very likely that other students are having similar problems. Students are encouraged to organise study groups to discuss the course. Graduate students who did the course in previous years can also be helpful. Part III drop-in sessions provide an opportunity for discussion with graduate students, see *Section 11 – Academic Support*.

Problems with Part III as a whole

Sometimes a student may find that Part III is not the right course for them. If you are worried that this may be the case, you should **at once**[2] consult both your Departmental Contact or the Departmental Course Director **and** your College Director of Studies (if he or she is not available go directly to your College Tutor). It is especially important to talk to your College as soon as possible. It may be possible to switch to another course, or it may be possible to find a path through Part III, or, after careful consideration and discussion with your Director of Studies and the Course Director, you may find that the best solution may be for you to leave Part III. Colleges provide help and support in deciding and managing the best way forward.

The role of the Colleges

Students from outside Cambridge tend to underestimate the interest their College takes in them and the help and advice that their College can supply. If you need an advocate with the University or the Faculty, your College will provide one. You should consult your College Tutor or Graduate Tutor for advice. Your College aims to provide you with the best support available. Any decision you make with the help and advice of your College is likely to be better than one you make by yourself. However difficult your situation seems to you, it is very likely that your College has had experience in dealing with similar problems and can offer helpful advice and support. Colleges are used to negotiating with the University bureaucracy and with grant-giving bodies. More on the role of Colleges is published at https://www.studentwellbeing.admin.cam.ac.uk/college-pastoral-support.

Pastoral support

Students sometimes encounter personal difficulties during Part III that are not to do with the course itself (for example, there may be financial difficulties or family illness). If such problems arise, you are strongly advised to discuss the situation with your College Tutor or Graduate Tutor as soon as possible. Colleges are used to dealing with such problems, and are experienced in offering advice, help and support. There are also central resources as part of the university as a whole, see https://www.studentwellbeing.admin.cam.ac.uk.

Medical problems and disabilities

Students with medical problems or disabilities are strongly advised to discuss such problems with their College, who will offer advice and support for medical problems and disabilities. There is a University Disability Resource Centre, see http://www.disability.admin.cam.ac.uk/.

Mitigating circumstances

Candidates who are seriously hindered in preparing for, or sitting, their examinations should contact their College Tutor at the earliest possible opportunity. The Tutor will advise on what further action is needed (e.g. securing medical or other evidence) and, in cases of illness or other grave cause, the Tutor can make an application on the candidate's behalf to the University for an Examination Allowance.

[2] This is important. Some choices which are available in the first two or three weeks may not be possible later. In particular, University Ordinances treat students who have kept the first 21 days of Full Term differently from those who have not yet done so. From day 21 students become eligible for full fees for that term. See www.cam.ac.uk/about-the-university/term-dates-and-calendars for dates of Full Term.

Examination results
Examinations are a University matter and covered by strict regulations. Whether you have an issue of concern or not, **you should not, under any circumstances, seek to discuss your examination result with your examiners**.

A candidate who thinks that there is an error in their detailed marks should discuss this with their Director of Studies. If there is good reason to believe that an error has occurred, the Director of Studies can contact the Undergraduate Office within 14 days of the detailed marks being released, requesting a mark check and providing details of the reason for the request.

A candidate can also appeal to the University if they believe there is a case for an Examination Review; the University has a standard procedure for this, details of which can be found at https://www.studentcomplaints.admin.cam.ac.uk/examination-reviews. The various steps in the procedure are time-limited and you should therefore **immediately** discuss the matter with your College Tutor, who will advise you further. You should note that any investigation by the University will usually confine itself to seeing that the examiners acted correctly (for example that all the marks you received were entered into the mark book) and not try to second-guess the examiners by re-marking your papers.

Further information can be obtained from College Tutors and from the exams section http://www.studentadvice.cam.ac.uk/academic/exams of the students' advice service website.

Formal complaints
The formal complaints procedure to be followed within the University can be found at http://www.studentcomplaints.admin.cam.ac.uk/student-complaints. The Responsible Officer in Step 1 of this procedure for the Faculty of Mathematics is the Chair of the Faculty Board — see http://www.maths.cam.ac.uk/facultyboard for the name of the current Chair.

17. Research Careers

Many of you will be hoping to pursue a career in mathematical research. Subject advisers and lecturers can advise you on the opportunities for research both within Cambridge, elsewhere in the UK, and abroad. In many cases you need to apply early. Many foreign universities and grant-making bodies have deadlines well before the New Year. Universities in the UK are increasingly making offers early in the Lent term.

