Handbook for the M.Sc. in Mathematical Modelling and Scientific Computing

Version 1.0
Issued October 2015
Welcome from the Course Director

I would like to welcome you as a student on the M.Sc. in Mathematical Modelling and Scientific Computing here at the Mathematical Institute in Oxford. I hope the year ahead of you will be interesting and enjoyable and will build on the mathematical knowledge you already have.

The Andrew Wiles Building is still relatively new and we hope it will provide an inspirational setting in which to learn more mathematics and undertake research. It houses one of the largest and most successful mathematics departments in the world and you will have the opportunity to be taught by and work with internationally renowned mathematicians.

As a group of students you are diverse, coming from a variety of backgrounds both academically and geographically. I am sure this will mean we have different strengths and that we can all learn from each other.

Once again, welcome to the MMSC programme at Oxford, and best wishes for an enjoyable and successful year.

Dr Kathryn Gillow
Course Director
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1 Foreword

1.1 Statement of Coverage

This handbook applies to students starting the M.Sc. in Mathematical Modelling and Scientific Computing in Michaelmas Term 2015. The information in this handbook may be different for students starting in other years.

1.2 Disclaimer

The Examination Regulations relating to this course are available at [http://www.admin.ox.ac.uk/examregs/2015-16/mosbcimmandsciecomp/studentview/](http://www.admin.ox.ac.uk/examregs/2015-16/mosbcimmandsciecomp/studentview/). If there is conflict between information in this handbook and the Examination Regulations then you should follow the Examination Regulations. If you have any concerns please contact the Course Director at the Mathematical Institute, Dr Kathryn Gillow, email kathryn.gillow@maths.ox.ac.uk.

The information in this handbook is accurate as at 1st October 2015, however, it may be necessary for changes to be made in certain circumstances, as explained on the University’s changes to courses webpage at [http://www.graduate.ox.ac.uk/coursechanges](http://www.graduate.ox.ac.uk/coursechanges). If such changes are made the department will publish a new version of this handbook together with a list of the changes and all students will be informed.

1.3 The Handbook

The purpose of this handbook is to provide you with information about the way the M.Sc. in Mathematical Modelling in Scientific Computing is taught and assessed and the options you can take. It also provides some practical information about the department. If there are any questions you still have please ask someone. Your supervisor, the course director and the course administrator will be happy to help.

This handbook, and the supplementary handbook which gives detailed synopses of both the core and special topic courses, can be found online at [http://www.maths.ox.ac.uk/members/students/postgraduate-courses/msc-mmsc/course-handbooks](http://www.maths.ox.ac.uk/members/students/postgraduate-courses/msc-mmsc/course-handbooks).

1.4 Useful Links

The course webpage is at [http://www.maths.ox.ac.uk/members/students/postgraduate-courses/msc-mmsc](http://www.maths.ox.ac.uk/members/students/postgraduate-courses/msc-mmsc) and contains details of the lecture courses, as well as termly timetables, a diary of important events for the academic year and the examination conventions.

The official Examination Regulations for the course can be found at [http://www.admin.ox.ac.uk/examregs/2015-16/mosbcimmandsciecomp/studentview/](http://www.admin.ox.ac.uk/examregs/2015-16/mosbcimmandsciecomp/studentview/)

The Proctors’ and Assessor’s Memorandum is the document relating to the rules and the statutes of the University which you are expected to follow. This can be found in the student handbook available at [http://www.admin.ox.ac.uk/proctors/info/pam/](http://www.admin.ox.ac.uk/proctors/info/pam/).
The Oxford Students website at [http://www.ox.ac.uk/students](http://www.ox.ac.uk/students) provides access to information, services and resources to help you get the most out of your university experience.

Finally, your college will have a handbook giving information about your college and how it operates. You should receive a copy of this, but you should also be able to find it on your college website.

1.5 Departmental Contacts

Useful departmental contact details are:

- **Course Director**
  Dr Kathryn Gillow, kathryn.gillow@maths.ox.ac.uk

- **M.Sc. Course Administrator**
  Monica Finlayson, fnlayson@maths.ox.ac.uk

- **Director of Graduate Studies (taught)**
  Prof. Andreas Münch, muench@maths.ox.ac.uk

- **Computing Officers**
  help@maths.ox.ac.uk

- **Academic Administrator**
  Charlotte Turner-Smith, academic.administrator@maths.ox.ac.uk

- **Reception**
  reception@maths.ox.ac.uk, tel 01865 273525

- **Librarian: Whitehead Library**
  Cathy Hunt, cathy@maths.ox.ac.uk

- **Harassment Advisors**
  Prof. Frances Kirwan, kirwan@maths.ox.ac.uk; Prof. Tom Sanders, sanders@maths.ox.ac.uk

- **Disability Contact**
  The Administrator, departmental-administrator@maths.ox.ac.uk

- **Safety Officer**
  Dr Keith Gillow, safety-officer@maths.ox.ac.uk

- **Facilities Management**
  facilities-management@maths.ox.ac.uk

- **Consultative Committee for Graduates Representatives**
  For current representatives see [http://www.maths.ox.ac.uk/members/students/postgraduate-courses/doctor-philosophy/consultative-committee-graduates](http://www.maths.ox.ac.uk/members/students/postgraduate-courses/doctor-philosophy/consultative-committee-graduates).
1.6 Building Location, Maps and Access

The postal address of the department is:
Mathematical Institute
University of Oxford
Andrew Wiles Building
Radcliffe Observatory Quarter
Woodstock Road
Oxford
OX2 6GG

Maps of Oxford, and in particular a map showing the location of the Mathematical Institute, can be found at [http://www.maths.ox.ac.uk/about-us/travel-maps](http://www.maths.ox.ac.uk/about-us/travel-maps). Almost all lectures and classes will take place in the Mathematical Institute in the teaching space on the mezzanine level.

The building has been designed with accessibility in mind. More details of the disability policy and the access guide are given at [http://www.maths.ox.ac.uk/members/building-information/accessibility](http://www.maths.ox.ac.uk/members/building-information/accessibility).

1.7 The Academic Year

The course lasts almost twelve months, from the beginning of October to the end of the following September. Although the lecture courses are given during the three University terms, the examinations will take place on the Thursdays and Fridays of the weeks preceding both Hilary and Trinity terms. Additionally, much other work is carried out in the vacations, and you should expect to spend most of the year in Oxford. There will be no time for long holidays.

For the academic year 2015–2016, the course will begin with a week of introductory material based at the Mathematical Institute, beginning at 9.30am on the morning of Monday 5th October 2015.

The dates of the University Full Terms for the Academic Year 2015–2016 are:
MT = Michaelmas Term 2015: Sunday 11th October – Saturday 5th December
HT = Hilary Term 2016: Sunday 17th January – Saturday 12th March
TT = Trinity Term 2016: Sunday 24th April – Saturday 18th June

Further important dates for the academic year are given in the Diary of Important Events in Appendix B.

2 The M.Sc. Course: Content and Structure

2.1 Overview

The Master of Science in Mathematical Modelling and Scientific Computing is a 12 month course. The relevant QAA subject benchmark statement is Mathematics, Statistics and Opera-
2.2 Aims

The aims of the programme are as described below.

1. To provide graduates with a strong mathematical background with the skills necessary to apply their expertise to the solution of real problems.

2. To provide students with a systematic understanding of core areas in both applied mathematics and numerical analysis, as well as advanced topics in one or both of these areas.

3. To lay the foundation for further research for a career as a research mathematician in a whole range of application areas.

4. To develop students’ skills so that they are able to:
   - formulate a well posed problem from a possibly sketchy verbal description;
   - carry out relevant mathematical analysis;
   - develop an appropriate numerical scheme;
   - present and interpret these results;

Particular emphasis is placed on the need for all these parts in the problem solving process, and on the fact that they frequently interact and cannot be carried out sequentially.

2.3 Intended Learning Outcomes

Students on the course will gain a knowledge of:

- core methods of applied mathematics and numerical analysis;
- computer coding in Matlab;
- mathematical modelling;
- more advanced topics in modelling, methods and numerical analysis;
- how to undertake a short research project in an area of applied mathematics and/or numerical analysis;
- how to communicate mathematics effectively both orally (in conversation and by giving presentations) and in written form.
2.4 Course Structure

During the course you will be assessed on 13 units counted as follows:

- Four core courses on mathematical methods and numerical analysis (1 unit each)
- Three special topics chosen from a range of about 25 courses (1 unit each)
- Two case studies: one in each of mathematical modelling and scientific computing (1 unit each)
- A dissertation and viva voce examination (1 unit each)

More details of these units are given below.

You will be assigned a supervisor on arrival in Oxford whose main role throughout the first two terms is to act as an academic advisor. They will be able to help with decisions about which options to take and the Course Director is also available for advice.

