UNIVERSITY OF
CAMBRIDGE

Master's Programme in
Scientific Computing

Course Handbook
2022-23

Course Management

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MPhil Academic Committee

- The Course Director and Deputy Director
- The Director of the CDT in Computational Methods for Materials Science
- The Examiners of the course
- The External Examiner of the course

Contents

Introduction

The MPhil programme on Scientific Computing is offered by the University of Cambridge as a full-time course which aims to provide education of the highest quality at Master's level.

Covering topics of high-performance scientific computing and advanced numerical methods and techniques, it produces graduates with rigorous research and analytical skills, who are formidably well-equipped to proceed to doctoral research or directly into employment in industry, the professions and the public service.

It also provides training for the academic researchers and teachers of the future, encouraging the pursuit of research in computational methods for science and technology disciplines, thus being an important gateway for entering PhD programmes containing a substantial component of computational modelling.

The MPhil is administered by the Department of Physics, but it serves the training needs of the Schools of Physical Sciences and Technology. The ability to have a single Master's course for such a broad range of disciplines and applications is achieved by offering core (i.e. common for all students) numerical and High Performance Computing (HPC) lecture courses, and complementing them with additional courses relevant to atomistic and continuum modelling.

In this way, students are given a bespoke training portfolio, as well as having all the benefits of a cohort training approach. This bespoke course is fully flexible in allowing each student to liaise with their academic or industrial supervisor to choose a study area of mutual interest.

Course objectives

By the end of the course, students will have:

- a comprehensive understanding of numerical methods, and a thorough knowledge of the literature, applicable to atomic scale or continuum simulations;
- demonstrated originality in the application of knowledge, together with a practical understanding of how research and enquiry are used to create and interpret knowledge in their field;
- shown abilities in the critical evaluation of current research and research techniques and methodologies;
- demonstrated self-direction and originality in tackling and solving problems, and acted autonomously in the planning and implementation of research.

Eligibility, admissions and funding

Places in the course are offered from October onward on a conditional (academic and other, as applicable) basis. Applications for the course will be submitted through the University-wide online system for processing postgraduate applications, which then passes them to the Department of Physics.

Successful candidates will have a first-class honours degree from a UK university (or equivalent from international institutions) in a science or technology discipline. Applicants are expected to be able to demonstrate an adequate level of computer literacy (should be able to write code performing a science/maths application using a programming language such as C/C++, FORTRAN, Java or Python).

Full details of the application procedure, including an application form and deadlines, can be found on the University's website:
https://www.postgraduate.study.cam.ac.uk/courses/directory/pcphmpscm

Candidates are encouraged to pay particular attention, on the application form, to the section where their preferred choice of research area must be stated. Their choice must be identified at this stage, so that their application can be forwarded to an appropriate supervisor for consideration. Alternatively, if a preferred supervisor has been identified, they can be named in the appropriate box in the application form.

The main University website has a webpage listing all of the possible sources of funding:
https://www.graduate.study.cam.ac.uk/finance/funding

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Course Architecture

The MPhil in Scientific Computing is a 12-month full-time Master's Degree, which has a research and a taught element.

The taught element comprises lectures and practicals. It is examined by means of written assignments and written examinations and accounts for 50 % of the total examination credit.

The research element is a project on a science or technology topic which is studied by means of scientific computation (most of the projects are expected to make use of the University's High Performance Computing Service).

To gain research examination credit (which accounts for 50 % of the total examination credit), students have to submit a dissertation and attend a viva-voce examination.

The topic of the research project should fall within the research interests of the Departments of the Schools of Physical Sciences and Technology.

The preferred direction of a student's research project strongly influences their training during the course, i.e. their choice of lectures and practicals and hence their assessment (written assignments and examination papers). These are selected in consultation with the Course Director.

The combination of the research project, lecture courses, written assignments and written examination papers, defines an informal route (or stream) within the MPhil.

Commonly followed routes are related to atomistic or continuum modelling of matter and on computational multiphysics and engineering. These routes are for guidance only and are not exhaustive of the topics that can be supported.
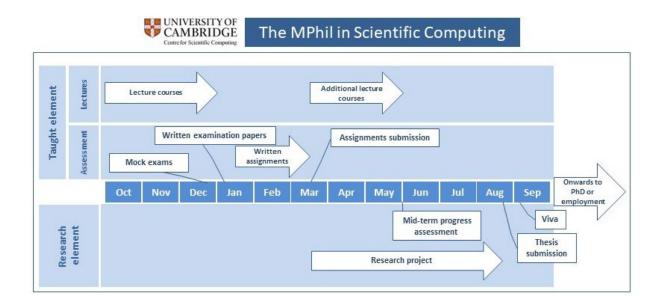
Candidates who have a specific research topic in mind should approach the relevant research staff members from the Departments of the Schools of Physical Sciences and Technology.