Cambridge is anxious to attract the most able students to continue their studies here. Information on how to apply for a PhD place at Cambridge will be provided during the Wednesday afternoon talk *Applying for PhDs* on **Wednesday 23rd October 2019**. If you wish to apply for a research position at Cambridge, you are strongly encouraged to speak to potential supervisors as soon as possible. Your Part III Departmental Contact can also be a useful source of information; ask him or her in your first interview. The availability of Research Council grants varies from one subject area to another, so you need to seek individual advice. Many, but by no means all, awards for research at Cambridge are dependent on your performance in the examination at the end of the year. Both Departments will consider making firm offers in the New Year and DAMTP, in particular, expects to be able to make several such offers. The Graduate Office can provide advice on the formalities of the applications process.

Theoretical Physics Test
If you are interested in a PhD in Theoretical Physics note that there will be a Theoretical Physics test for Part III students applying for a PhD in Theoretical Physics. This test takes place in the Lent Term. There will be information and details about the test in the Wednesday afternoon talk *Applying for PhDs* on **Wednesday 23rd October 2019**.

Careers Service
For those who would like more general careers advice, the University Careers Service is situated in Stuart House, 6 Mill Lane. The service has extensive information about fields of work, individual employers, and current vacancies. Information about the Careers Service, including an events calendar is available from www.careers.cam.ac.uk. There are also a number of careers advisers available to those who wish to book individual discussions.

Faculty Careers Website and Mailing Lists
The Faculty operates mailing lists for those wishing to receive information about careers, research positions and other opportunities that are sent to the Faculty for broader circulation and publication. At the start of Part III students are automatically subscribed to:

- phd-opportunities
- job-opportunities
- temporary-job-opportunities.

Further information about these lists, including how to unsubscribe, is available from www.maths.cam.ac.uk/careers/, where you will also find links to other resources.

Talks and Events
There will be several talks and workshops run throughout the year. Details of these events can be found in the Part III Calendar (*Appendix II*):

- *Applying for PhDs*
- *Introduction to the Careers Service*
- *Research in the UK*
- *Cambridge Mathematics Placements (CMP)*

In addition, the *Careers for Mathematicians Event* will be hosted at the CMS at the end of October. This job and internship fair is open to all students and postdocs.

Many research groups in the Faculty also organise presentations to Part III students during the Michaelmas term. Part III students will have the opportunity to hear examples of what the different groups are working on, and to ask questions about their research group and subject.

18. Cambridge Mathematics Placements (CMP)

Students are encouraged get experience working as mathematicians during their summer holidays including working as a mathematician outside the environment of a mathematics department. **Cambridge Mathematics Placements (CMP)** facilitates placements of students in industry and in other departments and laboratories within the University. For further information, please see www.maths.cam.ac.uk/opportunities/careers-for-mathematicians/summer-research-mathematics/information-for-students.

19. Safety and Security

Access and Security at the CMS
The main doors into Central Core are normally unlocked on weekdays between 8.00am-5.30pm, and on Saturdays from 8.30am-5.00pm in term time. Magnetically locked doors should not be propped open, or the alarm will sound. You need a University Card to unlock exterior doors and interior doors outside core hours. ***Keep your card on you at all times.***

Your College is responsible for providing you with a University Card, but it will need activating to work at the CMS and will give you 24/7 access. Ask at Reception for activation of your card. If you

wish to have out-of-hours access to the Betty and Gordon Moore Library, you will also need to take your card there for programming.

If you lose your card report it immediately to Reception (65000) reception@maths.cam.ac.uk.

Do not let strangers without keys or entry cards into the buildings and **do not** move computers without contacting the Computer Officers. Close manual windows and lock manual doors if you are the last to leave.

The University is not insured for theft of, or damage to, your personal property while you are on University premises, so if you bring a computer with you, you should take out insurance for it. The University is insured for accidental personal injury to staff, students and visitors while they are on University premises, but only where the accident was due to fault on the University's part.

General Safety

The CMS Safety Officer, Mick Young, will give a short safety briefing for new students as part of the Introductory Meeting. It is important that all members of the Department staff observe safe working practices and inform the appropriate Safety Officer or the relevant Departmental Administrator, if they see anything giving cause for concern. The CMS safety policy is available at http://www.cms.cam.ac.uk/site-safety-policy.

All accidents or near misses should be reported, whether or not they involve personal injury. Accident report forms are available from Reception and online at https://www.safety.admin.cam.ac.uk/policy-guidance/emergency-first-aid/hsd020e-accident-dangerous-occurrence-and-incident-report-form. Completed forms should be submitted to the Laboratory or Site Safety Officer as appropriate.

