The University Of Sheffield.

School Of Mathematics and Statistics

Single and Dual Honours

Level Two Mathematics and Statistics Courses

2011/2012

Contents

1 Introduction: Your Module Choices

This handbook gives details of the module choices you need to make for the coming session. Many of you will have taken all the mathematics and statistics modules available at Level 1; at Level 2 you need to select 12 from the 16 available, subject to various restrictions. Dual degree students have less choice and, again, the rules governing module choice are detailed in this handbook.

When considering which modules to take this year, you should always have in mind the effect of your choices on your options for Level 3 and beyond (even into your future career). The Level 3 and 4 handbooks for 2011–2012 are available on the Mathematics UG Group on MUSE and these will give you a reasonably good idea of what may be available in future years and what Level 2 prerequisites the various higher level modules require.

Like most leading UK Universities, the University of Sheffield has two Special Honours degree programmes in Mathematics and Statistics (as well as a variety of dual programmes and programmes involving study abroad). These are the three-year Bachelor of Science (BSc Mathematics) and the four-year Master of Mathematics (MMath Mathematics). They have the same syllabus for the first two years, so if you decide that you wish to change programme, you should do so when you select your Level 3 options, at the end of Level 2. The Level 3 handbook will carry details of the differences between the two programmes and how to switch from one to the other.

This handbook contains essential information to help you to make informed choices and will be useful throughout your second year. Please feel free to seek further information or advice from your personal tutor or any of your lecturers.

Dr. A.F.Jarvis, Director of Teaching, SoMaS

2 Disclaimer

Every care has been taken to ensure the accuracy of the information in this booklet. To the best of our knowledge it was correct at the time at which it was prepared. The School of Mathematics and Statistics cannot accept responsibility for any errors which could occur should there be any further modification of the Regulations.

3 Administrative Information

Dates of Semesters

Session 2011–2012

2011				
26 September	–	17 December	:	Autumn Semester Teaching Period (12 weeks)
2012				
16 January	–	4 February	:	Autumn Semester Examinations (3 weeks)
6 February	–	31 March	:	Spring Semester, First Teaching Period (8 weeks)
23 April	–	19 May	:	Spring Semester, Second Teaching Period (4 weeks)
21 May	–	9 June	:	Spring Semester Examinations (3 weeks).

Session 2012–2013

2012				
24 September	–	15 December	:	Autumn Semester Teaching Period (12 weeks)
2013				
14 January	–	2 February	:	Autumn Semester Examinations (3 weeks)
4 February	–	16 March	:	Spring Semester, First Teaching Period (6 weeks)
8 April	–	18 May	:	Spring Semester, Second Teaching Period (6 weeks)
20 May	–	8 June	:	Spring Semester Examinations (3 weeks).

Choice of Modules

As in your first year, most modules in mathematics will involve two lecture hours per week. There will generally be an associated tutorial or practical hour each fortnight. Maths courses at Level 2 last for one semester and will be examined at the end of that semester: such a course is a 10-credit module (and is reckoned to involve a total of 100 hours work). All students need to take **120 credits** at the appropriate level for each year of your degree course. If you are registered for a dual honours degree then in your second year you will normally take 60 credits for each half of the dual (check the regulations for your dual degree – http://www.shef.ac.uk/govern/calendar/regs.html). It is your responsibility to determine the prerequisites and timetable for any non-mathematical

module.

Online module choice in 2011 runs from 4–27 May. You should ensure that you submit your choice of modules during this period. Details of the operation of online module choice will be given separately.

The choice of Level 2 modules which you make in May 2011 will be regarded as provisional. You will have an opportunity, when you return in September, to modify your choice in the light of your examination results.

Unrestricted Modules

The term **unrestricted** means you are free to choose either a mathematics or a statistics module or one outside the School of Mathematics and Statistics. The marks from such modules are used in assessing your final degree classification.

It is **your responsibility** to determine the prerequisites and timetable for any non-mathematical module and to obtain academic approval from the department which owns the module.

Note that some mathematics and statistics modules **cannot** be taken with certain modules from other departments; details are included in the information on individual modules.

You may not choose Level 1 modules as unrestricted modules at Levels 2, 3 or 4. You are also advised that the School will not permit its students to take any mathematical module from another University department as an unrestricted module at Level 2, 3 or 4.