The structure of the course	
Length:	12 months
Course structure:	Core taught courses: Michaelmas Term. Elective taught courses: Michaelmas and Lent Terms. Written assignments: Lent Term Research Project/Dissertation: Lent and Easter Terms.
Teaching methods:	Lectures, practicals, tutorials and supervision (for the dissertation).
Forms of assessment and weighting:	Written assignments (Lent Term), 25% credit Examinations (Lent or Easter Term), 25% credit Dissertation (15,000 word limit, submission date in August), 50% credit, examined by viva voce examination (August or September)

The students will attend lecture courses during Michaelmas Term (some courses may be during Lent Term), followed by written examinations and two written assignments between January and mid-March, and then they will undertake a substantial Research Project over the next five months (from mid-March to the mid- August). The research element aims to provide essential skills for continuation to a PhD programme or employment, as well as to assess and enhance the research capacity of the students. It is based on a science or

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technology topic which is studied by means of scientific computation. Research project topics will be provided by the course management team during Michaelmas Term.

A timeline of the year is shown below:

Taught Element

The taught element comprises courses supported by the MPhil on topics of all aspects of scientific computing, and additional lecture courses relevant to the topic of the research project.

The student submits their initial choice of courses and exams to the course administrator in writing (using the relevant form) at the start of Michaelmas Term (see 'Important dates' on page 16 for the exact date) for approval by the Course Director. Students will be asked to confirm their final exam choices in November, and these will again be subject to approval by the Course Director.

Courses supported by the MPhil

Courses supported by the MPhil are on topics of high performance scientific computing, numerical simulation and advanced numerical methods and techniques. They are organized by the Centre for Scientific Computing and are taught and examined during the first six months (October-March). Their purpose is to provide the students with essential background knowledge for completing their dissertation and for their general education in scientific computing.

In particular, their objective is to introduce students to the simulation science pipeline of problem identification, modelling, simulation and evaluation - all from the perspective of employing high-performance computing. Numerical discretisation of mathematical models will be a priority, with a specific emphasis on understanding the trade-offs (in terms of modelling time, pre-processing time, computational time, and post-processing time) that must be made when solving realistic science and engineering problems. Understanding and

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working with computational methods and parallel computing will be a high priority. To help the students understand the material, the lecturers will furnish the courses with practical coursework assignments.

The lectures on topics of numerical simulations and HPC are complemented with hands-on practicals using Linux-based laptops provided by the course (students may bring their own), as well as on the University's High Performance Computing Service.

For a list of courses supported by the MPhil in Scientific Computing, please visit:
https://www.csc.cam.ac.uk/academic/MPhilSciComp/taughtelement/supportedlectures

Additional lecture courses

Appropriate additional lecture courses are selected from Master's-level courses offered by the Departments of the School of Physical Sciences or Technology. The choice of courses will be such as to provide the students with essential background knowledge for completing their dissertation and for their general education in the materials science application of the project. They are decided in consultation with the course management team. While every effort is made within the Departments to arrange the timetable in a coherent fashion, it is inevitable that some combinations of courses will be ruled out by their schedule, particularly if the choices span more than one department.

Assessment

The taught element is examined by means of two written assignments amounting to 6 credit units and unseen written examination papers also amounting to 6 credit units, i.e. the students must accumulate a total of 12 units for examination credit (24 hrs course = 4 units, 16 hrs course = 2.5 units, 12 hrs course = 2 units, 6 hrs course = 1 unit).

The unseen written examination papers

Students will be expected to take the majority (if not all) of the examination credit units from unseen written examination papers offered by the MPhil in Scientific Computing. These currently are:

- Paper 1: Electronic Structure (12hrs, 2units).
- Paper 2: Atomistic Modelling (12hrs, 2units).
- Paper 3: Introduction to topological materials (12hrs, 2units).
- Paper 4: Computational Continuum Modelling (i) (12hrs, 2units).
- Paper 5: Computational Continuum Modelling (ii) (12hrs, 2units).
- Paper 6: Advanced Continuum Modelling (i) (12hrs, 2units).
- Paper 7: Advanced Continuum Modelling (ii) (12hrs, 2units).
- Paper 8: Introduction to Computational Multiphysics (12hrs, 2units).

Students may take written examination papers from other Master's level courses in the University, but this has to be approved by the Course Director and sanctioned by the Course Academic Committee. The form and timing of those papers will be dictated by the structure of the corresponding Master's programme.