2.4.1 Core Courses

There are four core course with a weighting of 1 unit each:

- A1: Mathematical Methods I
- A2: Mathematical Methods II
- B1: Numerical Linear Algebra and Numerical Solution of Differential Equations
- B2: Further Numerical Linear Algebra and Continuous Optimization

A1 and B1 are taken during Michaelmas Term and are examined during Week 0 of Hilary Term. A2 and B2 are taken during Hilary Term and are examined during Week 0 of Trinity Term.

Each core course consists of 24 lectures. The lectures are backed up by one or two problem solving classes per week, usually with no more than 14 students per class, in which the class tutor goes through the problems given out in lectures as well as clarifying any of the material as necessary. However, the course is assessed solely by the examination.

Revision classes will be organised in the week preceding the written examinations and students are encouraged to look at and attempt past examination papers which are available online at http://www.maths.ox.ac.uk/members/students/postgraduate-courses/msc-mmnc/past-papers.

Note that calculators will not be allowed, or required, in the written examinations.

Details of the synopses for the core courses are given in the supplementary handbook available in pdf form at http://www.maths.ox.ac.uk/members/students/postgraduate-courses/msc-mmnc/course-handbooks.
2.4.2 Special Topics

All students complete three special topics with each special topic having a weighting of 1 unit. Special topic courses consist of between 12 and 16 lectures. There is a great variety of special topic lecture courses which are classified under the broad headings of Modelling, [M], Computation, [C], or Other, [O]. You should complete at least one Modelling course and one Computation course. A special topic is usually assessed by a mini-project on a topic agreed with the lecturer. If you wish to do a special topic on one of these courses you should discuss a suitable plan with the lecturer by the end of term, and two hard copies of the special topic must be handed in with a completed cover sheet available from [http://www.maths.ox.ac.uk/members/students/postgraduate-courses/msc-mmsc/special-topics](http://www.maths.ox.ac.uk/members/students/postgraduate-courses/msc-mmsc/special-topics) by the deadline (see the Diary of Important Events in Appendix B). Special topic marks are awarded by the examiners on the recommendation of the assessors; usually the relevant course lecturer and a second independent marker. Once the official marks have been released, you will also be able to collect the feedback provided by the assessors.

It is also possible to do other topics if approved by the M.Sc. Supervisory Committee. If you wish to follow a lecture course not on the list or to do a special topic based on a reading course, you should submit a short description of the project to the course director.

The special topic guidelines are given in Appendix A.

These are the special topic courses expected to be available for the Academic year 2015–2016. Each falls under the broad heading of Modelling [M], Computation [C] or Other [O].

Michaelmas Term 2015

- Approximation of Functions [C],
- Dynamical Systems and Energy Minimisation [O],
- Integer Programming [C],
- Mathematical Ecology and Biology [M],
- Mathematical Geoscience [M],
- Mathematical Physiology [M],
- Perturbation Methods [O],
- Solid Mechanics [M],
- Statistical Mechanics [M],
- Stochastic Differential Equations [O],
- Topics in Fluid Mechanics [M],
- Viscous Flow [M].
Hilary Term 2016

- Applied Complex Variables [O],
- Computational Algebraic Topology [O],
- *Continuum Models in Industry [M],
- Elasticity and Plasticity [M],
- Finite Element Methods for PDEs [C],
- *Mathematical Analytics [O],
- Mathematical Mechanical Biology [M],
- Mathematical Models of Financial Derivatives [M],
- *Mathematics for Energy [M],
- Networks [O],
- Numerical Solution of Differential Equations II [C],
- Stochastic Modelling of Biological Processes [M/C],
- Waves and Compressible Flow [M].

Trinity Term 2016

- C++ for Scientific Computing [C],
- Numerical Analysis of SDEs and SPDEs [C],
- Numerical Solution of Navier-Stokes Equations [C],
- Python in Scientific Computing [C],
- Solving PDEs on Supercomputers [C].

Note that the courses marked * (Continuum Models in Industry, Mathematical Analytics and Mathematics for Energy) are run by the Industrially Focused Mathematical Modelling (InFoMM) CDT and have an upper limit of five students from outside the CDT.

Details of the synopses for the special topic courses are given in the supplementary handbook available from [http://www.maths.ox.ac.uk/members/students/postgraduate-courses/msc-mmsc/course-handbooks](http://www.maths.ox.ac.uk/members/students/postgraduate-courses/msc-mmsc/course-handbooks).

2.4.3 Case Studies

Some of the time in the induction week will be spent teaching Matlab, and hopefully this will provide a good introduction if you do not already know the language, and revision if you do. In MT you will take Practical Numerical Analysis classes (2 hours per week) in which you will use Matlab to investigate numerical algorithms as described in lectures. You will also attend
Mathematical Modelling classes (3 hours per week) which will also include group work and presentation of results.

The skills learnt in these courses are further developed in HT when you participate in the Case Studies in Scientific Computing and in Mathematical Modelling. One project will be written up for assessment for each course. These assessments are worth 1 unit each. The Case Studies in Scientific Computing consist of developing numerical solutions to problems of interest, possibly using algorithms beyond the scope of the lecture courses. You will work in groups of 4 or 5 and meet with the course lecturer weekly over four weeks to report on progress and discuss future directions. The course is then assessed by an individual written report. The Case Studies in Mathematical Modelling extend the MT course and you will work in groups to model problems of practical interest. Each group meets with the group leader weekly and at the end of the term they give a presentation; the mark for the presentation makes up 20% of the final mark for this unit. The remaining 80% of the mark is for a written report.

2.4.4 Dissertation

You will prepare your dissertations during Trinity Term and the long vacation. Your dissertation topic should be selected in consultation with your supervisor and the details of the form and scope of the dissertation are described in the Regulations. Some possible dissertation projects can be viewed at [http://www.maths.ox.ac.uk/members/students/postgraduate-courses/msc-mmse/dissertation](http://www.maths.ox.ac.uk/members/students/postgraduate-courses/msc-mmse/dissertation) (although note that this list will not be updated for the 2015–16 academic year until March 2016).

The topics suitable for dissertations will be presented by the appropriate supervisors at a meeting in March. Also you are encouraged to talk to any potential supervisors, which includes most academics or researchers in OCIAM or the Numerical Analysis Group. Note that the supervisor allocated to you in the first term will not usually turn out to be the supervisor for your dissertation.

You will be required to give a short talk and answer questions on the background to your dissertation topic at an open meeting, attended by supervisors, examiners and other students, to be held at the end of May.

The main body of the final dissertation (excluding appendices etc.) should be approximately 50 pages in length. Precise guidelines on the length of the dissertation, the formatting and the penalties for overlong submissions are available in the dissertation handbook which can be downloaded from [http://www.maths.ox.ac.uk/members/students/postgraduate-courses/msc-mmse/course-handbooks](http://www.maths.ox.ac.uk/members/students/postgraduate-courses/msc-mmse/course-handbooks).

You should submit three bound copies of your dissertation to the Examination Schools by 12noon on Friday 2nd September 2016. An electronic copy will also be requested.

Your dissertation will be read by at least two assessors, at least one of whom will be an examiner and neither will be your supervisor.

The oral examination (viva) will be held in the second half of September and you will be expected to answer questions on their dissertation. Each viva will last approximately 30 minutes and subfusc should be worn. At least two examiners will attend the viva and ask questions: you do not
need to prepare a presentation in advance. The final mark for your dissertation and viva will be decided after the viva by the examiners present in the viva, and taking into account comments from any assessors who are not examiners.

3 Teaching and Learning

3.1 Organisation of Teaching and Learning

Almost all lectures and classes will take place in the teaching space in the mezzanine level of the Mathematical Institute’s Andrew Wiles Building. Some of the lectures are shared with the undergraduate mathematics programme and can therefore have a large audience, but all problem solving classes are solely for M.Sc. students and you should expect there to be about half the cohort in each class.

On arrival in Oxford you will be assigned a college advisor who will be available as another source of advice throughout the year. Beyond this, however, the college has no role in the teaching of the course (although the mathematics tutors from your college may be involved in the teaching of the course in the department).

In terms of workload, in the first term you should expect to spend about 14 hours per week in core lectures (lectures for the core courses as well as Practical Numerical Analysis, Mathematical Modelling and Additional Skills) and a further two hours per week in lectures for each special topic course followed. You should also expect to spend about four hours per week in problem solving classes, as well as further personal study time to work on the problem sheets and consolidate lecture material.

Termly timetables can be found on the course webpage at [http://www.maths.ox.ac.uk/members/students/postgraduate-courses/msc-mmsc](http://www.maths.ox.ac.uk/members/students/postgraduate-courses/msc-mmsc).

If you have any issues with teaching or supervision please raise these as soon as possible so that they can be addressed promptly. Details of who to contact are provided in Section 7.2 Complaints and Appeals.