Site Officers are:

- For the Laboratory: Dr Mark Hallworth (37841) mah14@cam.ac.uk
- For the rest of the CMS site: Mr Mick Young (66915) CMSfacilitiesmanager@maths.cam.ac.uk
- For DAMTP: Hannah Fox, Departmental Administrator (37863) damtpsec@maths.cam.ac.uk
- For DPMMS: Vivien Gruar, Departmental Administrator (37996) dpmmssec@dpmms.cam.ac.uk

First Aid

First Aiders may be summoned via Reception (65000). First Aid boxes are held in each common rooms in one of the cupboards and a First Aid room is located in the lower ground floor of Pavilion F. There is an automated external defibrillator (AED) sited on the buttress adjacent to reception leading to the entrance to Pavilion G common room.

If an accident occurs outside normal office hours, telephone Security on 31818. The emergency number for FIRE, POLICE or AMBULANCE is ***via Security on 101, or 1999 on any network phone***.

All incidents must be reported to Reception, and a report form completed. Forms can be downloaded from https://www.safety.admin.cam.ac.uk/policy-guidance/emergency-first-aid/hsd020e-accident-dangerous-occurrence-and-incident-report-form. The completed form should be handed to reception or emailed to reception@maths.cam.ac.uk.

Fire Safety

Familiarise yourself with entrances, emergency exits and fire-alarm assembly points. In the event of the fire alarm sounding, leave the building by the nearest exit. ***Do not re-enter the building, even if the alarm has been silenced, until advised to do so.***

The external doors do not unlock automatically for security reasons; exit in the normal way. Assembly points are shown on posted site plans and Fire Wardens will direct you. Do not attempt to enter another building if the alarm is sounding there also.

In an emergency, and in the unlikely event of doors failing to open, break the glass in the ***green*** "break glass" boxes located alongside each door. Please report this to Reception/Security, as the doors will remain unlocked until the breakglass is replaced.

Fire alarms are tested in each building every Wednesday morning between 08.30 and 09.00. The alarm will sound for only a few seconds and for this brief period only it can be ignored; if the alarm continues to sound please evacuate the building. Fire Safety training is provided at the CMS in Michaelmas term and you are encouraged to attend.

Smoking
Smoking, including electronic cigarettes and vapour pipes, is not allowed in any of the CMS buildings and is actively discouraged near entrances or automatic vents and windows. Please do not smoke in the garden area outside the Part III room or near the bridge between Pavilion B and Central Core. Ashtrays are provided beneath the cycle shelters around the perimeter of the site and the circular seating areas outside the main entrance to Central Core.

20. Part III Facilities

Part III Room
The Part III room (sometimes known as the Dirac Graduate Centre) is located on the lower ground level of Pavilion B (BL.16). It can be accessed via Pavilion B, or via the external steps from the walkway which connects Pavilion B to Central Core. Part III students are free to access this room at any time, but please note that card access is required after hours and at weekends (see *Section 19 – Safety and Security*).

Part III Kitchen and Coffee Area
Kitchen facilities (kettle, microwave, fridge etc.) outside the Part III room are for the use of Part III students. Limited quantities of milk and sugar are provided free of charge. Sachets for Flavia hot drinks machines are available to purchase from Reception. Please wash and clear away any crockery and cutlery after use. The refrigerators should not be used for long-term storage of food as space is limited. Please use the recycling bins for paper, cardboard, glass, plastic bottles and aluminium cans**.**

Other Catering Facilities
The central dining facility is open Monday – Friday from 09.00 to 16.00 for snacks, light lunches and coffee and tea. Please ensure you return your trays to the collection points and place all unwanted items in the appropriate bin. All cafeteria plates, cutlery, napkins, etc. are made from Vegware and are biodegradable and should be placed along with any waste food in the bins marked as compostable waste. There are vending machines in Pavilion A and also the Betty & Gordon Moore Library.

Recycling
CMS has one of the best recycling rates within the University with approximately 2/3 of waste recycled; please help us maintain and better this by thinking carefully about how you should dispose of waste and select the correct waste stream. Most waste may be recyclable or compostable so please do take the trouble to carefully segregate different items. Minimising our impact on the environment is increasingly important and it costs the University twice as much to dispose of general waste as it does for mixed recyclables waste.

