

Mathematical Institute and Department of Statistics: Examination Conventions 2020–21

MSc in Mathematical Sciences (OMMS)

1 Introduction

Examination conventions are the formal record of the specific assessment standards for the course or courses to which they apply. They set out how examined work will be marked and how the resulting marks will be used to arrive at a final result and classification of an award. This document sets out the examination conventions for the **MSc in Mathematical Sciences (OMMS)** in accordance with the regulations for this course. This document explains how work will be marked and how the final degree classification will be derived from these marks. These examination conventions are approved annually by the Supervisory Committee for the MSc in Mathematical Sciences and by the Graduate Studies Committee in the Mathematical Institute. The Board of Examiners may only make minor deviations from these conventions in exceptional circumstances and only after the consent of the Proctors. This document is in all ways subsidiary to the current:

- *Examination Regulations,*
- *Policy and Guidance for Examiners and others involved in University Examinations.*

2 General Structure of the Examination

All courses in this programme have a component of formal assessment — through open book written exams or mini-projects. The modes of assessment for all courses will be published at the beginning of each academic year.

You are required to take 8 units, of which 2 units should be a dissertation. More specifically, you are required to offer at least 3 units which are assessed by open book written examination. You may take an additional 1-2 units if you wish. A unit usually corresponds to a 16-hour lecture course, supplemented with around 6 hours of classes.

Of the non-dissertation units, you may take Mathematics units, Statistics units, and up to 2 units from Computer Science.

3 Open Book Written Examination Papers

Further details about open book written examinations can be found in the Open Book Exams Guide for Candidates, available at <https://www.ox.ac.uk/students/academic/exams/open-book>.

3.1 Mathematics Department Units

C1.1–C3.10, C4.1–C5.3, C5.5–C5.9, C5.11–C6.4, C7.4–C8.4

Most mathematics units will be assessed by an open book written exam. These will consist of three questions, each worth 25 marks. You may submit answers to as many questions as you wish, but only the best two answers will count towards the final mark for the paper. The examinations will be administered online and will be of two hours and 15 minutes duration. Of this time you should spend one hour and 45 minutes on the examination and the 30 minutes on downloading the exam paper and then scanning your handwritten solutions and uploading them at the end.

In all papers the questions set should, as a whole, be fairly spread across the syllabus. Questions will be similar in style to previous questions, with an easy start examining material explicitly covered in the course, followed by a part which tests understanding. Each question will be set so that a sound student can produce a complete answer in 35–40 minutes.

Each question should be divided into two to four parts and an indication of the raw marks available for each part of each question should be given on the question paper.

C7.1

Please see the Physics Part C examination conventions at <https://weblearn.ox.ac.uk/portal/hierarchy/mps/physics/teaching/undergrads/exammatters>.

3.2 Statistics Department Units: SC1–SC10

Please see the Mathematics and Statistics Part C examination conventions at http://www.stats.ox.ac.uk/current_students/bammath/examinations.

3.3 Computer Science Department Units: CCS1–CCS3

Please see the Mathematics and Computer Science Part C examination conventions at <http://www.cs.ox.ac.uk/teaching/examconventions/mcs.html>.

4 Mini-Projects

Mini-projects are normally set by the course lecturers and have a weighting of one unit. USM marks will be assigned to mini-projects with the same meaning as regards class boundaries as in the mathematics/statistics papers and with reference to the qualitative descriptors in Appendix B.

Note: Once a mini-project has been submitted you cannot withdraw from that unit.

5 Dissertation

Each dissertation will be offered and supervised by a dissertation supervisor and have a weighting of two units. The word limit for dissertations is 7,500 words. USM marks will be assigned to dissertations with the same meaning as regards class boundaries as in the mathematics/statistics papers with reference to the qualitative class descriptors in Appendix C. In arriving at these marks, the relative weights attached to mathematics/statistics, content and presentation will be 50%, 25% and 25% respectively.

Further guidance on dissertations can be found in the dissertation guidance handbook:
<https://www.maths.ox.ac.uk/members/students/undergraduate-courses/teaching-and-learning/part-c-students/teaching-and-learning/dissertations>.

6 Examination Conduct

You will receive advice from the examiners before each part of your examination. These notices provide information on the practical arrangements, procedures in the case of illegible or incomplete scripts and illness, and notification of results. Notices from examiners can be found on the Mathematical Institute's website at:

<https://www.maths.ox.ac.uk/www.maths.ox.ac.uk/members/students/undergraduate-courses/teaching-and-learning/part-c-students/examinations-and-assessments/part-c-and-omms>.