3.2 Expectations of Study

You are responsible for your own academic progress and so it will be important for you, as an individual, to plan your own study time. As already indicated, the course has a large amount of structured teaching time, with about 20 hours of lectures and classes in the first terms. In addition you are expected to spend time working on the problem sheets and consolidating the material covered in lectures and classes. You will also be expected to work during the vacations with revision being required during the Christmas and Easter breaks. Special topic and case study reports will also be written during these vacations whilst most of the summer will be taken up with dissertation work. You will be responsible for planning your own work pattern during the vacations and so you may work in a “flexi-time” fashion, working harder sometimes in order to enjoy a break at other times.
The University policy on paid work can be found at [http://www.admin.ox.ac.uk/edc/policiesand\nguidance/policyonpaidwork/](http://www.admin.ox.ac.uk/edc/policiesand\nguidance/policyonpaidwork/). In general, it is recommended that students on the M.Sc. in Mathematical Modelling and Scientific Computing do not undertake paid work during the course.

### 4 Examinations and Assessment

The board of examiners will consist of 4 internal members (2 from the Numerical Analysis Group and 2 from OCIAM) and 1 external examiner. The examiners will appoint assessors to help with the assessment of special topics, case studies and dissertations.

You should complete 13 units. Each unit will carry the same weight. Marks will be given in terms of USMs out of 100 with the usual conventions: 0–49 fail, 50–69 pass, 70–100 distinction.

In order to complete these 13 units, you will take and be assessed on: 4 core courses; 3 special topics; 2 case studies (one in modelling and one in scientific computing); a dissertation.

1. **Core Courses (1 unit each).** There are four courses, two in Michaelmas Term and two in Hilary Term. Each course will be assessed by a written examination paper in Week 0 of the following term. Each paper will be two hours long and contain 6 questions. The best 4 answers, including an answer to at least one question in each section, will count and you will be given a USM for each paper, with a weighting of 1 unit.

2. **Special Topics (1 unit each).** You must do at least one special topic in the area of Modelling [M] and one in the area of Computation [C]. For each special topic taken you must submit a mini-project. Mini-projects will be marked by two assessors, one of whom will usually be the course lecturer. For each mini-project you will be given a USM, with a weighting of 1 unit.

3. **Case Studies in Modelling and in Scientific Computing (1 unit each).** You must do at least one 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 a report. Each mathematical modelling case study involves 5 weeks of group work, an oral presentation, and a report. In both cases reports are written individually and are marked by the appropriate lecturer and one other assessor. For the modelling case study 20% of the mark will be for the oral presentation. Each case study will be given a USM with a weighting of 1 unit.

4. **Dissertation (4 units).** Dissertations will be read and marked by at least two examiners/assessors, neither of whom will be your supervisor and at least one of whom will be an examiner. The main body of the dissertation should be approximately 50 pages long, and need not necessarily contain original research to pass. You will also be examined viva voce. The dissertation and viva will be given a USM with a weighting of 4 units. The USM marks will include credit for originality and performance in the viva.

The USMs, weighted as above, are averaged to give an Average USM.

You 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.

You will fail if your average USM is less than 50. If you fail 4 or more units of assessment you will also normally fail even if your average USM $\geq 50$.

Otherwise, you will be awarded a Pass.

Qualitative class descriptors for these levels of performance are summarised below.

**Distinction:** High quality work throughout the course. Candidates achieving a distinction show excellent problem-solving skills and excellent knowledge of the material over a wide range of topics, and are able to use that knowledge innovatively and/or in unfamiliar contexts.

**Pass:** The pass covers a wide range of results from candidates who show basic problem solving skills and adequate knowledge of most of the material to candidates who show good or very good problem-solving skills, and good or very good knowledge of much of the material over a wide range of topics.

**Fail:** Candidates who fail show inadequate grasp of the basic material. Such candidates may have shown some understanding but the majority of work is likely to show major misunderstanding and confusion, and/or inaccurate calculations.

The official Examination Regulations can be downloaded from [http://www.admin.ox.ac.uk/examregs/2015-16/mosbcimmandsciecomp/studentview/](http://www.admin.ox.ac.uk/examregs/2015-16/mosbcimmandsciecomp/studentview/)

### 4.1 Feedback on Learning and Assessment

Informal feedback on progress is provided during the first two terms via the marking of problem sheets and verbal feedback on group work in the modelling classes and case study meetings. In the third term you will be expected to present your dissertation project to the examiners and you will be provided with feedback afterwards.

You can expect marks for exams, special topics and case studies to be released throughout the year. Exam marks should be available within three weeks of sitting the exam and special topic and case study marks should be available by the end of the term in which they were submitted. The exception is the special topics submitted after the end of Trinity Term. Marks for these will be released in September after the final examiners’ meeting.

Feedback on assessed work is given for the special topics and the case studies once the marks have been released. All the assessors are expected to fill in a feedback sheets commenting on the content of the work, the accuracy of the mathematics and the presentation. These comments forms are then passed on to you. The hope is that this feedback will be constructive and provided in a timely manner so that it can be used to help you improve your other written reports.

In addition you will receive feedback on your dissertation after the final results have been released. This will take the form of comments from the examiners.
4.2 Examination Conventions

Examination conventions are the formal record of the specific assessment standards for the course to which they apply. They set out how your examined work will be marked and how the resulting marks will be used to arrive at a final result and classification of your award. They include information on marking scales, marking and classification criteria, scaling of marks, resits, use of viva voce examinations, penalties for late submission and penalties for over-length work. The examination conventions can be downloaded from the course website at http://www.maths.ox.ac.uk/members/students/postgraduate-courses/msc-mmse.

4.3 Late Submission of Coursework

Late Submission of Coursework for the M.Sc. 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 below.

<table>
<thead>
<tr>
<th>Lateness</th>
<th>Penalty (USMs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 4 hours</td>
<td>1</td>
</tr>
<tr>
<td>4–24 hours</td>
<td>5</td>
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<tr>
<td>24–48 hours</td>
<td>10</td>
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<tr>
<td>48–72 hours</td>
<td>20</td>
</tr>
<tr>
<td>72–96 hours</td>
<td>30</td>
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<tr>
<td>96–120 hours</td>
<td>40</td>
</tr>
<tr>
<td>120–144 hours</td>
<td>50</td>
</tr>
</tbody>
</table>

Where no work is submitted, the Proctors may decide not to permit you to continue on the M.Sc. course. If the Proctors permit you to continue, a mark of zero will be awarded for that particular piece of work.

You must attend all written examinations for the M.Sc. 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.

4.4 Good Academic Practice and Avoiding Plagiarism

The university defines plagiarism as follows:

“Plagiarism is presenting someone else’s work or ideas as your own, with or without their consent, by incorporating it into your work without full acknowledgement. All published and unpublished material, whether in manuscript, printed or electronic form, is covered under this definition. Plagiarism may be intentional or reckless, or unintentional. Under the regulations for examinations, intentional or reckless plagiarism is a disciplinary offence.”
The university guidance on plagiarism can be found at [http://www.ox.ac.uk/students/academic/guidance/skills/plagiarism](http://www.ox.ac.uk/students/academic/guidance/skills/plagiarism) and is also reproduced in Appendix C.

Specific guidance of academic good practice and topics such as time management, note-taking, referencing, research and library skills and information literacy can be found on the Oxford Students skills webpage at [http://www.ox.ac.uk/students/academic/guidance/skills](http://www.ox.ac.uk/students/academic/guidance/skills).

### 4.5 Entering for University Examinations

General advice on exam entry is given at [http://www.ox.ac.uk/students/academic/exams/entry](http://www.ox.ac.uk/students/academic/exams/entry). For the M.Sc. in Mathematical Modelling and Scientific Computing, you should expect to fill in an exam entry form each term. In Michaelmas Term you will enter for all four core courses, the two case studies and the dissertation. You will also enter for any special topics you wish to submit based on Michaelmas Term lecture courses. Then in Hilary and Trinity Term it will simply be necessary to enter for the special topics based on the lecture courses from those terms.

When it is time to complete the exam entry form, you will receive an email invitation to log in to the Student Self Service and you will be able to make the appropriate selections.

After the final deadline for submitting your exam entry data, it is still possible to change your special topic choices. There are three types of change you may wish to make and all should be done via your college:

1. Adding a special topic entry: if you wish to enter for an extra special topic additional to any special topics you are already entered for then you will be liable for a late entry fee.

2. Change of special topic option: if you wish to withdraw from one special topic option and enter for another you will be required to pay a change of options fee.

3. Withdrawal from a special topic: if you no longer wish to submit a project for a special topic you should withdraw from this course.

In all cases the change should be made as soon as possible and certainly by the special topic deadline.

### 4.6 Sitting Your Examinations

All the written examinations will take place at Ewert House where there are dedicated exam rooms and the quiet environment required for examinations can be ensured. Ewert House is in Summertown (approximately 1.3 miles north of Oxford on Banbury Road) and its location can be found at [https://www.conted.ox.ac.uk/about/findus/ewerthouse.php](https://www.conted.ox.ac.uk/about/findus/ewerthouse.php).