Lockers

The lockers located in the coffee area of the Part III room and in the lobby immediately outside the room are available for student use. Locker keys can be obtained from the Graduate Office (C0.15). ***Lockers must be emptied and keys returned by 30th June 2020. Lockers will be cleared shortly thereafter.***

Computing, Printing and Photocopying Facilities
For details of the computing and printing facilities in the Part III room see *Section 22 – Email and Computing*. There is a photocopier available for your use. Currently there is no charge for copying. Please report any problems with the photocopier to Reception. Spare paper for printers and photocopier is kept alongside the equipment in the Part III room. Call Reception for more paper. When Reception is closed, limited paper supplies may be taken from B0.01. Please use the recycling bins for used printer paper.

Telephone
Incoming and outgoing calls are restricted to within the University network only. The extension number is 65243. There is also a telephone at the top of the staircase near Reception that is restricted to outgoing calls within the University network.

Post
Part III student post should be directed to your College address. Ask at Reception for help with outgoing post.

Disabled Students
The building was designed for universal access but please contact Mick Young (66915) CMSfacilitiesmanager@maths.cam.ac.uk for advice on access to and egress from the buildings and any special requirements that may need to be considered.

21. Library

The Betty and Gordon Moore Library, located on the CMS site, is the principal STEM library of the University holding collections across the whole of STEM with the exception of Clinical Sciences (which are held at the Medical Library). The library holds extensive collections in Mathematics and the Physical Sciences. Detailed information is available from http://moore.libraries.cam.ac.uk/. Students are pre-registered for borrowing on the library management system as part of the general enrolment to the University, but you will need to register for 24-hour access. Please see a member of staff at the library to obtain a form.

Other libraries in Cambridge may be relevant to postgraduate students. For example, the University Library in West Road holds a large collection of older mathematical material. A complete listing of Cambridge libraries may be found at https://www.libraries.cam.ac.uk/libraries-directory/libraries-a-z.

The library discovery system is iDiscover (http://idiscover.lib.cam.ac.uk). Use this to search the University's libraries print and online collections using a single search. You can also manage your patron account through iDiscover, check your loans, pay fines online etc.

There are many specialist print and online resources to support mathematical sciences in Cambridge, which are detailed in the Maths LibGuide at https://libguides.cam.ac.uk/maths.

You may find that you have to search existing academic literature for your work. The Betty & Gordon Moore Library's Research Support team will be happy to help you do this. Feel free to get in touch with them to book an appointment at moore-rso@lib.cam.ac.uk. The team also offers useful training sessions on a range of topics, which are advertised to all mathematics students throughout the year.

22. Email and Computing

Email and Computing Accounts
Students will be issued with a University email account and a Desktop Services computing account by the University Information Services (UIS). Students who are new to Cambridge are able to retrieve passwords for these accounts in advance of arrival in Cambridge as part of the University's Student Registration process. Students who have already studied at Cambridge should be able to access their previous account. Accounts that have been closed down during the summer vacation by UIS can be re-activated upon request. Further information about accounts is available from http://help.uis.cam.ac.uk/user-accounts-security/accounts-passwords/user-administration/accounts.

Cohort mailing lists
The Faculty uses student mailing lists for issuing important information to the entire student body, or specific student groups. They are moderated to prevent students receiving unofficial email and/or junk email. Most students will have *no* need to send email to these lists, and should do so only if information is of genuine *academic interest to all* students.

Noticeboard mailing lists
The Faculty also operates email lists for students who wish to receive information about careers, courses or jobs via a system called 'noticeboard'. All new students are added to this mailing list at the start of their course. If you wish to opt out of the 'noticeboard' you are free to do so. For further details see https://www.maths.cam.ac.uk/current-students/careers-mathematicians.

Laptops/Wifi Devices
You can connect to the Internet using Wifi on most of the site; further information on wireless connections is available at https://help.uis.cam.ac.uk/service/devices-networks-printing/network-services/wireless. Alternatively, you can use a wired connection by plugging into data-ports in the Part III Room which are connected to the CMS laptop network. These are clearly labelled and normally provided with an orange patch cable.

Windows/Linux PCs available for students at the CMS
PCs connected to the University's Desktop Services are available for use by students in the Part III Room. The computers are all 'dual-boot' which means they can be started-up to run either Microsoft Windows or Linux. Many software applications are available on both Linux and Windows computers. You may use whichever operating system you prefer, but students who intend to stay on to do research may wish to learn Linux as most of the computers in DAMTP/DPMMS run Linux. Information on these and other Desktop Services facilities at the CMS is available from https://things.maths.cam.ac.uk/computing/mcs/. Information on Desktop Services facilities in general, including a list of available software is available from https://help.uis.cam.ac.uk/service/devices-networks-printing/managed-desktops/mcs.