The written assignments

The objective of the assignments is to provide the student with suitable background training on the underlying numerical methods and techniques which are necessary to complete the

research project. The lecturers of the courses supported by the MPhil or the research project supervisors, will offer a choice of assignments (with detailed instructions of what is expected) on the lectured topic.

The advisory word limit for the written assignments is within the range of **3,000 to 5,000 words**, including figure captions and references. Appropriate presentation of scientific results will be assessed as part of the overall quality of the report, therefore reports that are significantly outside the expected word limit may not be marked as highly.

Students are required to write the assignments in the LaTeX typesetting language using a research journal template (will be provided by the course organisers), so as to resemble an article submitted for publication. This is part of their training for communicating their research in the scientific literature and in conference proceedings.

Each candidate is required to submit an electronic copy of their written assignments**.** The submission deadline for the two written assignments is in mid-March (see 'Important dates' on page 16) and candidates who fail to meet this deadline without advance permission from the Course Directors will normally get no credit for this part of the assessment. Permission to defer submission will be granted only in exceptional cases, and candidates are asked to note in particular that computer-related problems will not normally be considered as grounds for deferral. Any application to defer submission must be made in writing to the Course Directors in advance of the deadline and must be accompanied by a supporting letter from the candidate's College Tutor.

The written assignments are marked by suitable assessors, but the marks are subject to moderation by the Examiners of the course. The assessors' reports will be released to candidates. The written assignments will be made available to the research project dissertation examiners.

In response to growing concerns over plagiarism in all University courses, each piece of submitted work must be accompanied by a standard cover sheet, including a signed declaration to the effect that the work is the student's own unaided effort and meets the University's guidelines and regulations on plagiarism which are outlined in the relevant page of this site.

The Research Project

The topic of the project (and hence the choice of supervisor) should fall within the research interests of the groups within the Departments of the Schools of Physical Sciences and Technology. The project is supervised by a member of the research groups of the Departments of the School.

To gain examination credit for the research element (50% credit towards the degree), students have to submit by mid-August a 15,000-word (maximum) dissertation on a substantial project of original research. The viva voce examination of the dissertation will take place during late August/early September, conducted by two assessors (an external assessor from another institution and an internal assessor, who cannot be the student's supervisor or anyone closely associated with the supervision process). The assessment of

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the projects is based on the candidate's understanding of the background literature, the commitment of the candidate to the project, the degree of originality shown in the research and the degree of rigour applied in justifying any conclusions.

In the interim period between submitting their dissertations and the viva voce examination, the students have to prepare a poster as if they were to present their research to a conference. The students have to give a 10 minute presentation of their poster at the start of their viva.

Students are expected to discuss their research preferences with the Course Director during the first week of Michaelmas Term. At the same time the Course Director will recommend suitable core and elective courses.

Research Project Guidelines

Research Projects and potential supervisors

You may list one or more preferred supervisors on your application form, however this is not mandatory. If no supervisor is listed or your preferred supervisor is not available, we will do our best to assign you someone who is suitable to your background.

We do not need a specific research project to be outlined in the application form, this will be agreed with the course management team at a later date.

The research project title

Once a research project is agreed, the title will be registered with the Course Academic Committee as a 'provisional working title' for the student's project. The provisional title can be changed to a 'final title' during the course of the project. At any time of the duration of the project, it is the students' responsibility to inform the Course Director and the Course Administrator of changes in the title and subject of their project, in the form of a written statement, signed by their supervisor. Any unchanged provisional title will automatically receive the status 'final title'.

Conduct of the research project

It is very important that the whole project is planned carefully and sufficient time allowed for each step of the research process, including writing up. During the course of their work, students are expected to see their supervisors regularly (the frequency of the meetings depends partly on the nature of the dissertation selected) to receive feedback and advice on the design and implementation of their research projects and to receive critical comments on draft chapters of their dissertation.

It is the responsibility of students to make and maintain contact with their supervisors, to attend supervisions when requested to do so, and to keep demands on their supervisors reasonable. Supervisors cannot be expected to do the students' work for them, or to respond instantly to requests for comments and advice. In particular students should agree dates for the completion of near final drafts so that time can be set aside in advance for reading and commenting on these.

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It is the responsibility of supervisors to monitor their students' work and ensure that it is progressing satisfactorily, to respond promptly to students' requests for meetings, and to turn work around in a timely manner. A good relationship between students and supervisor is crucial to the success of the MPhil course and students or supervisors are asked to contact the Director of the course as a matter of urgency if they experience any problems in this respect.