Although the written examinations are in Ewert House, they still class as examinations administered by the department and therefore you are not required to wear sub fusc. However, you will require your university card and you will not be able to take bags into the exam room (there will be a place you can leave them). If you wish to take water into the exam room this will need
to be in a clear, spill-proof bottle. Ewert House will provide an invigilator in the exam room but the course director will be available in case of any queries about the paper.

Calculators will not be allowed in the examinations but nor will they be necessary.

Information on (a) the standards of conduct expected in examinations and (b) what to do if you would like examiners to be aware of any factors that may have affected your performance before or during an examination (such as illness, accident or bereavement) are available on the Oxford Students website [http://www.ox.ac.uk/students/academic/exams/guidance](http://www.ox.ac.uk/students/academic/exams/guidance).

The viva voce examinations at the end of the course will take place in two of the classrooms on the mezzanine level of the Mathematical Institute. For these examinations sub fusc must be worn by both students and internal examiners. The examination lasts 30 minutes and you should take with you a copy of your dissertation (with no notes on). In addition you may take a clear, spill-proof bottle of water.

### 4.7 External Examiner

The Examination Board contains an External Examiner, nominated by the Supervisory Committee and appointed by the Vice Chancellor, who acts as an external arbiter of standards. In particular, national guidance requires external examiners to report on three major areas:

1. whether the standards set are appropriate for the institution’s awards;
2. the standards and comparability of student performance in the programme concerned;
3. the extent to which procedures for assessment, examination and the determination of awards are sound and have been fairly conducted.

Within this framework, boards of examiners will work with their external examiner(s) in a variety of ways, but the University expects external examiners to:

1. have opportunity to comment on all examination papers in draft form;
2. have access to all scripts and other material submitted by candidates;
3. see a sample of scripts including scripts at the borderlines of classes;
4. see a sufficient sample of dissertations, extended essays and course work to be able to comment on the marks awarded;
5. be in a position to comment on the fairness of any procedures for the reconciliation of marks, moderation, scaling and adjustments arising out of medical or other evidence.

In relation to 5, the University does not regard this as requiring the external examiner to give a definitive final mark where there is initial disagreement between first markers (although examining boards may choose to ask the external examiner(s) to act in this way) but to be in a position to report on the soundness of the procedures used to reach a final agreed mark.
The external examiner for the M.Sc. in Mathematical Modelling and Scientific Computing for the academic year 2015–16 is Professor Eddie Wilson who is the Chair in Intelligent Transport Systems at the University of Bristol.

Students are strictly prohibited from contacting external examiners directly. If you are unhappy with an aspect of your assessment you may make a complaint or appeal (see Section 7.2).

4.8 Examiners’ Reports

You may access the internal examiners’ reports for the course from [http://www.maths.ox.ac.uk/members/students/postgraduate-courses/msc-mmsc/internal-examiners-reports](http://www.maths.ox.ac.uk/members/students/postgraduate-courses/msc-mmsc/internal-examiners-reports). In addition, the external examiners’ reports are available at [http://www.maths.ox.ac.uk/members/students/postgraduate-courses/msc-mmsc/external-examiners-reports](http://www.maths.ox.ac.uk/members/students/postgraduate-courses/msc-mmsc/external-examiners-reports), although you will need to log in to the website using your maths username and password in order to access these.

4.9 Prizes

A prize will be awarded by the examiners to the student who has performed best on the course.

5 Skills and Learning Development

5.1 Academic Progress

Academic progress will be measured within the department. In each of the first two terms you should expect to meet at least twice with your supervisor and all supervisors will report on student progress at the end of term via GSS (the Graduate Supervision System). The course director will also monitor all students’ progress and, in particular, will have access to grades on all the weekly problem sheets. The course director will also report on progress at the end of the first two terms using GSS.

During the third term and the long vacation you should expect to meet regularly with your dissertation supervisor(s) (in person during term time, possibly via Skype or email during the long vacation). Your dissertation supervisor(s) will then assume responsibility for monitoring and reporting on your progress.

5.2 Learning Development and Skills

Throughout the course you will develop a variety of skills, both academic and transferable. The ways in which these will be developed are detailed below.
<table>
<thead>
<tr>
<th>Skill</th>
<th>Related teaching/learning method and assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge of core methods of applied mathematics and numerical analysis</td>
<td>Lectures and classes in MT and HT, written examinations in January and April.</td>
</tr>
<tr>
<td>Mathematical Modelling</td>
<td>Students work in small groups on a variety of case studies and give oral presentations in MT. Group work in Case Studies in Mathematical Modelling in HT assessed by group presentation and individual written report.</td>
</tr>
<tr>
<td>More advanced topics in Modelling, Methods and Numerical Analysis</td>
<td>About 25 special topic lecture courses are available and each student will follow 3 courses and write up a mini project for assessment.</td>
</tr>
<tr>
<td>A short research project in an area of applied mathematics and/or numerical analysis</td>
<td>Students work with a supervisor (and sometimes an industrial collaborator) and write a thesis of about 50 pages. The thesis is assessed by the board of examiners who also examine the students viva voce.</td>
</tr>
<tr>
<td>Effective oral communication of mathematics</td>
<td>Presentation of work in modelling classes, discussions with supervisors and peers, viva voce examination.</td>
</tr>
<tr>
<td>Effective written communication of mathematics</td>
<td>Practised throughout the course on problem sheets, in written reports and in the dissertation.</td>
</tr>
<tr>
<td>Ability to learn independently</td>
<td>The dissertation and special topics require students to put together material from a number of sources including lectures, textbooks, and electronic sources, in their own time.</td>
</tr>
<tr>
<td>Independent time management</td>
<td>Requirement to produce substantial amounts of written work against class deadlines; necessity to balance academic and non-academic activities without continuous oversight.</td>
</tr>
</tbody>
</table>

5.3 Skills Training and Development

You will learn Matlab at the start of the course if you do not already know it. Your computing skills will be developed further in the Mathematical Modelling and Practical Numerical Analysis classes.

During Michaelmas Term you will attend the Additional Skills classes. These sessions will provide information about how the course is assessed and advice about special topics as well as covering the use of \LaTeX{} and the web, sources of numerical software, literature searches, communication and career development.

A wide range of information and training materials are available to help you develop your academic skills including time management, research and library skills, referencing, revision skills and academic writing. This information can be accessed through the Oxford Students website [http://www.ox.ac.uk/students/academic/guidance/skills](http://www.ox.ac.uk/students/academic/guidance/skills).
You can also make use of the training opportunities offered, for example, by IT Services.

5.4 Opportunities to Engage in the Department Research Community

The dissertation provides an ideal chance to work on a research project with one or more members of the academic faculty within the Mathematical Institute. During this time your supervisor may encourage you to attend some of the research seminars where academics from outside Oxford present their recent research. You are welcome to attend these seminars earlier in the year, providing the course timetable allows this.

There is a small amount of funding available to attend relevant seminars or courses outside of Oxford. Colleges may also have funding for this but you are encouraged to discuss your plans with the course director in the first instance.

There is also the possibility of participating in one of two modelling weeks during the summer. During these weeks, students work in teams on a case study problem and present the result of their group work at the end of the week. More details will be circulated as they become available.

5.5 Careers Information and Advice

An event entitled “Careers for Mathematicians” will be held in November. This will comprise several talks about industries which employ mathematicians as well as a careers fair with the opportunity to talk to a wide variety of employers.

The Careers Service can advise students considering continuing studying for a DPhil or PhD as well as providing advice on careers. The Careers Service runs a range of sessions including lunchtime sessions on writing CVs and interview skills. Job vacancies are advertised on the Careers Service website (http://www.careers.ox.ac.uk).

6 Student Representation, Evaluation and Feedback

6.1 Department Representation

6.1.1 M.Sc. Supervisory Committee

The M.Sc. Supervisory Committee oversees the running of the M.Sc. It approves the syllabus for the course as well as the documentation. The committee also has responsibility for considering the feedback on the course from students. This feedback is obtained through lecture questionnaires and an end of course questionnaire but the committee also obtains feedback by having a student representative. This representative will be elected in early Michaelmas Term and will serve on the committee for the whole year of the M.Sc.
6.1.2 Consultative Committee for Graduates

Students on the M.Sc. course are eligible to serve on the Consultative Committee for Graduates (CCG). This committee consists of six graduate students (at least one of whom is a student on a taught masters course) and the two Directors of Graduate Studies. The committee considers syllabus, teaching arrangements, library facilities, office facilities, and the general aspects of examinations. Each year it reviews the examiners’ reports for the taught M.Sc.s. The CCG webpage can be found at http://www.maths.ox.ac.uk/members/students/postgraduate-courses/doctor-philosophy/consultative-committee-graduates.

6.2 Division and University Representation

Student representatives sitting on the Divisional Board are selected through a process organised by the Oxford University Student Union (OUSU). Details can be found on the OUSU website, http://ousu.org/, along with information about student representation at the university level.