Printing
Students are given some print-credit at the start of each academic year that can ***only*** be used to print to the two Desktop Service printers in GL.04 and to the two Desktop Services printers in the Part III Room. The amount of print-credit given is generous and should not require topping up during the year. Printing within the credit limit is free. If for any reason you run out of credit you can apply in writing for additional credit. A form and further details are available at https://things.maths.cam.ac.uk/computing/ucs/mcs/MCS-print.html.

Computing Help
Please email requests for computing assistance to help@maths.cam.ac.uk.

Computing Courses
The University Information Service offers a wide range of training courses which are open to members of the University. Please see the online training timetable and booking facility at http://training.cam.ac.uk/ucs/ for details.

Computing Rules
Users of Faculty computing facilities are subject to some rules which are published by UIS at http://www.uis.cam.ac.uk/about-us/governance/uis-policies-and-guidelines. In particular your attention is drawn to the following:

- Desktop Services accounts are issued for use by a single individual. You must not log in using another person's login name or allow any other person to access facilities using your login name.
- Computer hardware should be used carefully and left in a condition fit for others to use.
- Information belonging to other users is confidential. You must not read, access, or modify any file not owned by you without the explicit permission of the owner. When a file is not protected (i.e. read or write access by others is allowed), it should not be assumed that permission to copy or modify the file is granted.
- Proprietary software must be used correctly in accordance with licensing conditions and must not be copied or modified. If you install any proprietary software, including shareware, on Part III computers, you must hold a valid licence.
- Users must **not access** any material on the Internet or other facility which:
  (a) is libellous, racist, obscene or indecent;
  (b) is likely or designed to cause offence, inconvenience or anxiety to others;
  (c) infringes copyright law or any other law (images and sound particularly);
  (d) is of a character likely to bring the University or Faculty of Mathematics into disrepute.
- If you encounter such material by accident you are advised to stop viewing immediately and avoid accessing it again.

Appendix I: Key Contacts 2019-2020

Role	Name	Email	Room
DAMTP Course Director	Dr D. Stuart	partiii-director@damtp.cam.ac.uk	B2.20
DPMMS Course Director	Prof I. Leader	partiii-director@dpmms.cam.ac.uk	C2.02
Director of Taught Postgraduate Education	Dr J. Wolf	director-tpe@maths.cam.ac.uk	C2.07
Chair of the Part III Committee	Prof D. Tong	partiii-chair@maths.cam.ac.uk	B2.13

DAMTP Subject Advisers

Subject	Adviser	Email	Room
Astrophysics	Dr R. Rafikov	rrr@damtp.cam.ac.uk	F1.10
Applied and Computational Analysis	Dr A. Shadrin	A.Shadrin@damtp.cam.ac.uk	F2.03
Particle Physics, Quantum Fields and Strings	Prof D. Tong	D.Tong@damtp.cam.ac.uk	B2.13
Quantum Computation, Information and Foundations	Prof A.P.A. Kent	A.P.A.Kent@damtp.cam.ac.uk	F0.11
Continuum Mechanics	Prof E. Lauga	E.Lauga@damtp.cam.ac.uk	H0.07
Relativity and Gravitation	Prof H.S. Reall	H.S.Reall@damtp.cam.ac.uk	B2.02
Philosophy of Physics	Dr J. Butterfield	jb56@cam.ac.uk	Trinity College
Mathematical Biology	Prof J. Gog	jrg20@cam.ac.uk	G.10

DPMMS Subject Advisers

Subject	Adviser	Email	Room
Algebra	Dr C.J.B. Brookes	C.J.B.Brookes@dpmms.cam.ac.uk	C1.06
Analysis and PDEs	Dr N.G. Wickramasekera	N.Wickramasekera@dpmms.cam.ac.uk	E1.11
Combinatorics	Prof I. Leader	I.Leader@dpmms.cam.ac.uk	C2.02
Foundations	Prof I. Leader	I.Leader@dpmms.cam.ac.uk	C2.02
Differential Geometry and Topology	Prof I. Smith	I.Smith@dpmms.cam.ac.uk	E2.01
Number Theory	Prof. A.J. Scholl	A.J.Scholl@dpmms.cam.ac.uk	E1.17
Algebraic Geometry	Prof M. Gross	M.Gross@dpmms.cam.ac.uk	E1.08
Statistics	Prof R.J. Samworth	R.J.Samworth@statslab.cam.ac.uk	D2.08
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Administrative Contacts
If you are uncertain which office to contact, please contact the Graduate Office in the first instance.

