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 M.Sc. in Mathematical Modelling and Scientific Computing for the academic year 2019-20. These examination conventions are approved annually by the Supervisory Committee for the M.Sc. in Mathematical Modelling and Scientific Computing and by the Graduate Studies Committee in the Mathematical Institute.

Examiners

The board of examiners will consist of 4 internal members (2 from the Numerical Analysis Group and 2 from OCIAM/WCMB) and 1 external examiner. The examiners will appoint assessors to help with the assessment of the course. The internal examiners for the academic year 2019-20 will be Professor Philip Maini (Chair), Professor Patrick Farrell, Professor Peter Grindrod, and Professor Jared Tanner, and the external examiner will be Dr Stephen Langdon from the University of Reading.

Candidates should not, under any circumstances, seek to make contact with individual internal or external examiners.

Course Requirements

All students should complete 13 units. Each unit will carry the same weight. Marks will be given in terms of USMs (University Standardised Marks) out of 100 with the conventions: 0-49 fail; 50-64 pass; 65-69 merit; 70-100 distinction.

All students should take and be assessed on 13 units:
- 4 written examinations on core courses (1 unit each);
- 2 special topics: one labelled [M] and one labelled [C] (1 unit each);
- 1 case study in mathematical modelling (1 unit);
- 1 case study in scientific computing (1 unit);
- 1 dissertation and viva (4 units);
- 1 further special topic or case study (1 unit).

The USMs, weighted as above, are averaged to give an average USM. Any USMs with decimals of 0.5 and above will be rounded up to the nearest whole USM, and any USMs with decimals below 0.5 will be rounded down to the nearest whole USM.
Classification

Students will only be eligible for a distinction if they fulfil all the following criteria:

- Average USM $\geq 70$;
- All partial USM $\geq 50$;
- Dissertation and Viva USM $\geq 70$.

Students who fulfil these criteria will usually be awarded a distinction.

Students who are not awarded a distinction, but who have passed at least 10 units of assessment and have an average USM of at least 65, will be awarded a merit.

Students who are not awarded a distinction or merit, but who have passed at least 10 units of assessment and have an average USM of at least 50, will be awarded a pass.

Otherwise, students will fail the course.

A student who fails the whole course may resit on one, but not 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.

Individual Units of Assessment

Once a piece of work has been submitted, it cannot be withdrawn. Students may not submit work for assessment for more than 13 units. Below is a description of the different units on the course and how they are assessed.

Core Courses (1 unit each) The core courses will be taught in Michaelmas and Hilary Terms and will be assessed by four written examinations, two in Week 0 of Hilary Term and two in Week 0 of Trinity Term. Each examination lasts for two and a half hours and consists of six questions, split into two or three sections. Calculators will not be allowed in the written examinations. Each question is marked out of 25 according to an approved marking scheme and these marks are independently checked to ensure that all parts have been marked and that the marks have been correctly totalled and recorded. A mark of zero will be recorded for any part or parts of questions that have not been answered but which should have been answered. Candidates may attempt as many questions as they wish. Each student’s raw mark consists of their best mark from each section and their other best marks (two further marks if there are two sections, one further mark if there are three sections). If a student has not attempted a question from one section, their raw mark will consist of their best three marks from the other
sections. (In the case where there are three sections and a student has only attempted questions from one section, the raw mark consists of the best two marks from that section.) The examiners exercise their academic judgment to recalibrate the raw marks to arrive at USMs as described at the end of this document.

**Special topics** (1 unit each) Each student must do at least one special topic in the area of Modelling [M] and one in the area of Computation [C]. Special topics are assessed by mini-projects of approximately 15 pages in length (up to a maximum of 20 pages without penalty) which are independently marked by two assessors, usually the course lecturer and another member of faculty. These two marks are then reconciled as described below. The final USMs are then awarded by the examiners based on the reconciled raw marks.

**Case Studies in Mathematical Modelling and in Scientific Computing** (1 unit each) Each student must do at least one mathematical modelling case study and at least one scientific computing case study. Each scientific computing case study involves 4 weeks of group work, further personal study and an individual written report. The report is independently marked by two assessors, usually the lecturer and another member of faculty. A mark out of 75 is awarded for the write-up of the group work and a mark out of 25 is awarded for the write-up of the student’s individual extension. (If the student has not extended the project, they are given a mark of zero for this part of the project.) These marks are then reconciled as described below. Each mathematical modelling case study involves 5 weeks of group work, a group oral presentation and an individual written report. The presentations are given a mark out of 20 (agreed by at least two assessors) and the reports are marked out of 100, normally by the course convenor and another member of faculty. The reconciled mark for the written report is then multiplied by 0.8 and added to the presentation mark to give a raw mark for the unit. Marks with decimals of 0.5 and above will be rounded up to the nearest whole mark, and marks with decimals below 0.5 will be rounded down. The final USMs for the case studies are awarded by the examiners based on the recommended and reconciled raw marks.