6.3 Opportunities to Provide Evaluation and Feedback

6.3.1 Course Questionnaires

Student feedback is sought on all aspects of the course and students are invited to give feedback on each of the core lecture courses they attend through lecture and class questionnaires. The responses to these questionnaires are analysed and brought to the next Supervisory Committee meeting.

The course director holds a meeting at the end of Trinity Term which all students are invited to attend to discuss the course and ways it could be improved. Students are also given the opportunity to express their views in the end of course questionnaire.

6.3.2 University Feedback

Students on full-time and part-time matriculated courses are surveyed once per year on all aspects of their course (learning, living, pastoral support, college) through the Student Barometer. Previous results can be viewed by students, staff and the general public at http://www.ox.ac.uk/students/life/feedback. Information from these surveys is also considered by the M.Sc. Supervisory Committee.

7 Student Life and Support

7.1 Who to Contact for Help

You are encouraged to talk about any problems you may have while on the course. Within the department, the course director and a student’s supervisor may be in the best position to help.
Within your college, your college advisor, tutor for graduates or senior tutor may be able to help. Each college has their own systems of support for students, please refer to your College handbook or website for more information on who to contact and what support is available through your college.

Details of the wide range of sources of support which are available more widely in the University are available from the Oxford Students website at [http://www.ox.ac.uk/students/welfare](http://www.ox.ac.uk/students/welfare). This includes information in relation to mental and physical health and disability.

If you are having difficulties with the academic side of the course, you should approach either your supervisor or the course director who will be able to arrange extra help.

### 7.1.1 Financial Support

Your offer of a place on the course will have been made subject to you proving that you can support yourself throughout your time in Oxford but it is appreciated that occasionally financial problems can occur. The hardship funding website [http://www.ox.ac.uk/students/fees-funding/assistance/hardship](http://www.ox.ac.uk/students/fees-funding/assistance/hardship) has advice in such situations but initially you should discuss this with your college as they often have hardship funds. The M.Sc. course also has limited funds available, so if your college is unable to help you should discuss any financial problems with the course director.

### 7.1.2 Illness

It is appreciated that most people will be ill occasionally during the course of the year and this should not adversely affect your studies. It is not necessary to inform anyone if you will miss a lecture due to illness, although you should ensure you get a copy of the notes from the lecture from a coursemate. If you will miss a class, it is appropriate to inform the class tutor who will make a note in the attendance log and ensure that arrangements are made to give you your work back. Similarly, it is helpful to contact the class tutor if you will not be able to submit solutions to a problem sheet because of illness.

If you are ill on the day of a written examination, you should contact your college doctor or nurse who will be able to write a note for you. If you are able to sit the examination then this note will be taken into account when your final result is decided. More details of how such a note will be used are given in the Examination Conventions which can be found on the course website, [http://www.maths.ox.ac.uk/members/students/postgraduate-courses/msc-mmse](http://www.maths.ox.ac.uk/members/students/postgraduate-courses/msc-mmse).

If you are ill on the day of a written examination and unable to sit the examination then your college should apply to the Proctors on your behalf for you to be exempt from the examination — there will not be an opportunity to sit the examination at a later date.

If you are ill or suffer a bereavement in the time when you are revising or preparing reports for special topics, case studies or the dissertation, you should again approach your college and they can apply to the Proctors for an extension of the deadline (written reports only) or for your circumstances to be taken into account.

If you are ill for a significant period of time during the year, you should discuss this with the
course director as it may be appropriate for you to suspend your status to allow you to recover, then return to complete the course the following academic year.

7.2 Complaints and Appeals within the Mathematical Institute

The University, the Mathematical, Physical and Life Sciences Division (MPLS) and the Mathematical Institute all hope that provision made for students at all stages of their course of study will make the need for complaints (about that provision) or appeals (against the outcomes of any form of assessment) infrequent.

Nothing in the University’s complaints procedure precludes an informal discussion with the person immediately responsible for the issue that you wish to complain about (and who may not be one of the individuals identified below). This is often the simplest way to achieve a satisfactory resolution.

Many sources of advice are available within colleges, within faculties/departments and from bodies like Student Advice Service provided by OUSU or the Counselling Service, which have extensive experience in advising students. You may wish to take advice from one of these sources before pursuing your complaint.

General areas of concern about provision affecting students as a whole should be raised through Joint Consultative Committees or via student representation on the faculty/departments committees.

7.2.1 Complaints

If your concern or complaint relates to teaching or other provision made by the department, then you should raise it with the chair of the Teaching Committee (Dr Richard Earl) or with the Director of Graduate Studies (Professor Andreas Münch) as appropriate. Within the department the officer concerned will attempt to resolve your concern/complaint informally.

If you are dissatisfied with the outcome, then you may take your concern further by making a formal complaint to the University Proctors. The procedures adopted by the Proctors for the consideration of complaints and appeals are described on the Proctors’ webpage [http://www.admin.ox.ac.uk/proctors/complaints/proceduresforhandlingcomplaints](http://www.admin.ox.ac.uk/proctors/complaints/proceduresforhandlingcomplaints), the Student Handbook [http://www.admin.ox.ac.uk/proctors/info/pam](http://www.admin.ox.ac.uk/proctors/info/pam) and the relevant Council regulations [http://www.admin.ox.ac.uk/statutes/regulations/247-062.shtml](http://www.admin.ox.ac.uk/statutes/regulations/247-062.shtml).

If your concern or complaint relates to teaching or other provision made by your college, you should raise it either with your tutor or with one of the college officers, Senior Tutor, Tutor for Graduates (as appropriate). Your college will also be able to explain how to take your complaint further if you are dissatisfied with the outcome of its consideration.

7.2.2 Academic Appeals

An academic appeal is defined as a formal questioning of a decision on an academic matter made by the responsible academic body.
For undergraduate or taught graduate courses, a concern which might lead to an appeal should be raised with your college authorities and the individual responsible for overseeing your work. It must not be raised directly with examiners or assessors. If it is not possible to clear up your concern in this way, you may put your concern in writing and submit it to the Proctors via the Senior Tutor of your college.

As noted above, the procedures adopted by the Proctors in relation to complaints and appeals are described on the Proctors’ webpage [http://www.admin.ox.ac.uk/proctors/complaints/proceduresforhandlingcomplaints](http://www.admin.ox.ac.uk/proctors/complaints/proceduresforhandlingcomplaints), in the Student Handbook [http://www.admin.ox.ac.uk/proctors/info/pam](http://www.admin.ox.ac.uk/proctors/info/pam) and in the relevant Council regulations [http://www.admin.ox.ac.uk/statutes/regulations/247-062.shtml](http://www.admin.ox.ac.uk/statutes/regulations/247-062.shtml).

Please remember in connection with all the academic appeals that:

- The Proctors are not empowered to challenge the academic judgement of examiners or academic bodies.
- The Proctors can consider whether the procedures for reaching an academic decision were properly followed; i.e. whether there was a significant procedural administrative error; whether there is evidence of bias or inadequate assessment; whether the examiners failed to take into account special factors affecting a candidates performance.
- On no account should you contact your examiners or assessors directly.

### 7.3 Policies and Regulations

The University has a wide range of policies and regulations that apply to students. These are easily accessible through the A–Z of University regulations, codes of conduct and policies available on the Oxford Students website [http://www.ox.ac.uk/students/academic/regulations/a-z](http://www.ox.ac.uk/students/academic/regulations/a-z).

In addition, the Mathematical Institute has a set of policies for its members. These can be found at [http://www.maths.ox.ac.uk/members/policies](http://www.maths.ox.ac.uk/members/policies). Further information about some of these policies is given below.

#### 7.3.1 Code on Harassment

The Mathematical Institute has appointed two senior members who may be consulted in connection with the University’s Code on Harassment. Details of the senior members and of the university’s policy on harassment are posted at [http://www.maths.ox.ac.uk/members/personnel-hr/harassment](http://www.maths.ox.ac.uk/members/personnel-hr/harassment).

#### 7.3.2 Mathematical Institute Disability Statement

The Institute will do everything within its power to make available its teaching and other resources to students and others with disabilities to ensure that they are not at a disadvantage. In some cases, this may require significant adjustments to the building and to teach-
ing methods. Those with disabilities are encouraged to discuss their needs with the Administra-
tor (email departmental-administrator@maths.ox.ac.uk) and/or Safety Officer (email safety-
officier@maths.ox.ac.uk) at the earliest possible opportunity.

The university has produced an access guide for the Mathematical Institute’s Andrew Wiles
Building available at http://www.admin.ox.ac.uk/access/dandt/mpls/andrewwilesbuilding/.
The Executive Committee is responsible for the department’s disability policy.
Also see the University Equal Opportunities page at http://www.admin.ox.ac.uk/eop/.

7.3.3 Safety

You are urged to act at all times responsibly, and with a proper care for your own safety and
that of others. Departmental statements of safety policy are posted on noticeboards, and you
must comply with them. Students should note that they (and others entering onto departmental
premises or who are involved in departmental activities) are responsible for exercising care in
relation to themselves and others who may be affected by their actions.