Office	**Responsibilities**	**Email**	**Room**
Undergraduate Office	Lecture timetable Examples class timetable Examinations Part III Essays Results & Transcripts	undergrad-office@maths.cam.ac.uk	B1.28
Graduate Office	Registration Guide to Courses Progress Interviews	partiii-secretary@maths.cam.ac.uk	C0.15
	End-of-Year Questionnaire	partiii-survey@maths.cam.ac.uk	
	Applications for continuation to PhD	DAMTP: research@damtp.cam.ac.uk DPMMS: research@dpmms.cam.ac.uk CCA: cca@maths.cam.ac.uk	

Other Useful Contacts

	Email
Computing Help	help@maths.cam.ac.uk
Facilities	facilities@maths.cam.ac.uk
Reception	reception@maths.cam.ac.uk
Faculty Hotline	feedback@maths.cam.ac.uk

Appendix II: Provisional Part III Calendar 2019-2020

October	
Tue 08	*Welcome to CMS and Part III for MASt Students* 10:00, CMS MR2
Tue 08	Michaelmas Full term begins
Tue 08	Preparatory Workshops begin 14:00, various locations
Wed 09	*Introductory Meeting for All Students* 09:30, CMS MR2 & MR3 *Group photograph and welcome party* 16:30, CMS Core
Thu 10	Michaelmas term lectures begin
Wed 16	*Meet-and-Greet by subject area* Various times (to be announced), CMS
Wed 23	*Applying for PhDs* 16:15, CMS MR2
Wed 30	*Introduction to the Careers Service* 16:15, CMS MR2 *Careers for Mathematicians* 17:00, CMS Core
November	
Fri 01	List of examination courses announced in Reporter by this date
Wed 06	*Research in the UK* 15:30, CMS MR2
Fri 08	Deadline for Faculty members to request additional examination papers
Wed 13	*Planning your essay: reading, understanding, structuring* 16:15, CMS MR2
Thu 14	Michaelmas Term Progress Interviews take place this week (Week 6)
Mon 18	Essay deadline information and essay descriptions are expected to be available to candidates by this date.
Wed 20	*Introducing Cambridge Mathematics Placements* 16:15, CMS MR2
Wed 20	Deadline for return of completed Michaelmas term Progress Interview forms
Wed 27	*How to give a good talk* 16:15, CMS MR2
December	
Wed 04	Last day of Michaelmas term lectures
Thu 05	*Part III seminar series* All day, various locations
Fri 06	*Part III seminar series* All day, various locations

	Part III seminar series party 18:00, Part III room Michaelmas Full term ends List of essay titles and additional examination papers announced in Reporter by this date
January	
Tue 14	Lent Full term begins
Thu 16	Lent term lectures begin
Throughout	*Cambridge Mathematics Placements Project Presentations* Various lunch-time seminar, CMS
Wed 29	*Writing your essay: from outline to final product* 16:15, CMS MR2
Fri 31	Deadline for candidates to request additional essay titles Deadline for candidates to raise concerns about the examination timetable
February	
Wed 12	*All about exams* 16:15, CMS MR2
Thu 13	Additional essay titles are expected to be available to candidates by this date.
Wed 19	List of additional essay titles announced in the Reporter by this date
Thu 20	Lent Term Progress Interviews take place this week (Week 6)
Wed 26	Deadline for return of completed Lent term Progress Interview forms
March	
Wed 04	*Revision strategies* 16:15, CMS MR2
Wed 11	Last day of Lent term lectures
Thu 12	*Part III seminar series* All day, various locations
Fri 13	*Part III seminar series* All day, various locations *Part III seminar series party* 18:00, Part III room Lent Full term ends
April	
Tue 21	Easter Full term begins Candidates receive examination entry form to indicate choice of examination papers and essay
Thu 23	Easter term lectures begin
Thu 30	Deadline (at noon) for return of forms giving choice of examination papers and essay Deadline (at noon) for submission of essays
May	
Wed 20	Easter term lectures end

Thu 28	Part III examinations begin
June	
Tue 09	Part III examinations end
Fri 12	Full term ends
Wed 17	It is expected that your results will be available to you alone via CamSIS at 16:30.
Thu 18	Examination results are released so you can discuss them with Faculty members.
Fri 19	*Part III End-of-Year Party* 16:00, CMS Core

A Google calendar of all Part III deadlines, events and activities can be accessed at www.maths.cam.ac.uk/facultyboard/calendars/. Details of how to subscribe to this calendar are available from the website.