6.1 Penalties for Non-Attendance

Rules governing non-attendance at examinations and any consequent penalties are set out in full in the Examination Regulations (Regulations for the Conduct of University Examinations, Part 14). If you will be prevented by illness or other urgent cause from sitting one of your examinations you should contact your college office or college advisor as soon as possible.

If you miss an exam, you will be expected to provide a statement to your college explaining the reason you were not able to attempt the open-book exam within 48 hours of the start of that open-book exam. Colleges should apply with this information using the standard process.

In cases where the Proctors do not believe there are satisfactory reasons for non-attendance or an application to the Proctors has not been submitted, students with an overall failure will be permitted to retake the examination on at most one subsequent occasion. A candidate who resits a failed examination will have the mark for that unit capped at 50.

6.2 Penalties for Late Submission of Open Book Examination Solutions

Candidates should upload their submission within the time allowed for their open-book examination. Candidates who access the paper later than the published start time (and who do not have an agreed alternative start time) will still need to finish and submit their work within the originally published time frame or be considered to have submitted late. Candidates who access the paper on time but who submit their work after the published time frame will also be considered to have submitted late. Where candidates submit their examination after the end of the specified time frame and believe they have a good reason for doing so, they may submit a mitigating circumstances notice to examiners to explain their reasons for the late submission. The Exam Board will consider whether to waive the penalties for late submission.

The penalties will be applied at the paper level and are shown in Table 1 below. Penalties will only be applied after the work has been marked and the Exam Board has checked whether there are any valid reasons for late submission.

Lateness	Penalty
First 5 minutes	No penalty
6–20 minutes	Fail mark

Table 1: Late Submission Tariff for Open Book Exams.

7 Penalties for Late Submission of Coursework

The Examination Regulations stipulate specific dates for submission of coursework to the examiners, this includes the OMMS dissertations, mini-projects and any coursework you need to complete if you take a course taught by another

department. Rules governing late submission and any consequent penalties are set out in full in the Examination Regulations (Regulations for the Conduct of University Examinations, Part 14).

If you will be prevented by illness or other urgent cause from submitting your coursework on time, you should contact your college office or college advisor as soon as possible. Your college is able to submit an application for an extension of time to the Proctors on your behalf.

The scale of penalties agreed by the board of examiners in relation to late submissions of assessed coursework, where permission to submit late has not been granted by the Proctors, is set out in Table 2 below. Details of the circumstances in which such penalties might apply can be found in the Examination Regulations (Regulations for the Conduct of University Examinations, Part 14).

Lateness	Penalty, % point reduction
Up to 4 hours	1%
4–24 hours	10%
24–48 hours	20%
48–72 hours	30%
72 hours – 14 days	35%
More than 14 days late	Fail

Table 2: Late Submission Tariff for Coursework.

Note: The penalty will be a percentage reduction of the maximum total mark available for the work. For example, if a 10% penalty is applied to an assessment given a USM out of 100 then 10 marks would be deducted. The final mark awarded after application of the penalty cannot be below 0.

You are advised that, according to the University’s Examination Regulations, the University applies a late fee to any work covered in this section which is handed in late. You must inform your college of any mitigating circumstances as soon as possible, so that the college can make an application to the Proctors if appropriate.

Failure to submit a required element of assessment, without an accepted reason, will result in the failure of that assessment. In this case, the mark for any resit of the assessment will be capped at 50 and you would be ineligible for a merit or distinction overall. Such as resit is available on one occasion only to candidates who initially fail the whole MSc course.

8 Plagiarism

You are reminded of the importance of avoiding any plagiarism, please see <http://www.ox.ac.uk/students/academic/guidance/skills/plagiarism> for further guidance. Depending on their severity, cases of suspected plagiarism may be referred to the Proctors for investigation or may be dealt with by the board of examiners. If dealt with by the board of examiners as a case of poor academic practice, the examiners may deduct marks (for lack of adequate referencing, poor use of citation conventions etc) of up to 10% of the marks available for the assessment. Where the consequence of the marks deduction would result in both the failure of the assessment and of the programme, the case must be referred to the Proctors.

When you take an open book exam, you will be required to sign up to an ‘honour code’. This will confirm that you have understood and abided by the University’s rules on plagiarism and collusion (see <https://www.ox.ac.uk/students/academic/exams/open-book/honour-code?wssl=1>).