In the Institute accidents should be reported immediately. This should be done by ensuring that
the accident is recorded in the Accident/Incident Book located in the main reception area and
held by the receptionists. The report will then be sent to the Safety Office. There is a First Aid
room located on the ground floor of the South wing. If you require access to this room please
report to reception to request the key. First aid boxes are located in every stair core (cores 1,2,3
and 5) on every level and are clearly signed.

Each lecture theatre has its own regulations for procedures to be followed in the case of fire
or other emergency; you are urged to familiarise yourself with the proper escape routes. The
assembly point is in the courtyard outside the Humanities Building adjacent to Woodstock Road.
More information is available online at http://www.maths.ox.ac.uk/members/health-safety.

8 Facilities

8.1 Social Spaces and Facilities

The Andrew Wiles Building has a cafeteria on the mezzanine level which is open from 08:30 to
16:15 on Monday to Friday. The cafe serves a wide variety of food including:

- Breakfast 08:30–10:30: cereals, yoghurts, Danish pastries, fresh fruit, traditional English
  breakfast.

- Lunch 12:00–14:00: daily hot choices, hot deli sandwich, jacket potatoes, fresh soup and a
  range of sandwiches, wraps and salads.

A weekly menu is displayed in the mezzanine near the cafeteria, on the kitchen noticeboards and
as an online weekly menu at http://www.admin.ox.ac.uk/estates/ourservices/fm/buildings_we_
manage/cafe_menu/
There are communal kitchens on every floor throughout the building. Boiling and chilled, filtered water is provided in these via Zip Hydroboil counter-top taps. Chilled water is dispensed freely on depressing the blue button on the top of the tap and there is a safety button which must be depressed in addition to the red button on the top of the tap to dispense boiling water. Once the capacity of the tap is exhausted the unit will rapidly re-boil/chill before being able to dispense again. A white light will flash to indicate a filter change is required. Please report any issues with a Zip tap to facilities-management@maths.ox.ac.uk.

Each kitchen is stocked with tea, filter coffee (for the supplied machines) and milk (only for use with tea and coffee and not for use in larger quantities). Each kitchen is provided with a range of cutlery and crockery appropriate to the numbers each point serves. Please make sure you place your used items in the dishwasher. If the dishwasher is full please feel free to put in a tablet and turn it on. The overnight cleaning staff will also run and empty dishwashers when they can. Largely enclosed kitchens also have a microwave.

There is a common room on the first floor of the Andrew Wiles Building, linking the North and South Wings. Tea and coffee making facilities are available at all times in the kitchens adjacent to the common room but in addition from 10:45 to 11:30 every week day tea, coffee and biscuits are served. In the afternoon from 15:30 to 16:15 the same provision will be offered but mugs must be returned to the trolley provided.

8.2 Workspace

The M.Sc. in Mathematical Modelling and Scientific Computing has a dedicated student workroom, room S0.45, on the ground floor in the South Wing of the Andrew Wiles Building. The room contains a number of computers on the Mathematical Institute’s IT network as well as space for students to use their own laptops, although there is not room for each student to have an individual desk. There is also a post box for each individual student.

8.3 Libraries

There is a lending library in the Mathematical Institute which has copies of most of the books included on course reading lists. Students also have access to the Radcliffe Science Library, which is located on Parks Road, and the library in their college. A large number of journals are available electronically via Oxford University e-Journals (http://ejournals.bodleian.ox.ac.uk/). Further details about electronic resources for mathematics can be found in Appendix D.

8.4 IT

You will have access to computer facilities in the Mathematical Institute and the department has an IT support team. You can also attend training sessions run by the IT Services and access centrally provided electronic resources. You will have a University e-mail account and an account with the Mathematical Institute set up for you automatically.

The Mathematical Institute’s academic network is primarily Linux based with almost 3000 in-
stalled packages per machine. A vast amount of information about the network and the software installed can be found online at [http://www.maths.ox.ac.uk/members/it](http://www.maths.ox.ac.uk/members/it). This includes a list of all public machines and their specifications at [http://www.maths.ox.ac.uk/members/it/machines](http://www.maths.ox.ac.uk/members/it/machines) (although note that you will have to log in to the website to access this page). The department also has a Windows Terminal Server (wts) that can be remotely accessed from the Linux machines should you need access to Microsoft only applications, e.g. MS Office.

For details of how and where to obtain IT help relating to the departmental systems see the information at [http://www.maths.ox.ac.uk/members/it/support](http://www.maths.ox.ac.uk/members/it/support). In particular the department operates an email IT help request system (help@maths.ox.ac.uk) which is the recommended approach for IT queries as it keeps a record of the query and will reach all the IT staff. Note that there are also signs above the printers with details of how best to report problems and how to get IT help should you need it.

Information about how to connect your laptop to the Mathematical Institute network can be found at [http://www.maths.ox.ac.uk/members/it/faqs/connection/laptop-connections](http://www.maths.ox.ac.uk/members/it/faqs/connection/laptop-connections).

For information about printing and the printers available for use see [http://www.maths.ox.ac.uk/members/it/faqs/printing](http://www.maths.ox.ac.uk/members/it/faqs/printing). Note that, while printing and photocopying are free within the department, it is expected that these machines will be used responsibly and not excessively.

### 8.4.1 Central IT Services

IT Services is located at 13 Banbury Road and offers facilities, training and advice to members of the University in all aspects of academic computing. More information can be found at [http://www.it.ox.ac.uk](http://www.it.ox.ac.uk).

### 8.5 The Language Centre

The Language Centre provides resources and services for members of the University who need foreign languages for their studies or research and for those who have a personal interest in languages. The Language Centre runs a variety of language courses and has a large library and self-study area. Further information can be found at [http://www.lang.ox.ac.uk](http://www.lang.ox.ac.uk).
A Special Topic Guidelines

Special Topics usually take the form of a short essay based on a topic relevant to one of the listed lecture courses. Students are expected to read beyond the lectures and to write approximately 15 pages. Students may write up to 20 pages without penalty. Penalties for longer submissions are given in Table 1. The page limit includes the whole main body of the special topic (i.e. all text, mathematical equations, figures, tables, table of contents etc.) but excludes the appendices which the assessors are not obliged to read. A minimum of a 12pt font size must be used, the width of the text should be at most 15cm (6 inches) per page and the height of the text should be at most 22.5cm (9 inches) per page. The spacing of the text should be at least one and a quarter spacing (use a baselinestretch of 1.25 in \LaTeX).

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

Table 1: Penalties for over long special topics.

The subject of the essay should be agreed between the lecturer and the student and the student should then write a short plan (approximately one paragraph including 1 or 2 references) which should be approved by the lecturer before the end of the term in which the lectures take place.

The student will then write the special topic, usually without further assistance from the lecturer, but he/she should consult his/her supervisor on general issues. In particular a draft of the special topic may be shown to the supervisor before final submission. In the event that the lecturer is the student’s supervisor, the student may consult the course director.

Two hard copies of the special topic, along with a completed declaration form available from http://www.maths.ox.ac.uk/members/students/postgraduate-courses/msc-mmsc/special-topics should be submitted to Monica Finlayson or another member of the Academic Administration team in room S0.16 by the deadline.

The lecturer will usually mark the special topic themselves and the special topic will also be independently marked by another assessor. Special topic marks are awarded by the examiners on the recommendation of both assessors. If both the assessors’ marks fall within the same class and do not differ by more than 10 marks, the final special topic mark will usually be the average of the two marks. However, if the marks are in different classes or differ by more than 10 marks there will be further discussion between the assessors and with the examiners if necessary in order to reach a decision on a final mark.

Students are advised to read the University’s policy on plagiarism which may be found online at: http://www.ox.ac.uk/students/academic/guidance/skills/plagiarism and is also reproduced in Appendix C.
# B  Diary of Important Events

This diary of important events will be updated throughout the year as dates are confirmed. For the most up-to-date version see [http://www.maths.ox.ac.uk/members/students/postgraduate-courses/msc-mmsc/diary-important-events](http://www.maths.ox.ac.uk/members/students/postgraduate-courses/msc-mmsc/diary-important-events).