Appendix III: Faculty Board Advice to Examiners

Aims and Objectives of Part III of the Mathematical Tripos

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 the way to becoming independent learners, expositors and thinkers.

Examinations
Courses of 24 hours duration count as 3 units and are examined by 3 hour papers. Courses of 16 hours duration count as 2 units and are examined by 2 hour papers. Students may write one essay which counts as 3 units. Students may take up to 19 units for examination.

Each paper is set and marked by an assessor. They award marks out of a maximum of 100 and in addition assign a ‘quality mark’. This will usually be a straight reflection of the numerical mark in accordance with the table below. The minimum performance deserving of a distinction is associated with α-, while the minimum performance deserving of a pass is associated with β-.

92-100	α+
81-91	α
70-80	α-
59-69	β+
48-58	β
37-47	β-
26-36	γ+
15-25	γ
1-14	γ-

However, if the assessor feels that the quality of a candidate's work is not properly represented by the numerical mark, then the quality mark will reflect this. When there is a discrepancy between the numerical and quality mark this must be explained in a note to examiners.

In addition assessors may make comments about the nature of the performance of individual candidates and about the overall difficulty of the paper.

The Faculty's Transcript given to each successful candidate includes the numerical mark and quality mark for each paper.

Classification
As a result of the examination, each candidate is placed in one of the following categories: Distinction, Merit, Pass, Fail or 'Other'. 'Other' may include, for example, candidates who were ill for part of the examination.

The Faculty Board has laid down the following criteria for deciding the different classes.

Distinction. Candidates will have demonstrated mastery over a considerable range of material. Their performance will have been such as would be expected of someone starting PhD research at a leading mathematics department.

Merit. Candidates will have performed at first class level. In the words of the criteria used for a first class in our undergraduate examinations they 'will have demonstrated a good command and secure understanding of examinable material. They will have presented standard arguments accurately and showed skill in applying their knowledge.'

Pass. Candidates will have performed at upper second class level. They will have demonstrated the ability to absorb and understand difficult material but there may remain gaps in their understanding and they may not always be able to apply their knowledge successfully.

The examiners are responsible for assigning a class to the candidates but are not expected to rank candidates within classes. The chairman of examiners should discuss with the external examiners which candidates are likely to lie on borderlines so that the external examiners may pay particular attention to the scripts of those candidates.

The examiners are asked to classify students according to the descriptions above taking account of the following guidance issued by the Faculty Board. If the examiners have difficulty in applying any of the Faculty Board recommendations, then they are asked to draw attention to the specific problem in the examination report.

The Faculty Board expects that the examiners will award about 35%-40% Distinctions and about 60% (±2.5%) Distinctions and Merits. Based on past experience the Faculty Board expects the number of Fails to be small but to fluctuate substantially from year to year.

In addition, the Faculty Board has issued the following advice to examiners.

In classing students the examiners will not consider whether they have chosen to be examined on 17, 18 or 19 units. Since judgements are made on the best papers the choice of 17, 18 or 19 units will not affect their chances of obtaining a distinction or a merit. Although it is possible to get a distinction or a merit with fewer units, the examiners may take into account the fact that students taking fewer than 17 units have covered a smaller range of courses.

In deciding whether to pass students the examiners will not consider the number of units the students have chosen to be examined on provided the number is greater than or equal to 12. Although it is possible to pass with fewer units, the examiners may take into account the fact that students taking fewer than 12 units have covered a smaller range of courses.

Students should not be penalised for the act of sitting a paper.

The Faculty Board does not necessarily expect the mark distribution for essays to be the same as that for written examinations. Many students produce excellent essays and the Faculty Board wishes that hard work and talent thus exhibited should be properly rewarded.

The Faculty Board recognises that the length of an essay is only a weak reflection of the quantity of work involved and bears no relation to the quality of the work done. However, it is anxious to prevent the essay absorbing too much of the candidate's time. It is therefore perfectly content if a topic is set for which an excellent essay requires about 5000 words and would be unhappy if a topic were set for which an excellent essay required more than 8000 words. The Faculty Board does not wish candidates to worry about word count but would like essay setters who discover that their essays regularly elicit more than 8000 words to consider whether their topics are too demanding.

In the light of the above advice, the Faculty Board has recommended that the primary classification criterion should be the Optimum Mark, which is defined below. However, the treatment of candidates near borderlines may include other considerations, for example quality marks. The treatment of candidates on the pass/fail border line depends on individual considerations.