We will reserve the right to conduct follow-up viva voce exams to check candidates’ understanding of the examined material, even where these are not currently specified in the Examination Regulations.

9 Marking of Examinations

All mathematics, statistics and computer science examinations are marked by a single assessor or examiner according to a pre-agreed mark scheme which is strictly adhered to. The examination scripts are then checked by an independent checker to ensure that all work has been marked, and that the marks have been correctly totalled and recorded.

The dissertations are independently double-marked, normally by the dissertation supervisor and one other assessor. The two marks are then reconciled to give the overall mark awarded.

Mini-projects are independently double-marked, normally by the course lecturer and one other assessor. The two marks are then reconciled to give the overall mark awarded for the mini-project. The exception to this is that mini-projects which have pre-agreed model solutions and marking schemes are marked by a single assessor. The mini-projects are then checked by an independent checker to ensure that all work has been marked, and that the marks have been correctly totalled and recorded.

Please see the appendices for the qualitative descriptors for mini-projects (Appendix B) and dissertations (Appendix C).

9.1 Reconciliation of Dissertation and Mini-Project Marks

Where a piece of work has been independently marked by two assessors, they will adhere to the department's reconciliation process. If the assessors' marks do not differ by more than 10, the final mark will usually be the average of the two marks, symmetrically rounded if necessary (for example, 75.49 will be rounded down and 75.50 will be rounded up). However, if the marks differ by more than 10 marks, the assessors will be required to have a further discussion about the assessment in order to try to reach a decision on the final mark. In the unlikely event the two assessors are unable to agree on a mark, the examiners will be consulted and, if necessary, a third assessor appointed in order to make a final decision on the mark.

10 University Standardised Marks

Marks for each individual assessment will be reported as University Standardised Marks (USMs). The object of the USMs is to allow direct comparison between the results of examinations in different subjects. Raw marks may be turned into USMs by scaling (see Section 11 for further details), sometimes necessary to ensure that all papers are fairly and equally rewarded. The correspondence between the USM ranges and classes is as follows:

- 70-100: Distinction
- 65-69: Merit
- 50-64: Pass
- 0-49: Fail

These marks reflect the qualitative descriptors given in Appendix D.

11 Analysis of Marks

Examination marks will be reported to candidates in the form of University Standardised Marks. The object of the USM is to allow direct comparison between the results of examination in different subjects. Examiners may recalibrate raw marks to arrive at the USMs reported to candidates and the USMs reported to candidates for each paper should be symmetrically rounded.

The examiners may choose to scale marks where in their academic judgement:

- a paper was more difficult or easier than in previous years, and/or
- a paper was more or less difficult than other papers taken by students in a given year, and/or
- a paper has generated a spread of marks which is not a fair reflection of student performance on the University's standard scale for the expression of agreed final marks, i.e. the marks do not reflect the qualitative marks descriptors.

Such scaling is used to ensure that all papers are fairly and equally rewarded. Scaling will only be considered and undertaken after moderation of a paper has been completed, and a complete run of marks for all papers is available.

Scaling may be also used to mitigate against the difficulties with setting an alternative format of assessment required in response to the COVID-19 pandemic and any related difficulties faced by candidates.

When scaling the raw marks on a paper the examiners will consider the following:

- the relative difficulty of the paper compared to the other papers;
- the report submitted by the assessor who set and marked the paper.

Examiners will use their academic judgement to ensure that appropriate USMs are awarded and may use further statistics to check that the marks assigned fairly reflect the students' performances on a paper. The Board of Examiners may also review a sample of papers either side of the classification borderlines to ensure that the outcome of scaling is consistent with the qualitative marks descriptors. On each paper, any recalibration of marks should be done without disturbing the order of candidates.

The scaling algorithm used by the examiners is explained in detail in the 2019 undergraduate Part C (year 4) examiners' report which can be found at <http://www.maths.ox.ac.uk/node/33437>.

Classification Conventions

Let $AvUSM$ denote the weighted average of the dissertation plus the 6 other best USMs achieved (symmetrically rounded, 62.49 will be rounded down and 62.50 will be rounded up), at least 3 of which will have been assessed by written examination. Where a student has taken a double-unit course in addition to the dissertation, this will be counted as two separate USMs when calculating the $AvUSM$. Then the classification criteria agreed by the Supervisory Committee for OMMS are as follows:

- Distinction: $AvUSM \geq 70$;
- Merit: $70 > AvUSM \geq 65$;
- Pass: $65 > AvUSM \geq 50$;
- Fail: $50 > AvUSM$.