Format of the research project dissertation

As per our Regulations in the Statutes & Ordinances, the dissertation should be of not more than 15,000 words in length (including tables, figure legends, and appendices, but excluding bibliography). It should be written in 12-point type, one and a half or double spaced and with margins of at least 2 cm. The dissertation title page should bear, at the top of the page, the author's name, the approved title of the dissertation and the degree for which it is submitted. The supervisor's name should appear at the bottom right hand corner of the page. The work must be submitted electronically. Candidates should take particular care to ensure that the correct version of the text appears in the document submitted and that the title corresponds to that approved by the Degree Committee. A dissertation must be a connected account of an MPhil student's work, written by themself.

The dissertation should contain a literature survey which may be partly based on the written assignments, but it is expected that the majority of the dissertation will deal with the research actually performed during the research period. The form in which the dissertation is presented and the care with which it has been prepared and illustrated are in themselves evidence of the candidate's capabilities and will receive consideration as such. Apart from quotations (where appropriate) and recognised technical formulae, theses must be written in English and candidates are expected to show a reasonable command of the English language, to use a spellcheck facility, and to check their work carefully before submission. In submitting a dissertation, each candidate must state, generally in a preface and specifically in notes or in a bibliography, the sources from which their information is derived, the extent to which the candidate has availed himself or herself of the work of others, and the portions of the dissertation which the student claims as their own original work. The following declaration of originality should appear on the page following the title page:

"This dissertation is substantially my own work and conforms to the University of Cambridge's guidelines on plagiarism. Where reference has been made to other research this is acknowledged in the text and bibliography."

In response to growing concerns over plagiarism in all University courses, each piece of submitted work must be accompanied by a standard cover sheet, including a signed declaration to the effect that the work is the student's own unaided effort and meets the University's guidelines and regulations on plagiarism which are outlined on page 21.

Submission of the research project dissertation

The submission deadline for dissertation is in mid-August (see 'Important dates' on page 16) and any candidate who fails to meet this deadline without advance permission from the Course Directors will normally be awarded no marks for the research project and will fail the entire MPhil degree. Permission to defer submission will be granted only in exceptional cases, and candidates are asked to note in particular that computer-related problems will not normally be considered as grounds for deferral. Any application to defer submission must be made in writing to the Course Director in advance of the deadline and must be accompanied by supporting letters from the candidate's College Tutor and Supervisor. Except in the case of genuinely unforeseeable emergencies, applications to defer submission will only be considered if they are received at least one week before the deadline.

Each candidate is required to submit a digital copy of the dissertation as well as a soft-bound copy (double-sided), together with a completed Certificate of Dissertation Submission an anti-plagiarism declaration.

The student must also submit any computer source-code that they have used to generate the results shown in their dissertation. This will be referred to by the assessors to support their assessment of your work. Although re-use and modification of existing research software is typically expected, students should make it clear what code they have written themselves. The plagiarism regulations also apply to the source-code.

Posters

In the interim period between submitting their dissertation and the viva voce examination, the students have to prepare a poster as if they were to present their research to a conference. The students have to give a 10 minute presentation of their poster at the start of their viva. Poster files are to be submitted to the CSC Admin office at least 2 days before the students' viva.

Dissertation and Viva Marking and feedback

In their dissertation and viva, the student should demonstrate the following:

1. An awareness of the basic background science underlying their project work and an awareness and critical understanding of the literature which is relevant to their project work, particularly where that literature may impact on their analysis of data or their conclusions.
2. An understanding of the computational techniques they have employed, including the limitations of those techniques and how these limitations might impact on their understanding or analysis of their data.
3. An ability to accurately describe and interpret computational results.
4. An awareness of errors and ambiguities arising in computational techniques, and, where appropriate, an ability to quantify those errors.
5. An ability to draw convincing conclusions based on the evidence presented.
6. An ability to present their findings appropriately. This should include:
7. Providing a clear outline of the research problem and/or the goals of the research undertaken.
8. Writing a well-structured, concise dissertation of appropriate length

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9. Choosing appropriate illustrations and presenting them clearly with suitable annotations and legends.
10. Selecting references carefully, and presenting them in a consistent and appropriate form.

Additionally, the assessor is asked to assess to what extent the project work makes a fair contribution to the subject, and if it contains elements of originality. To pass the research project component of the MPhil course, the student should broadly meet criteria 1 - 6 described above. To achieve a "Distinction" the student should fully meet all criteria. Additionally, to achieve a "Distinction", the research presented should represent a genuine and useful original contribution to the field of study, and the dissertation as a whole should approach the quality expected of reports in reputable scientific journals.

Notes for the *Viva Voce* Examinations

Viva voce examinations normally take place in the last week of August/first two weeks of September, on dates arranged by the Course Administrator on the basis of the availability of external and internal assessors. The examination lasts for about 1.5 hours, during which the student and two assessors discuss the project work in a closed session (no one else is admitted).