Change of Choice of Modules

The University allows you to change your choice of modules in the first three weeks of any semester. **If you do change your options early in a semester it is your responsibility to ensure not only that your timetable for that semester works but also that you will have suitable options available in future semesters for you to be able to complete your degree** (for example, you will have covered all prerequisites for your future choices). To make the change you must obtain an 'Add-Drop Form'. These are available from the Student Services Information Desk (SSiD) in the Union of Students, and can also be downloaded from the SSiD web site at http://www.shef.ac.uk/ssid/forms.

When you have completed the form, you must have it signed, to signify the School's approval, by the Programme Leader for your degree programme, or by the Senior Tutor: see the list of members of staff authorized to sign such forms at http://www.maths.dept.shef.ac.uk/maths/who_signs.php. The form should then be handed in at the SSiD.

You can access the record of your choice of modules on central records. You **must** check that this record is correct in the fourth week of each semester. If it is not correct obtain an Add-Drop Form and take appropriate steps to correct it.

Progression into the Second Year

The rules for progression are given below and apply to the January and June exams taken together:

(i) You may proceed to the second year without any resit if you have obtained 120 credits in your first year courses.

(ii) If you have fewer than 120 credits but at least 100 credits and you have no mark below 30, then progress to Year 2 is at the discretion of the Board of Examiners; this is unlikely to be given in the event that a core module has been failed.

(iii) If you have less than 100 credits or have a mark below 30, then you will be required to resit all your failed modules.

(iv) If you have one or more 'Not Assessed' or 'Not Completed' modules, you will be required to resit these and any failed modules.

If you are required to resit any examinations, you will be informed of the arrangements by the University at the same time as you receive your official examination results via MUSE from Student Services which will be some time in July. Usually you will be required to pay a fee. If you are not obliged to resit a failed module but still wish to do so then you must either go to or write to the Examinations Office in University House, and ask to register for the resit examination and pay the fee. A conceded pass (denoted by PC), automatically gives a candidate the right to proceed to the next level without taking further examinations.

Progression from the Second into the Third Year

Since your Level 2 results contribute to your overall degree classification (unlike your Level 1 results), the rules for progression from Level 2 into Level 3 are slightly more involved.

For students on BSc degree programmes, progression from Level 2 to Level 3 is normally automatic for those who have been awarded 120 credits at Level 2. The Examiners have discretion to decide whether students who have been awarded 100 or 110 such credits may be deemed to have passed at Level 2 and permitted to proceed to Level 3. Permission to proceed in these circumstances is not automatic. If you have only **90 or fewer credits** then you must resit **ALL** the modules you have failed. If you have obtained at least 100 credits but have failed one or two modules at Level 2, then you are **strongly advised to resit** any failed modules (even if the Examiners permit you to progress) as a pass would give you more flexibility in your third year, because in all cases there is a minimum number of credits that must be obtained (over the second and subsequent years combined) if the degree is to be awarded. Students who are permitted to progress into Level 3, but who do not have the full 120 credits at Level 2 are permitted to resit Level 2 exams during their Level 3 year (but only one resit is permmitted for any module).

If you wish to retake failed modules you should follow the instructions at http://www.sheffield.ac.uk/ssid/exams/reassessment_ug.html. Any international student who wishes to take August 2012 resit examinations in their home country should apply

to do so by the end of the Semester 2 examination period 2012. The maximum score that can be credited as a result of a resit examination is 40.

Students on an MMath programme must obtain 120 credits at Level 2 with an average of at least 54.5 (59.5 for the MMath Mathematics with Study Abroad) to be permitted to progress to Level 3 of the same programme; those who do not meet this requirement will be transferred to a BSc programme.

MMath/BSc Transfers

If you are registered for the MMath Mathematics degree, then at the end of your second year you will need to decide whether to continue with that four-year MMath degree or transfer to the three-year BSc degree. Likewise, if you are registered for the BSc Mathematics degree, then you will need to decide whether to continue with that or transfer to the four-year MMath degree.

If you are registered for the MMath Mathematics with Study in Europe or one of the three MMath with French/German/Spanish Language degrees, then you will need to decide whether to continue with that four-year MMath degree or transfer to the four-year BSc with Study in Europe and spend year three abroad, returning to take Level 3 modules in your final year, or to transfer to the MMath in Mathematics or the three-year BSc in Mathematics degree (i.e., not going abroad).