Note: Students who fail one paper or more contributing to $AvUSM$ will not be eligible for a distinction or a merit.

11.1 Resits

A student who fails the MSc in Mathematical Sciences course may resit on one, but no more than one, subsequent occasion. This resit attempt shall normally be taken at the next opportunity, but may be deferred once, i.e. it must be taken at one of the next two opportunities. In such a case, a student will not be eligible for a merit or distinction on the whole course. The examiners will specify at the time of failure which of the assessed components of the course may or must be redone. A candidate who resits a unit for which a technical fail mark was originally awarded (a unit for which no work was submitted or a written examination was missed) will have the mark for that unit capped at 50.

No student who has satisfied the examiners in the examination may enter again for the same examination.

If a student fails one particular unit, there is no provision for the candidate to resit that unit during the same academic year.

Where a course is no longer being offered in the year of the resit, the Examiners will be responsible for arranging provisions. For more information, please see Part 14 of the Examination Regulations.

12 Alternative Examination Arrangements and Mitigating Circumstances Notices to Examiners

A candidate in any University Examination with specific learning difficulties or disability/illness may apply through the Senior Tutor of their college for alternative examination arrangements relating to their condition. Please see <http://www.ox.ac.uk/students/academic/exams/arrangements> for further information on the process.

Candidates who would like the examiners to be aware of any factors that may have affected their performance before or during an examination are advised to discuss their circumstances with their college and consult the Examination Regulations (Part 13). Candidates should complete the form entitled *mitigating circumstances notices to examiners* and send this to their college with appropriate supporting material. The candidate's college will submit the application for forwarding to the relevant Chair of Examiners.

Where a candidate or candidates have made a submission, under Part 13 of the Examination Regulations, that unforeseen factors may have had an impact on their performance in an examination, a subset of the board will meet to discuss the individual applications and band the seriousness of each application on a scale of 1–3 with 1 indicating minor impact, 2 indicating moderate impact, and 3 indicating very serious impact. When reaching this decision, examiners will take into consideration the severity and relevance of the circumstances, and the strength of the evidence. Examiners will also note whether all or a subset of papers were affected, being aware that it is possible for circumstances to have different levels of impact on different papers. The banding information will be used at the final board of examiners to adjudicate on the merits of candidates. Further information on the procedure is provided in the *Policy and Guidance for Examiners, Annex B* and information for students is provided at <http://www.ox.ac.uk/students/academic/exams/guidance>.

13 Formative Feedback

For mini-projects and dissertations, the assessors will be encouraged to give comments providing constructive feedback on the projects they marked. After being approved by the Chair of Examiners on behalf of the Examination Board, and after the final results have been released, this feedback will be passed on to students.

You will also receive formative feedback on some non-examined work through comments on the problem sheets you complete for the classes accompanying lecture courses. You will receive further formative feedback during supervisions.

14 Examiners for 2020–21

The internal examiners are:

Prof. Luc Nguyen (Chair),

Prof. Robin Evans,

Prof. Dominic Joyce,

Prof. James Martin,

Prof. Harald Oberhauser,

Prof. Damian Rössler,

Prof. Qian Wang.

The external examiners are:

Prof. Jim Griffin (UCL),

Prof. Richard Jozsa (University of Cambridge),

Prof. James Robinson (University of Warwick).

It must be stressed that to preserve the independence of the examiners, you should not make contact directly with them about matters relating to the content or marking of papers. Any communication must be via the Senior Tutor of your college, who will, if they deem the matter of importance, contact the Proctors. The Proctors in turn communicate with the Chair of Examiners.

Appendices

A Examination Papers: Form of Questions

Further information set out for examiners, as well as examination setters and checkers can be found in the appendices of the MMath Part C examination conventions:

<https://www.maths.ox.ac.uk/members/students/undergraduate-courses/examinations-assessments/examination-conventions>.

B Mini-Projects Qualitative Descriptors

Mini-projects will be assessed with reference to the following qualitative descriptors.