<table>
<thead>
<tr>
<th>Date</th>
<th>Event Description</th>
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<tbody>
<tr>
<td>5–9 Oct 2015</td>
<td>Introductory Week.</td>
</tr>
<tr>
<td>12 Oct 2015</td>
<td>Monday of week 1, lectures begin.</td>
</tr>
<tr>
<td>24 Nov 2015</td>
<td>Careers Event.</td>
</tr>
<tr>
<td>4 Dec 2015</td>
<td>Friday of week 8, lectures end.</td>
</tr>
</tbody>
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**Hilary Term 2016**

<table>
<thead>
<tr>
<th>Date</th>
<th>Event Description</th>
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<tbody>
<tr>
<td>11–12 Jan 2016</td>
<td>Revision classes.</td>
</tr>
<tr>
<td>14 Jan 2016</td>
<td>A1 examination, 9.30am.</td>
</tr>
<tr>
<td>15 Jan 2016</td>
<td>B1 examination, 9.30am.</td>
</tr>
<tr>
<td>18 Jan 2016</td>
<td>Submission deadline for Michaelmas Term Special Topics (12noon).</td>
</tr>
<tr>
<td>18 Jan 2016</td>
<td>Monday of week 1, lectures begin.</td>
</tr>
<tr>
<td>11 Mar 2016</td>
<td>Friday of week 8, lectures end.</td>
</tr>
<tr>
<td>15 Mar 2016</td>
<td>Presentation of projects suitable for dissertations (provisional).</td>
</tr>
</tbody>
</table>

**Trinity Term 2016**

<table>
<thead>
<tr>
<th>Date</th>
<th>Event Description</th>
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<tbody>
<tr>
<td>18–19 Apr 2016</td>
<td>Revision classes.</td>
</tr>
<tr>
<td>21 Apr 2016</td>
<td>A2 examination, 9.30am.</td>
</tr>
<tr>
<td>22 Apr 2016</td>
<td>B2 examination, 9.30am.</td>
</tr>
<tr>
<td>25 Apr 2016</td>
<td>Submission deadline for Hilary Term Special Topics (12noon).</td>
</tr>
<tr>
<td>25 Apr 2016</td>
<td>Submission deadline for Case Studies in Mathematical Modelling reports (12noon).</td>
</tr>
<tr>
<td>25 Apr 2016</td>
<td>Monday of week 1, lectures begin.</td>
</tr>
<tr>
<td>23–24 May 2016</td>
<td>Presentation of dissertation topics by students to examiners.</td>
</tr>
<tr>
<td>17 Jun 2016</td>
<td>Friday of week 8, lectures end.</td>
</tr>
</tbody>
</table>

**Long Vacation 2016**

<table>
<thead>
<tr>
<th>Date</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 Jul 2016</td>
<td>Submission deadline for Trinity Term Special Topics (12noon).</td>
</tr>
<tr>
<td>2 Sep 2016</td>
<td>Final deadline for submission of dissertations to Examination Schools (12noon).</td>
</tr>
<tr>
<td>14–16 Sep 2016</td>
<td>Viva Voce examinations (and leaving party!)</td>
</tr>
</tbody>
</table>
C University’s Policy on Plagiarism

(Taken from http://www.ox.ac.uk/students/academic/guidance/skills/plagiarism.)

Plagiarism is presenting someone else’s work or ideas as your own, with or without their consent, by incorporating it into your work without full acknowledgement. All published and unpublished material, whether in manuscript, printed or electronic form, is covered under this definition. Plagiarism may be intentional or reckless, or unintentional. Under the regulations for examinations, intentional or reckless plagiarism is a disciplinary offence.

The necessity to acknowledge others work or ideas applies not only to text, but also to other media, such as computer code, illustrations, graphs etc. It applies equally to published text and data drawn from books and journals, and to unpublished text and data, whether from lectures, theses or other students essays. You must also attribute text, data, or other resources downloaded from websites.

The best way of avoiding plagiarism is to learn and employ the principles of good academic practice from the beginning of your university career. Avoiding plagiarism is not simply a matter of making sure your references are all correct, or changing enough words so the examiner will not notice your paraphrase; it is about deploying your academic skills to make your work as good as it can be.

C.1 Forms of plagiarism

- **Verbatim (word for word) quotation without clear acknowledgement**
  Quotations must always be identified as such by the use of either quotation marks or indentation, and with full referencing of the sources cited. It must always be apparent to the reader which parts are your own independent work and where you have drawn on someone else’s ideas and language.

- **Cutting and pasting from the Internet without clear acknowledgement**
  Information derived from the Internet must be adequately referenced and included in the bibliography. It is important to evaluate carefully all material found on the Internet, as it is less likely to have been through the same process of scholarly peer review as published sources.

- **Paraphrasing**
  Paraphrasing the work of others by altering a few words and changing their order, or by closely following the structure of their argument, is plagiarism if you do not give due acknowledgement to the author whose work you are using.
  A passing reference to the original author in your own text may not be enough; you must ensure that you do not create the misleading impression that the paraphrased wording or the sequence of ideas are entirely your own. It is better to write a brief summary of the authors overall argument in your own words, indicating that you are doing so, than to paraphrase particular sections of his or her writing. This will ensure you have a genuine
grasp of the argument and will avoid the difficulty of paraphrasing without plagiarising. You must also properly attribute all material you derive from lectures.

- **Collusion**
  This can involve unauthorised collaboration between students, failure to attribute assistance received, or failure to follow precisely regulations on group work projects. It is your responsibility to ensure that you are entirely clear about the extent of collaboration permitted, and which parts of the work must be your own.

- **Inaccurate citation**
  It is important to cite correctly, according to the conventions of your discipline. As well as listing your sources (i.e. in a bibliography), you must indicate, using a footnote or an in-text reference, where a quoted passage comes from. Additionally, you should not include anything in your references or bibliography that you have not actually consulted. If you cannot gain access to a primary source you must make it clear in your citation that your knowledge of the work has been derived from a secondary text (for example, Bradshaw, D. Title of Book, discussed in Wilson, E., Title of Book (London, 2004), p. 189).

- **Failure to acknowledge assistance**
  You must clearly acknowledge all assistance which has contributed to the production of your work, such as advice from fellow students, laboratory technicians, and other external sources. This need not apply to the assistance provided by your tutor or supervisor, or to ordinary proofreading, but it is necessary to acknowledge other guidance which leads to substantive changes of content or approach.

- **Use of material written by professional agencies or other persons**
  You should neither make use of professional agencies in the production of your work nor submit material which has been written for you even with the consent of the person who has written it. It is vital to your intellectual training and development that you should undertake the research process unaided. Under Statute XI on University Discipline, all members of the University are prohibited from providing material that could be submitted in an examination by students at this University or elsewhere.

- **Auto-plagiarism**
  You must not submit work for assessment that you have already submitted (partially or in full) to fulfil the requirements of another degree course or examination, unless this is specifically provided for in the special regulations for your course. Where earlier work by you is citable, i.e. it has already been published, you must reference it clearly.

**C.2 Why does plagiarism matter?**

Plagiarism is a breach of academic integrity. It is a principle of intellectual honesty that all members of the academic community should acknowledge their debt to the originators of the ideas, words, and data which form the basis for their own work. Passing off another's work as your own is not only poor scholarship, but also means that you have failed to complete the
learning process. Plagiarism is unethical and can have serious consequences for your future career; it also undermines the standards of your institution and of the degrees it issues.

C.3 Why should you avoid plagiarism?

There are many reasons to avoid plagiarism. You have come to university to learn to know and speak your own mind, not merely to reproduce the opinions of others — at least not without attribution. At first it may seem very difficult to develop your own views, and you will probably find yourself paraphrasing the writings of others as you attempt to understand and assimilate their arguments. However it is important that you learn to develop your own voice. You are not necessarily expected to become an original thinker, but you are expected to be an independent one — by learning to assess critically the work of others, weigh up differing arguments and draw your own conclusions. Students who plagiarise undermine the ethos of academic scholarship while avoiding an essential part of the learning process.

You should avoid plagiarism because you aspire to produce work of the highest quality. Once you have grasped the principles of source use and citation, you should find it relatively straightforward to steer clear of plagiarism. Moreover, you will reap the additional benefits of improvements to both the lucidity and quality of your writing. It is important to appreciate that mastery of the techniques of academic writing is not merely a practical skill, but one that lends both credibility and authority to your work, and demonstrates your commitment to the principle of intellectual honesty in scholarship.

C.4 What happens if you are thought to have plagiarised?

The University regards plagiarism in examinations as a serious matter. Cases will be investigated and penalties may range from deduction of marks to expulsion from the University, depending on the seriousness of the occurrence. Even if plagiarism is inadvertent, it can result in a penalty. The forms of plagiarism listed above are all potentially disciplinary offences in the context of formal assessment requirements.

The regulations regarding conduct in examinations apply equally to the submission and assessment of a thesis, dissertation, essay, or other coursework not undertaken in formal examination conditions but which counts towards or constitutes the work for a degree or other academic award. Additionally, this includes the transfer and confirmation of status exercises undertaken by graduate students. Cases of suspected plagiarism in assessed work are investigated under the disciplinary regulations concerning conduct in examinations. Intentional plagiarism in this context means that you understood that you were breaching the regulations and did so intending to gain advantage in the examination. Reckless, in this context, means that you understood or could be expected to have understood (even if you did not specifically consider it) that your work might breach the regulations, but you took no action to avoid doing so. Intentional or reckless plagiarism may incur severe penalties, including failure of your degree or expulsion from the university.