It will normally be necessary for you to achieve an average of at least 54.5 (59.5 for the MMath Mathematics with Study Abroad) taken over all your Level 2 courses in order to take any MMath degree. Therefore if you do not achieve this then you will have to change to one of the BSc degrees.

Degrees with Employment Experience

It is now possible to take a year out and work in a company to obtain employment experience. For further information please see the university website http://www.sheffield.ac.uk/placements/students and contact Professor Zinober, who administrates the SoMaS scheme for any particular additional information.

Students need to find their own company placement and Professor Zinober should validate the placement.

Avoiding Collusion and Plagiarism

This has been extracted from the University's Notes for Candidates on Non-Invigilated Examinations at http://www.shef.ac.uk/ssid/exams/notes.html.

(i) When preparing essays, projects or other work, you will read widely and become familiar with the work of others. You should ensure that the materials you prepare for submission would be accepted as your own original work. A lecturer or tutor who is assessing your work is interested in your understanding of an idea and you should use your own words to demonstrate your understanding. The selective quoting of

material from books and articles is permissible, but the material must always be attributed to its sources by means of quotation marks. In assessed essays, a footnote or brackets naming the author and the title of the text plus the dates of publication would be required, as would a bibliography that provides full references of all the material consulted or used.

The basic principle underlying the preparation of any piece of academic work is that the work submitted must be your own original work. Plagiarism and collusion are not allowed because they go against this principle. Please note that the rules about plagiarism and collusion apply to all assessed and non-assessed work, including essays, experimental results and computer code. Cutting and pasting from web sites would also be considered unacceptable.

Plagiarism is passing off others' work as your own, whether intentionally or unintentionally. The work can include ideas, compositions, designs, images, computer code, and, of course, words. This list is not exhaustive. The benefit accrued could be, for example, an examination grade or the award of a research degree.

(a) If a student submits a piece of work produced by others, or copied from another source, this is plagiarism.

(b) If a student produces a piece of work which includes sections taken from other authors, this is plagiarism, unless the source has been attributed as outlined above. The length of the copied section is not relevant, since any act of plagiarism offends against the general principle set out above. When copying sections from other authors it is not sufficient simply to list the source in the bibliography.

(c) If a student paraphrases from another source without the appropriate attribution, this is plagiarism. Paraphrasing should use a student's own words to demonstrate an understanding and accurately convey the meaning of the original work, and should not merely reorder or change a few words or phrases of the existing text.

(d) If a student copies from or resubmits his or her own previous work for another assignment, this is self-plagiarism, and is not acceptable.

(ii) Collusion is a form of plagiarism where two or more people work together to produce a piece of work all or part of which is then submitted by each of them as their own individual work.

(a) If a student gets someone else to compose the whole or part of any piece of work, this is collusion.

(b) If a student copies the whole or part of someone else's piece of work with the knowledge and consent of the latter, then this is collusion.

(c) If a student allows another student to copy material, knowing that it will subsequently be presented as that student's own work, then this is collusion.

(d) If two or more students work on an assignment together, produce an agreed piece of work and then copy it up for individual submission, then this is collusion. When producing a piece of work arising out of groupwork, students should seek the advice of the tutor setting the assigned work regarding the acceptable limits of collaboration.

(iii) Both plagiarism and collusion are strictly forbidden. Students are warned that the piece of work affected may be given a grade of zero, which in some cases will entail

failure in the examination for the relevant unit or research degree. The student may also be referred to the Discipline Committee.

(iv) You should follow any guidance on the preparation of material given by the academic department setting the assignment. If in doubt, consult the member of academic staff responsible for the unit of study. There is unlikely to be any objection to you discussing the subject of an essay or project with fellow students in general terms, or to quoting from various sources in the work submitted. However, if you have any problems with an assignment you should always consult your tutor, who will give general advice and help.

See also the *Guidance for Students on the Use of Unfair Means*, available from the SSiD web page at http://www.shef.ac.uk/ssid/exams/plagiarism.html.

Failure to Comply with Assessment Requirements

Failure to attend an examination without adequate reason will result in a grade of 0 being awarded. If you are ill you must obtain a **medical note** signed by a **medical practitioner**; you must also complete a 'Special Circumstances Form' to explain your absence, and hand it in at SoMaS Reception in Room G12 of the Hicks Building. Excuses such as misreading the timetable or oversleeping are **not** acceptable as reasons for absence. Any student who misses an exam should avoid seeing or talking about the exam and report to SoMaS Reception as soon as possible.