**Dissertation and viva** (4 units) The main body of the dissertation should be 40-50 pages long (including figures and tables and up to a maximum of 54 pages without penalty), and need not necessarily contain original research. The dissertation is read and marked by two internal assessors/examiners, neither of whom is the student’s supervisor and at least one of whom is an examiner. The dissertations of a selection of students, including those at the pass/fail or pass/distinction borderlines, are also read by the external examiner. All students will also be examined viva voce. The assessors for the viva voce examination will be the examiners who have read the dissertation. The supervisors will propose a 10 mark range for the dissertation along with a statement of justification for this range which the exam board will take into account when confirming the final mark. If the assessors are unable to agree a mark the decision will be referred to the other examiners. The USM marks will include credit for originality and performance in the viva.

For students starting PGT courses from Michaelmas Term 2018, agreed final marks for individual units of assessment will be expressed using the following scale:

<table>
<thead>
<tr>
<th>Mark Range</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>70-100</td>
<td>Distinction</td>
</tr>
<tr>
<td>65-69</td>
<td>Merit</td>
</tr>
<tr>
<td>50-64</td>
<td>Pass</td>
</tr>
<tr>
<td>0-49</td>
<td>Fail</td>
</tr>
</tbody>
</table>
Reconciliation of Special Topic and Case Study Marks

Special topics and case studies are independently marked by two assessors. If the assessors' marks do not differ by more than 10, the final mark will usually be the average of the two marks (rounded up to the nearest whole mark if necessary). However, if the marks are on opposite sides of the pass/fail borderline or differ by more than 10 marks there will be further discussion between the assessors in order to try to reach a decision on a 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.

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 worthy of publication without the need for further mathematical investigation and without the need for significant re-writing of the text.
- 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 shows very good quality of work throughout the course. Candidates who achieve a merit will have demonstrated very good problem solving skills and knowledge over a wide range of topics, or excellent command of some material and 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 or very 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 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 inadequate grasp of the basic material. The work is likely to show major misunderstanding and confusion.

**Usage of Formative Feedback**

Those who mark the case studies and special topics are 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 results have been released, this feedback is passed on to the students in the hope it will help them to improve future project work. In addition students will receive feedback on their dissertations after the final results have been released. Students will also receive feedback on non examined work during the first two terms. This will take the form of comments on problem sheets submitted for the core courses.

**Late Submission of Coursework**

Late Submission of Coursework for the MSc in Mathematical Modelling and Scientific Computing (this includes case studies, special topics and the dissertation) is a serious matter and will usually result in financial and academic penalties unless prior permission for late submission has been given by the Proctors. In the absence of such Proctorial permission, the financial penalty will take the form of a late submission fee and the academic penalties will be as set out in the tables below. (Note that if the late submission penalty is higher than your mark for the submission, you will be awarded a mark of zero.) Note that deadlines for special topics and case studies are assumed to be on Mondays at 12noon and the deadline for the dissertation will be Wednesday at 12noon.

<table>
<thead>
<tr>
<th>Lateness of special topic or case study</th>
<th>Penalty (USMs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 4 hours, i.e. up to Monday 4pm</td>
<td>1</td>
</tr>
<tr>
<td>4-24 hours, i.e. up to Tuesday 12noon</td>
<td>5</td>
</tr>
<tr>
<td>24-48 hours, i.e. up to Wednesday 12noon</td>
<td>10</td>
</tr>
<tr>
<td>48-72 hours, i.e. up to Thursday 12noon</td>
<td>20</td>
</tr>
<tr>
<td>72-96 hours, i.e. up to Friday 12noon</td>
<td>30</td>
</tr>
<tr>
<td>96 hours-7 days</td>
<td>40</td>
</tr>
<tr>
<td>7-14 days</td>
<td>50</td>
</tr>
<tr>
<td>More than 14 days</td>
<td>fail (mark of 0 awarded)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lateness of dissertation</th>
<th>Penalty (USMs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 4 hours, i.e. up to Wednesday 4pm</td>
<td>1</td>
</tr>
<tr>
<td>4-24 hours, i.e. up to Thursday 12noon</td>
<td>5</td>
</tr>
<tr>
<td>24-48 hours, i.e. up to Friday 12noon</td>
<td>10</td>
</tr>
<tr>
<td>48 hours-5 days, i.e. up to Monday 12noon</td>
<td>20</td>
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<tr>
<td>5-6 days, i.e. up to Tuesday 12noon</td>
<td>30</td>
</tr>
<tr>
<td>6-7 days</td>
<td>40</td>
</tr>
<tr>
<td>More than 7 days</td>
<td>fail (mark of 0 awarded)</td>
</tr>
</tbody>
</table>
Where no work is submitted, the Proctors may decide not to permit the candidate to continue on the MSc course. If the Proctors permit the candidate to continue on the MSc course, a mark of zero will be awarded for that particular piece of work. The mark for any resit of the assessment will be capped at 50. Such a resit is only available once to candidates who initially fail the whole MSc course.