If plagiarism is suspected in a piece of work submitted for assessment in an examination, the matter will be referred to the Proctors. They will thoroughly investigate the claim and call the
student concerned for interview. If at this point there is no evidence of a breach of the regulations, no further disciplinary action will be taken although there may still be an academic penalty (see Section 9). However, if it is concluded that a breach of the regulations may have occurred, the Proctors will refer the case to the Student Disciplinary Panel. More information on disciplinary procedures and appeals is available from [http://www.ox.ac.uk/students/academic/conduct](http://www.ox.ac.uk/students/academic/conduct).

If you are suspected of plagiarism your College Secretary/Academic Administrator and subject tutor will support you through the process and arrange for a member of Congregation to accompany you to all hearings. They will be able to advise you what to expect during the investigation and how best to make your case. The OUSU Student Advice Service can also provide useful information and support, see [http://ousu.org/](http://ousu.org/).

C.5 Does this mean that I shouldn't use the work of other authors?

On the contrary, it is vital that you situate your writing within the intellectual debates of your discipline. Academic essays almost always involve the use and discussion of material written by others, and, with due acknowledgement and proper referencing, this is clearly distinguishable from plagiarism. The knowledge in your discipline has developed cumulatively as a result of years of research, innovation and debate. You need to give credit to the authors of the ideas and observations you cite. Not only does this accord recognition to their work, it also helps you to strengthen your argument by making clear the basis on which you make it. Moreover, good citation practice gives your reader the opportunity to follow up your references, or check the validity of your interpretation.

C.6 Does every statement in my essay have to be backed up with references?

You may feel that including the citation for every point you make will interrupt the flow of your essay and make it look very unoriginal. At least initially, this may sometimes be inevitable. However, by employing good citation practice from the start, you will learn to avoid errors such as close paraphrasing or inadequately referenced quotation. It is important to understand the reasons behind the need for transparency of source use.

All academic texts, even student essays, are multi-voiced, which means they are filled with references to other texts. Rather than attempting to synthesise these voices into one narrative account, you should make it clear whose interpretation or argument you are employing at any one time - whose voice is speaking.

If you are substantially indebted to a particular argument in the formulation of your own, you should make this clear both in footnotes and in the body of your text according to the agreed conventions of the discipline, before going on to describe how your own views develop or diverge from this influence.

On the other hand, it is not necessary to give references for facts that are common knowledge in your discipline. If you are unsure as to whether something is considered to be common knowledge or not, it is safer to cite it anyway and seek clarification. You do need to document facts that are not generally known and ideas that are interpretations of facts.
C.7 Does this only matter in exams?

Although plagiarism in weekly essays does not constitute a University disciplinary offence, it may well lead to College disciplinary measures. Persistent academic under-performance can even result in your being sent down from the University. Although tutorial essays traditionally do not require the full scholarly apparatus of footnotes and referencing, it is still necessary to acknowledge your sources and demonstrate the development of your argument, usually by an in-text reference. Many tutors will ask that you do employ a formal citation style early on, and you will find that this is good preparation for later project and dissertation work. In any case, your work will benefit considerably if you adopt good scholarly habits from the start, together with the techniques of critical thinking and writing described above.

As junior members of the academic community, students need to learn how to read academic literature and how to write in a style appropriate to their discipline. This does not mean that you must become masters of jargon and obfuscation; however the process is akin to learning a new language. It is necessary not only to learn new terminology, but the practical study skills and other techniques which will help you to learn effectively.

Developing these skills throughout your time at university will not only help you to produce better coursework, dissertations, projects and exam papers, but will lay the intellectual foundations for your future career. Even if you have no intention of becoming an academic, being able to analyse evidence, exercise critical judgement, and write clearly and persuasively are skills that will serve you for life, and which any employer will value.

Borrowing essays from other students to adapt and submit as your own is plagiarism, and will develop none of these necessary skills, holding back your academic development. Students who lend essays for this purpose are doing their peers no favours.

C.8 Unintentional plagiarism

Not all cases of plagiarism arise from a deliberate intention to cheat. Sometimes students may omit to take down citation details when taking notes, or they may be genuinely ignorant of referencing conventions. However, these excuses offer no sure protection against a charge of plagiarism. Even in cases where the plagiarism is found to have been neither intentional nor reckless, there may still be an academic penalty for poor practice.

It is your responsibility to find out the prevailing referencing conventions in your discipline, to take adequate notes, and to avoid close paraphrasing. If you are offered induction sessions on plagiarism and study skills, you should attend. Together with the advice contained in your subject handbook, these will help you learn how to avoid common errors. If you are undertaking a project or dissertation you should ensure that you have information on plagiarism and collusion. If ever in doubt about referencing, paraphrasing or plagiarism, you have only to ask your tutor.

C.9 Examples of plagiarism

The final entry at [http://www.ox.ac.uk/students/academic/guidance/skills/plagiarism](http://www.ox.ac.uk/students/academic/guidance/skills/plagiarism) demonstrates some of the common pitfalls to avoid.
D  Electronic Resources for Mathematics

See [http://www.maths.ox.ac.uk/members/library/other-e-resources](http://www.maths.ox.ac.uk/members/library/other-e-resources)

OxLIP — Oxford Libraries Information Portal [http://oxlip-plus.bodleian.ox.ac.uk](http://oxlip-plus.bodleian.ox.ac.uk)

Core Databases

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<td>MathSciNet</td>
<td>Mathematical Reviews produced by the American</td>
<td>OxLIP+</td>
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<tr>
<td></td>
<td>Mathematical Society</td>
<td></td>
</tr>
<tr>
<td>Web of Science with</td>
<td>Science and Technology</td>
<td>OxLIP+</td>
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<tr>
<td>Conference Proceedings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>INSPEC</td>
<td>Physics, Engineering, Computing, Applied Mathematics</td>
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Reference Management Software

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<tr>
<td>EndNote</td>
<td>Reference management software</td>
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<tr>
<td></td>
<td>Can be purchased from OUCS</td>
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<tr>
<td>EndNote Web</td>
<td>Web version of EndNote</td>
<td>OxLIP+</td>
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<tr>
<td></td>
<td>Free — university subscription</td>
<td>Internet</td>
</tr>
<tr>
<td>RefWorks</td>
<td>Web based reference management software</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Internet</td>
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</tbody>
</table>

RefWorks and EndNote Web are online research management, writing and collaboration tools, designed to help researchers easily gather, manage, store and share all types of information, as well as generate citations and bibliographies. Any bona fide member of the University may freely create an account, though you must be within the Oxford Internet domain to do so.

Electronic Journals

Oxford University e-journals portal [http://ejournals.bodleian.ox.ac.uk](http://ejournals.bodleian.ox.ac.uk) provides an extensive collection of e-journals published by the main societies and publishers: Association for Computing — ACM Digital Archive; American Mathematical Society; London Mathematical Society; IEEE Electronic Library — Computer Society (Digital Library); SIAM journals including LOCUS archive; Cambridge University Press — Computer Science and Mathematics; Science Direct; Springer journals; Wiley InterScience etc.
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<tr>
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<td>Open Access</td>
</tr>
<tr>
<td>ORA — Oxford University Research Archive</td>
<td>Full-text articles, conference proceedings, theses, reports</td>
<td>OxLIP+</td>
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<td>DOAJ Directory of Open Access Journals</td>
<td>Full-text journals</td>
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<tr>
<td>ZETOC journals — British Library</td>
<td>Electronic Tables of Contents Bibliographic details (references only)</td>
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Electronic Books

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<td>e-book</td>
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Standards and Conference Proceedings

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<td>OxLIP+</td>
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<tr>
<td>Lecture Notes in Mathematics</td>
<td>Conference Proceedings, e-books</td>
<td>OU e-journals</td>
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<td>British Standards On-Line — BSOL</td>
<td>Full-text standards</td>
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### Dissertations and Theses

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<td>Dissertations from UK universities</td>
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### Internet Gateways (quality assessed Internet Resources)

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<td>PhysMathCentral</td>
<td>Peer reviewed e-journals (physics and maths) [<a href="http://www.physmathcentral.com/">http://www.physmathcentral.com/</a>]</td>
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### Professional Organisations and Societies

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<tr>
<td>The London Mathematical Society</td>
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<tr>
<td>The Royal Society</td>
<td>Independent scientific academy of the UK [<a href="http://royalsociety.org/">http://royalsociety.org/</a>]</td>
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**Accessing electronic resources:**
Electronic resources can be accessed directly on the University of Oxford network. For remote access to databases, electronic reference works and e-book or e-journals packages use OxLIP+ and login with your Oxford Single Sign-On (SSO) [http://www.it.ox.ac.uk/welcome/your-oxford-sso-account](http://www.it.ox.ac.uk/welcome/your-oxford-sso-account).

**For print resources check the Library Catalogue SOLO:**
[http://solo.bodleian.ox.ac.uk](http://solo.bodleian.ox.ac.uk) Please note that this list of resources is not exhaustive.

**Your subject librarian is:**
Ljilja Ristic, Physical Sciences Librarian Subject Consultant, Radcliffe Science Library; Tel. (01865) 272816; Ljilja.Ristic@bodley.ox.ac.uk.