The purpose of a viva voce examination is to:

- Check that the dissertation is the candidate's own work.
- Confirm that the candidate understands what they have written.
- Investigate the candidate's awareness of where their original work sits in relation to the wider research field.
- Provide the candidate with an opportunity to justify their arguments and conclusions.
- Establish whether the dissertation is of sufficiently high standard to merit the award of the MPhil degree.

All viva voce examinations are different. The assessors will have read your dissertation in detail, and can choose to ask you about any aspect of your written work, or the background science theory which relates directly to your dissertation. (We would not expect questions to be asked about background science or theory which is unrelated to the dissertation.) However, various types of questions are quite common. For instance:

- At the beginning of the viva, you may be asked to summarise your dissertation, or describe the main achievements of your project work.
- You will probably be asked some questions about the background science theory in your introduction. These questions may require depth or breadth of thinking about these topics, rather than a simple factual response.
- You will probably be asked some questions about the methods or techniques you have used. The assessors may want to check that you have understood the technique properly, as a way of confirming that you actually did the work described in the dissertation yourself. They may also want to check that you have understood any limitations of the techniques you have used, and any sources of error.
- You may also be asked questions about any quantitative analysis you have done. The assessors may want to check that you have understood the quantification

procedure, rather than, for example, just pressing buttons on some software, with no understanding of what the software does to your data.
- The assessors may ask you to justify elements of your discussion and conclusion, or to look at your data from an alternative viewpoint, and consider whether this alternative viewpoint impacts on the validity of your conclusions.

The assessors won't expect you to have an instant answer to every question they ask. It is fine to take some time to think about the question, or to ask for clarification. If you really have no idea how to answer a question, then you can tell the assessors this. They will usually be willing to give you some hints to help you think about their question. Occasionally, the assessors may even misunderstand an element of your dissertation, and if you think this has happened, so that the questions you are being asked appear to be addressing topics which are not relevant to your dissertation, you may wish to politely ask the assessors to explain the relevance of their questions.

The assessors are trying to give you an opportunity to demonstrate your knowledge, not to catch you out. If you have worked hard on your project and written it up carefully, the viva should be an enjoyable experience, since it gives you the opportunity to talk in detail about the work you have done, and perhaps discuss some new ideas arising from that work.

Progress monitoring

The progress of the students is continuously monitored during the practical sessions (Michaelmas Term). Their performance on the two written assignments offers another opportunity for assessment, approximately half way through the course calendar (March).

Mid-term progress review

Although project supervisors continuously monitor the students during the 6 months of the research project, students are expected to hand in a first draft of their dissertation approximately half-way through the project period (third week of May). The draft should have a skeleton of the dissertation (in terms of chapters), an introduction to the research project, a literature review, a substantial description of the techniques being applied and some preliminary results. The drafts are made available to an assessment committee (composed by the Course Director and project supervisors) ahead of the event. During the Mid-Term Review, students will be holding 10-minute presentations (followed by questions) to the committee and other academics from the Department. Each assessor is asked to fill in a feedback form assessing the student's progress and presentation. Feedback is given to the students during appraisal sessions by the Course Director or the research project supervisor. This process ensures that the students are on track to submit their dissertations and also helps to ensure that the projects are of consistently high research quality.

The Mid-term progress review for 2022-23 will be held at the end of May (see 'Important dates' on page 16).

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Guidelines for the interim progress assessment

The purpose of the interim research project assessment is to provide each student with the opportunity to deliver an interim written and oral report on the work in progress towards their Master's Dissertation. In many cases the work will not yet be complete and so the exercise should generate a useful review of what has been achieved so far, and any general discussion which is stimulated may help to provide a useful steer for the final writing up of the thesis. For this reason it will be understood if conclusions are loosely drawn at this stage.

The main aims of the dissertation presentation are:

- To communicate effectively on a chosen research topic
- To demonstrate the ability to defend a presentation in public
- To provide evidence of satisfactory progress with the Master's Dissertation

Submission deadline of the interim progress review

The **submission deadline** for an electronic copy of the progress report is in May (see 'Important dates' on page 16).

Structure of the mid-term progress presentation

On the presentation day, students will be required to provide an oral presentation of their research work to date, not exceeding 10 minutes. This time will be strictly adhered to, and students exceeding 10 minutes will be asked to stop. Afterwards, 5 minutes will be used for questions and a general discussion of the work with the audience. The final programme for the day will be generated shortly before the day. Data projection facilities will be available. Special requirements will have to be communicated to the Course Administrator at least one week before the presentation day. Students can either use their own laptop, provided they make sure that the presentation can be started on time, or load their file onto a laptop provided by the course at least two days in advance of the presentation. Students will be expected to submit PDF, Microsoft Powerpoint, or Apple Keynote presentations the day before, with any animations or movies. These will be loaded onto a laptop provided by the course to facilitate smooth-running of the presentations.\

Assessment of the presentation

The dissertation presentation represents a mandatory contribution to the overall dissertation requirements. Characteristics of a good presentation are:

- Clarity of delivery (organisation of material, engagement with audience, effective use of visual aids)
- Technical depth (relevance of material, critical awareness and grasp of the problem, nature of conclusions)
- Response to questions (factual probity, depth of reply, understanding of issues).