The Optimum Mark

The Optimum Mark is calculated as follows. Suppose a student takes n papers and that x_i is the mark achieved on paper i, $i = 1, \dots, n$. Suppose that paper i is an n_i -unit paper (so that n_i is either 2 or 3 as appropriate and $\sum_{i=1}^{n} n_i \leq 19$).

First find the Mean Mark M_{all}, given by

$$M_{\text{all}} = \frac{\sum_{i=1}^{n} n_i x_i}{\max\left\{\sum_{i=1}^{n} n_i, 17\right\}} .$$

Then, for $k = 1, \dots, n$, find the Mean Mark M_{-k} that results from dropping paper k:

$$M_{-k} = \frac{\sum_{i \neq k} n_i \, x_i}{\max\{\sum_{i \neq k} n_i \, , 17\}} .$$

The Optimum Mark M is $\max\{M_{\text{all}}, M_{-1}, \dots, M_{-n}\}$.

Essay Descriptors for Part III of the Mathematical Tripos

The Part III Committee believes that the essay is a key component of Part III. It also believes that it is entirely reasonable and possible that candidates may obtain higher marks for essays than in their examination, both because of the typical amount of effort devoted to the essay, and also the different skill set which is tested compared to a time-limited written examination. In light of these beliefs, as well as the comments of both the internal examiners and the external examiners, the Part III Committee believes that it is appropriate to suggest the following descriptors for the various possible broad grade ranges for an essay. The committee trusts that these guidelines prove useful in guiding the judgement of the inevitably large numbers of assessors marking essays, and that these guidelines strengthen the mechanisms by which all essays are assessed uniformly. They are not meant to be either prescriptive or comprehensive, but rather general guidance consistent with long-standing practice within the faculty.

An Essay of Distinction Standard

Typical characteristics expected of a distinction standard essay include:

- Demonstration of clear mastery of all the underlying mathematical content of the essay.
- Demonstration of deep understanding and synthesis of advanced mathematical concepts.
- A well-structured and well-written essay of appropriate length (5000-8000 words) with:
    - very few grammatical or presentational issues;
    - a clear introduction demonstrating an appreciation of the context of the central topic of the essay;
    - a coherent presentation of that central topic;
    - a final section which draws the entire essay to a clear and comprehensible end, summarising well the key points while suggesting possible future work.

An essay of distinction standard would be consistent with the quality expected of an introductory chapter of a PhD thesis from a leading mathematics department. A more elegant presentation and synthesis than that presented in the underlying papers, perhaps in the form of a shorter or more efficient proof of some mathematical result would be one possible characteristic of an essay of distinction standard. Furthermore, it would be expected that an essay containing publishable results would be of a high distinction standard, but, for the avoidance of doubt, publishable results are **not necessary** for an essay to be of high distinction standard. An exceptionally high mark ($\alpha+$) should be justified by a specific extra statement from the assessor highlighting precisely which section of the essay was of particularly distinguished quality.

An Essay of Merit Standard

Typical characteristics expected of a merit standard essay include:

- Demonstration of good mastery of most of the underlying mathematical content of the essay.
- Demonstration of understanding and synthesis of mathematical concepts typical of the content of a Part III course.
- A largely well-structured essay of appropriate length (5000-8000 words) with:
    - some, but essentially minor, grammatical or presentational issues;
    - an introduction demonstrating an appreciation of at least some context of the central topic of the essay;
    - a reasonable presentation of that central topic;
    - a final section which draws the entire essay to a comprehensible end, summarising the key points.

An essay of merit standard would be consistent with the quality expected of a first class standard final year project from a leading mathematics department. Such essays would not typically exhibit extensive reading beyond the suggested material in the essay description, or original content.

An Essay of Pass Standard

Typical characteristics expected of a pass standard essay include:

- Demonstration of understanding of some of the underlying mathematical content of the essay.
- An essay exhibiting some non-trivial flaws in presentation through, for example:
    - an inappropriate length;
    - repetition or lack of clarity;
    - lack of a coherent structure;
    - the absence of either an introduction or conclusion.

An essay of pass standard would be consistent with the quality expected of an upper second class standard final year project from a leading mathematics department. For the avoidance of doubt, an excessively long essay (i.e. of the order of twice the suggested maximum length or more) would be likely to be of (at best) pass standard. A key aspect of the essay is that the important mathematical content is presented clearly in (at least close to) the suggested length.