Candidates must attend all written examinations for the MSc course unless permitted not to by the Proctors. Any case of non-attendance at an exam involving illness or other medical condition will require written medical evidence and will usually be referred to the Proctors. Candidates who miss a written examination without good reason will also have their case referred to the Proctors and will be awarded a mark of zero for that examination. The mark for any resit of the examination will be capped at 50. Such a resit is only available once to candidates who initially fail the whole MSc course.

**Penalties for Submissions Exceeding the Page Limits**

Submissions exceeding the pages limits will be assessed in the usual way and then penalties applied as indicated in the tables below.

<table>
<thead>
<tr>
<th>Length of special topic</th>
<th>Penalty (USMs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>21 pages</td>
<td>1</td>
</tr>
<tr>
<td>22 pages</td>
<td>5</td>
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<tr>
<td>23 pages</td>
<td>10</td>
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<td>24 pages</td>
<td>20</td>
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<tr>
<td>25 pages</td>
<td>30</td>
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<tr>
<td>26 pages</td>
<td>40</td>
</tr>
<tr>
<td>27 pages or more</td>
<td>50</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Length of dissertation</th>
<th>Penalty (USMs)</th>
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</thead>
<tbody>
<tr>
<td>55-56 pages</td>
<td>1</td>
</tr>
<tr>
<td>57-58 pages</td>
<td>5</td>
</tr>
<tr>
<td>59-60 pages</td>
<td>10</td>
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<tr>
<td>61-62 pages</td>
<td>20</td>
</tr>
<tr>
<td>63-64 pages</td>
<td>30</td>
</tr>
<tr>
<td>65-66 pages</td>
<td>40</td>
</tr>
<tr>
<td>67 pages or more</td>
<td>50</td>
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</tbody>
</table>

**Mitigating Circumstances Notices to Examiners**

The board of examiners will use the following procedure for the consideration of medical and other special circumstances transmitted to them via the Examinations and Assessments Section:

a) 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.
b) The banding information will be used at the final board of examiners meeting to
adjudicate on the merits of candidates;
c) A brief, formal record will be kept confirming (i) the fact that information about
special circumstances has been considered by the examiners, (ii) how that information
has been considered, and (iii) the outcome of the consideration with the reasons for
the decisions reached.

Further information on how to submit Mitigating Circumstances Notices to Examiners is
available at https://www.ox.ac.uk/students/academic/exams/guidance. Some examples of
mitigating circumstances that may have impacted on your performance in an examination or
during the preparation of coursework include acute illness or unforeseen circumstances such
as a traffic accident or bereavement

**Plagiarism**

All the assessors for the course will be alert to the possibility of plagiarism in written reports.
If an assessor, or a Turnitin report generated in the course of examination procedures, raises
concerns about the proper attribution of a passage or piece of submitted work, the matter will
be reported to the Chair of Examiners. If the extent of the material affected is a small
proportion of the whole (usually under 10%), this will be dealt with by the board of
examiners. More serious cases will be referred to the Proctors.

Where the Chair finds that the matter can be dealt with by the Board, assessors will mark the
work on its academic merits. The Board will then deduct marks for derivative or poorly
referenced work. Boards are free to operate marks deductions of between 1 and 10% (maximum)
of the marks available for that particular piece of work.

**Scaling of Examination Marks**

The Examiners may choose to scale marks for the written examinations where, in their
academic judgement:

a) a paper was more difficult or easy than in previous years, and/or
b) a paper has generated a spread of marks which are 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 candidates’ marks are not advantaged or disadvantaged by
any of these situations. In each case, examiners will establish if they have sufficient evidence
for scaling. 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.

If it is decided that it is appropriate to use scaling, the examiners will review a sample of
papers either side of the classification borderlines to ensure that the outcome of scaling is
consistent with academic views of what constitutes an appropriate performance within each class.