Important Dates

Most lecture courses take place in Michaelmas Term and written examinations take place in early Lent Term, but other course work is carried out throughout the year.
Although most lecture courses take place during the University term dates (see table below), written assignment and project-related work is carried out outside these dates. Students are required to be resident in Cambridge (unless working on a designated project placement) for the duration of the course, and are expected to participate in all mandatory course activities outside the periods of Cambridge Terms.

All lectures, events, deadlines etc are listed on the course **Google calendar**:
https://bit.ly/3BWlHJh

Event Timetable	
CSC Induction:	3 October 2022
Mock exams	5-9 December 2022
Live exams	9-13 January 2023
Progress review:	31 May 2023
Viva voce examination:	21 August -1 September 2023
Final Examiners meeting:	6 September 2023

Submission deadlines	
Course/exam choices:	3 October 2022 9:00 am
Final choices:	7 November 2022 12:00 noon
Written assignments:	13 March 2023 12:00 noon
Project progress report:	19 May 2023 12:00 noon
Dissertation:	18 August 2023 12:00 noon

University Full Terms	from	to
Michaelmas	Tuesday 4 October 2022	Friday 2 December 2023
Lent	Tuesday 17 January 2023	Friday 17 March 2023
Easter	Tuesday 25 April 2023	Friday 16 June 2023

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Examination Regulations

The Board of Examiners consists of the Academic Committee and the Course External Examiner. The Examiners will appoint assessors to help with the assessment of the written assignments and dissertations.

Published Examination Notice

Examination in Scientific Computing for the MPhil Degree

The scheme of examination for the one-year course of study in Scientific Computing for the degree of Master of Philosophy shall be as follows:

1. The Degree Committee for the Faculty of Physics and Chemistry shall publish, not later than the end of the Easter Term of the academical year preceding that in which the examination is to be held, a list of modules in 'Scientific Computing', provided that the Degree Committee shall have power to give notice of additional elective modules not later than the division of Michaelmas Term. The list will include core courses in scientific computing and may include elective courses from Master's-level courses offered by the Departments of the Schools of the Physical Sciences and Technology. In publishing the list of modules, the Degree Committee shall announce the form of examination for each module.

2. The examination shall consist of:

(a) a dissertation of not more than 15,000 words in length (including tables, figure legends, and appendices, but excluding bibliography) on a major project, involving in-depth original scientific research and a literature survey of the topic. The topic of the project shall be approved by the Degree Committee;

(b) two written assignments on two of the core-course options in scientific computing. The topic of the assignments shall be approved by the Degree Committee;

(c) written examination papers. The form of the examination of these papers shall be dictated by the regulations of the donor Department.

3. The examination shall include an oral examination of the dissertation or other work submitted by the candidate under Regulation 2(b), and on the general field of knowledge within which they fall.

The form of examination of each module is shown below:

Module name	Mode of Assessment
Core courses in Scientific Computing	C (written assignments), E
Elective courses in science or technology	E
Project	C (dissertation + viva)

C = coursework assignment (as specified)
E = unseen written examination

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Weighting of the Assessed Course Components

Course Element	Weight	Pass Mark (% overall mark)
Dissertation:	50	60
Written assignments on the core courses:	25	60
Written examinations on the elective courses:	25	
Total:	**100**	**60**

Marking of the Course Components

Lecture courses and Research Project	
Distinction	≥ 75%
Pass	60% - 74%
Marginal fail	55%-59%
Fail	≤ 54 %

Marking Guidelines

The following are marking guidelines, which are designed primarily for the marking of the dissertation but may be adapted for coursework and examinations. Where marks are awarded using a different scale, they will be adjusted by the Examiners at their final meeting to achieve comparability with the scale below.

The MPhil in Scientific Computing has an overall pass mark of 60%, achieved in the Lecture-course component and the Project component, and no one component can be missed or failed completely.

Students who fail or marginally fail one component but obtain an overall mark of 60% or above, and students who marginally fail both components of the course, will be expected to attend an oral examination with the External Examiner on all aspects of the course.

Marking guidelines for the dissertation and the viva voce examination:

Fail: Work that is not of the standard that might be expected of an MPhil dissertation, either because of lack of original content or because it shows a poor grasp of the relevant literature or research method adopted, because the analysis is seriously flawed, because the argument is incoherent or because the standard of writing or presentation is unacceptably poor.