- 70–100 The candidate has demonstrated an excellent understanding of almost all of the material covered with a commensurate quality of presentation and has completed almost all of the assignment satisfactorily, further subdivided by:
- 90–100 The candidate has shown considerable originality and insight going well beyond the straightforward completion of the task set.
 - 80–89 The work submitted shows a near-perfect completion of the task at hand, but does not meet the additional requirements above, or does but has some defects in presentation.
 - 70–79 The work submitted is of a generally high order, but may have minor errors in content and/or deficiencies in presentation.
- 60–69 The candidate has demonstrated a good or very good understanding of much of the material, and has completed most of the assignment satisfactorily, without showing the level of excellence expected of the above USM range.
- 50–59 The candidate has demonstrated an adequate understanding of the material and an adequate ability to apply their understanding, without showing the level of understanding expected of the above USM range.
- 40–49 The work submitted, while sufficient in quantity, suffers from sufficient defects to show a lack of adequate understanding or ability to apply results.
- 30–39 The candidate, while attempting a significant part of the mini-project, has displayed a very limited knowledge or understanding at the level required.
- 0–29 The candidate has either attempted only a fragment of a mini-project or has shown an inadequate grasp of basic material.

C Dissertations Qualitative Descriptors

Dissertations will be assessed with reference to the following qualitative descriptors.

- 90–100 Work of potentially publishable standard, as evidenced by originality or insight. The work should show depth and accuracy, and should have a clear focus. It is likely to go beyond the normal MSc level.
- 80–89 Work in this range will be at the level of a strong candidate for a DPhil applicant. It will have depth, accuracy and a clear focus. It will show a strong command of material at least at the MSc level. It is likely to contain original material, which may take the form of new mathematical propositions, new examples, or new calculations, for example.

- 70–79 The work submitted is of a generally high order, with depth, clarity and accuracy, but may have minor errors in content and/or deficiencies in presentation. It may contain original material, at least in the sense of new examples or calculations.
- 60–69 The candidate shows a good grasp of their subject, but without the command and clarity required for first class marks. Presentation, referencing and bibliography should be good, and the mathematics/statistics should have no more than minor errors.
- 50–59 The work shows an adequate grasp of the subject, but is likely to be marred by having material at too low a level, by serious or frequent errors, a high proportion of indiscriminate information, or poor presentation and references.
- 40–49 The candidate shows reasonable understanding of parts of the basic material, but reveals an inadequate competence with others. The material may be at too low a level. There are likely to be high levels of error or irrelevance, muddled or superficial ideas, or very poor writing style.
- 30–39 The candidate shows some limited grasp of at least part of the material.
- 0–29 Little evidence of understanding of the topic. The work is likely to show major misunderstanding and confusion.

D Class Descriptors

Qualitative class descriptors for the levels of performance are summarised below:

- **Distinction:** High quality work throughout the course. The candidate shows excellent knowledge of the material over a wide range of topics. The criteria for USMs in the distinction band are:
 - 90-100: The candidate shows remarkable ability and true insights. Dissertations in this band will be potentially worthy of publication.
 - 80-89: The candidate shows outstanding problem-solving skills and outstanding knowledge of the material over a wide range of topics, and is able to use that knowledge innovatively and/or in unfamiliar contexts.
 - 70-79: The candidate shows excellent problem-solving skills and excellent knowledge of the material over a wide range of topics, and is able to use that knowledge innovatively and/or in unfamiliar contexts.
- **Merit:** The merit covers very good quality of work through out the course. The criteria for USMs in the merit band are:
 - 65-69: The candidate shows very good problem-solving skills, very good knowledge over a wide range of topics, or excellent command of some material and good or very good command of the rest.
- **Pass:** The pass covers a wide range of results from candidates who show adequate knowledge of most of the material, to candidates who show good knowledge of much of the material over a wide range of topics. The criteria for USMs in the pass band are:
 - 60-64: The candidate shows good or very good problem-solving skills, and good or very good knowledge of much of the material over a wide range of topics.
 - 50-59: The candidate shows basic problem solving skills and adequate knowledge of most of the material.
- **Fail:** The candidate shows an inadequate grasp of the basic material. Candidates may have shown some understanding but the majority of work is likely to show major misunderstanding and confusion, and/or inaccurate calculations.
 - 40-49: The candidate shows reasonable understanding of at least part of the basic material and some problem solving skills. Although there may be some good work, the majority of work will contain errors in calculations and/or show incomplete understanding of the topics.

- 30-39: The candidate shows some limited grasp of basic material over a restricted range of topics, but with large gaps in understanding. There need not be any good quality work, but there will be indications of some competence.
- 0-29: The candidate shows an inadequate grasp of the basic material. The work is likely to show major misunderstanding and confusion, and/or inaccurate calculations.