Marginal fail: Work that, while below the standard that might be expected of an MPhil dissertation shows some evidence of independent thought and research, and a good basic command of the subject.

Pass: Work that shows evidence of independent thought and research, is of genuine interest as a contribution to its area of research, maintains a high standard of argument and scholarship throughout and provides evidence of the suitability of the candidate for Ph.D. research.

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Distinction: Work of undoubted interest and originality, which combines the qualities noted above to an impressive degree and provides clear evidence of the suitability of the candidate for Ph.D. research. Work at the upper end of the range will be able to stand comparison against leading scholars in the field.

Examination results

The examination results for the MPhil. are determined in September. Students must be available for the examiners' meeting.

The examiners for the MPhil in Scientific Computing meet in the third week of September.

An external examiner, who is an expert in the field of scientific computing, is appointed to review the coursework and the exam scripts, in order to moderate the marks awarded to ensure consistency between the different marking styles across this multi-disciplinary course.

All students must be available in the Department on the day of the examiners visit. It may be necessary to call the student for a short viva voce exam to confirm the mark that will be awarded to the student.

At the end of the meeting with the external examiner, a provisional list of marks is reached. These recommendations will then be considered by the Degree Committee of the Faculty of Physics and Chemistry which is the awarding body of the degree. Once confirmed by the Degree Committee, the marks will be entered onto the online CamSIS system and will be used to produce the official Transcripts at the end of the course.

The whole procedure can take some time so it is likely that the final outcome of the examination process will not be formally confirmed before the end of September and the detailed marks will not appear in CamSIS before the end of October.

Candidates should note that arrangements for the receipt of degrees are the responsibility of the Colleges, and that only candidates whose Colleges are able to present them may graduate at any particular congregation. The College will require proof that you are to be awarded the Degree of MPhil. They will see the degree has been awarded on CamSIS and they will also receive a copy of the approval email sent to the candidate by the Degree Committee.

Student Feedback Procedures

The MPhil Academic Committee values and very strongly encourages feedback from students on the performance of its academic and administrative staff and other aspects of the MPhil programme.

Unless they get feedback in a standardised form and from a statistically significant sample of the class the staff cannot determine how the quality of their provision is changing from year to year and from module to module and are severely hampered both in addressing problem areas and in meeting their objective of continuing quality improvement. The Course Administrator will contact the students with a University- approved polling system.

In addition to the formal mechanisms, informal feedback is welcome at any time and through any route (through student representatives, directly to the Coordinator of the course or to other staff members). Any serious or potentially serious problems should be communicated as quickly as possible so that action can be taken to correct them

Course Liaison Committee

A course liaison committee will be established before the end of the academic year, allowing sufficient time for the student group to get to know each other and elect two student representatives. The committee will consist of the following:

- The Course Director and Deputy Director
- Two student representatives
- The Course Administrator
- A representative from the previous cohort

Further resources for students

Please visit this page to access further resources, including the current Student's Code of Practice, Equality and Diversity information and Safety policies:

https://www.csc.cam.ac.uk/academic/MPhilSciComp/resources

Last edited in September 22

Plagiarism

In response to growing concerns over plagiarism in all University courses, each piece of submitted work must be accompanied by a standard cover sheet, including a signed declaration to the effect that the work is the student's own unaided effort and meets the University's guidelines and regulations on plagiarism. These guidelines are outlined below.

Examination in Scientific Computing for the MPhil Degree

Regulations on plagiarism

Plagiarism is presenting the work of others as if it were one's own. If discovered by the Examiners, it will be treated as an attempt to gain credit under false pretences and may be referred to the University Court of Discipline. Plagiarism is treated by the University with the utmost seriousness, and severe penalties are imposed whenever it is detected. This may result in a candidate failing the degree, for which they are entered.

The Examiners will normally consider as plagiarism any instance in which the work/ideas of another person have been included in the submission of examinable work, whether or in paraphrase, without full acknowledgement to their author. This acknowledgement must include detailed bibliographic references (including Internet addresses where appropriate) to any sources from which information or ideas have been derived.

It is appreciated that candidates will often perform practical exercises together, and that they may wish to study in groups in order to learn from each other and to solve problems together. However, it is essential that any material finally submitted for marking is the work of the candidate making the submission, written in their own words, and presented in their own way, with proper acknowledgement of all sources from which information has been derived, and a clear indication of the extent to which use has been made of the work of others.

Each candidate who submits a project report, essay, dissertation or any other work for examination will be required to sign a declaration that the submission is their own work, unaided except as may be specified in the declaration, that all sources are fully acknowledged and referenced, and that the submission does not contain material that has already been used to any substantial extent for a comparable purpose. If two or more candidates submit work in collaboration, they will each be required to sign the declaration and will be held jointly responsible for adhering to it.

Any marks awarded will be conditional on the above requirements having been met. Coursework marks contribute significantly to your overall mark. Because this work is not carried under examination conditions the distinction between beneficial co-operation and deliberate cheating should be clear in everyone's mind.

The course team will be using TurnItIn plagiarism detection software (https://www.plagiarism.admin.cam.ac.uk/investigating/turnitin/students) and MOSS (Measure of Software Similarity) https://theory.stanford.edu/~aiken/moss/

Co-operation and teamwork

It is perfectly acceptable to discuss continuously assessed work with other students or supervisors. Such discussions are beneficial and we wish to encourage them. It is right that effective use of such discussions can lead to higher marks, always provided that it is the student who has made the main contribution to the work submitted and understands all of it.

Cooperation can go too far, however, especially if one student is effectively carried by another. Thus, while it may well be beneficial for students to discuss a problem, it is unacceptable for two students to submit effectively identical essays or other assignment work. The named author must have made the main contribution to the work submitted and the report must be in their own words. Any attempt to pass off the work of others as being produced by the named author is cheating.

Web-based plagiarism

With the proliferation of easily accessible information on the internet there has been a steady rise in students using cut and paste techniques to import non-attributed material into their own work. Under no circumstances is this practice allowed and it is expressly forbidden. Sophisticated search engines are now available to staff to match passages suspected as having been plagiarised with the original source material. In circumstances where this confirms plagiarism from the internet the offending student will be immediately reported to the University authorities for disciplinary action.

The course team treats the issue of plagiarism very seriously. Integrity and responsibility in fulfillment of all course requirements is expected from all course participants.

Guidelines on plagiarism

In some cultures it may be seen as a form of flattery or respect to use someone else's words or ideas as part of the candidate's own material. However in many parts of the world, including the UK, words and ideas are considered to be intellectual property, owned by the individual who created them, in the same way they might own land or a lap-top computer. In these communities it is believed that a person's intellectual property must not be used without permission. Deliberate and conscious copying is unethical and against the high standards set by scientific researchers, academic authors and professional engineers.

In constructing a written piece of work it is therefore essential that the reader is clearly informed where the source material has been derived from, and identify any ideas or forms of expression that are not your own. This means all sources must be accurately cited so that the person owning the intellectual property is given proper acknowledgement for the work they have done. These are the high standards which are strictly adhered to at Cambridge University and even if you try and express someone else's ideas in your own words this too is considered plagiarism.

Citing a source

This means including a reference in your text to show that material such as words, data, ideas, diagrams, software, etc. has been extracted from another source. This can be done easily by including in parenthesis the author's last name and date of publication e.g. (Smith, 2002). This reference is cross-referenced to a complete list at the end of your paper or report

in the form of a Bibliography, which directs the reader to the location of the material (book, Journal, web-site page etc.). This information must be complete and accurately presented so the reader can find the source for themselves. Not only does this approach properly acknowledge the work of others but it also allows the reader to judge how much you are relying on information from perhaps just one or two, as opposed to many, authors and how recent and up to date this information is.

In general, any specific information, which is not common knowledge, must be cited. If in any doubt whether a fact or other information is common knowledge then a source must be cited. Other people's ideas can be included in two ways: either by quoting the source directly within quotation marks, or by paraphrasing in your own words the idea. In both cases, the reference to the source material must be cited. However direct quotes should not be overused and it is best to only include them in your work if the author has made a point in a particularly insightful way. These quotations can complement, but cannot be a substitute for, your own line of reasoning.

It is possible to fall into the trap of unconscious plagiarism, usually arising from an over zealous direct use of notes when preparing written assignments and reports. It may also occur if an essay is based too closely on the highlighted passages of marked up texts or photocopies.

Including un-referenced material downloaded directly from the internet also constitutes plagiarism. Any web-based information should be respected and cited like any other more traditional source. Also there is far less quality control applied to much information which is posted on the internet and so the veracity of material obtained in this way should be treated with greater caution, doubt and uncertainty.

A piece of work, which merely cites the ideas and results of other authors' endeavours, is not transformed into "original" work simply by the use of extensive referencing and footnotes. It is vital that your work adds a critical dimension to this material through your own judgement and analysis.

If in any doubt make it clear to the reader by citation and references where the original idea, material or data has come from. If you don't, it will be considered as lying, cheating, stealing and an insult to the original author.

For up-to-date advice on plagiarism please see the University's website:

https://www.plagiarism.admin.cam.ac.uk/