It is recommended that students with ongoing medical circumstances complete a special circumstances form each semester to ensure that consideration of their condition is not overlooked.

Failure to hand in assessed coursework on time without good reason will result in the imposition of a penalty in accordance with the University's Penalties Policy. Late submission of a major piece of assessed coursework, such as a project dissertation, will result in the deduction of 5% of the total mark awarded for each of the first 5 'University Working Days' by which the submission is late; work submitted even later than that will receive a mark of 0. For pieces of assessed coursework that contribute only a small percentage of the overall assessment, the Faculty of Science has given the School approval to operate a policy of 'zero tolerance', under which any late submission receives a mark of 0. Module leaders have the power to award dispensations in cases where the lateness was caused by certifiable medical problems or severe personal circumstances; requests for such dispensations should be made as soon as the problem is known, in writing or by e-mail to the module leader; students making such requests must also complete a 'Special Circumstances Form' and hand it in at SoMaS Reception (G12).

Statement on Assessment Criteria

Typical examinations in SoMaS involve several questions each of which will have components of at least some of the following types: (i) explanation of theory developed in the module; (ii) standard problems solvable using methods seen in the module; (iii) more difficult unseen problems requiring knowledge of the module but also requiring some original

thought. Students' scripts are assessed using a strict and detailed marking scheme, usually based on method and accuracy marks. The primary criterion is correctness, whether it be of calculation, method or explanation. This produces a set of raw marks which is then scaled, using the judgement of the examiner, to the University's 100-point reporting scale. The scaling is subjected to a central School scrutiny process involving, after Semester 1 of Year 1, the past record of each student who is registered for the module and for whom there are no abnormal circumstances. For each such student, a target mark is calculated and the average mark for the module is required to be within a specified distance, depending on the class size, of the average target mark.

Examination papers, including the past papers to which the students have access in advance, carry the distribution of marks between parts of questions.

The internal checker for each examination paper and the appropriate External Examiner are provided with copies of the module's objectives/learning outcomes, and these are also distributed to students. The internal checker is asked to complete a form indicating how well the paper assesses the learning outcomes.

The School operates a scheme whereby marking is checked for accuracy and adherence to the marking scheme. Each semester, the Director of Teaching makes a selection of modules, with a view to comprehensive coverage of all staff involved in marking, and asks a second marker to remark a random selection of scripts, following the detailed markscheme, and to report on the outcome. On each paper at Level 2 and above, selected scripts, usually from the borderbands between classifications, are sent to the appropriate External Examiner. Before the Final Year Examination Board Meeting, all final year scripts of borderband candidates are looked at by the External Examiners.

All examination marking and all discussion at formal Examination Board Meetings is conducted anonymously, that is, students are identified only by their registration numbers.

Award of Degrees

In order to qualify for the award of a degree, students have to obtain a specified number of credits. Also, the 'level' of the credits is important. In what follows, 'Level 3 modules' refers to courses MAS3**, normally (but not always) taken during Level 3, and 'Level 4 modules' refers to courses MAS4**, normally (but not always) taken during Level 4.

In order to be awarded an **honours degree of BSc**, you must obtain at least **200 credits**, of which at least **90 must be of Level 3 modules**, out of the overall **240 credits** possible on the second and third years combined.

This is a minimum requirement below which you cannot obtain an honours BSc degree: the granting of a pass degree (that is, without honours) to a student with less than 200 credits (or with less than 90 credits of Level 3 modules) is always at the discretion of the examiners, and requires the specific concurrence of the External Examiners.

Candidates for a BSc degree who have completed, and submitted themselves for assessment on, 120 credits at each of Levels 2 and 3 but have not been recommended for the award of a degree may enter for a subsequent examination for each failed module on one further occasion, but will only be eligible for the award of a BSc pass degree.

In order to be awarded an **honours degree of MMath**, you must take **120 credits** of Level 4 modules across Levels 3 and 4. You must obtain at least **320 credits**, of which at least **90 must be Level 4 modules**, out of the overall **360 credits** possible on the second, third and fourth years combined, provided the Examiners recommend a class II(ii) degree or above. (Classification of honours degrees is discussed in the next subsection.) Candidates whom the Examiners would place in Class III will be recommended for the award of a BSc degree with honours; candidates whom the Examiners deem to be worthy of a pass shall be recommended for the award of a BSc pass degree.

In particular, **in order to be awarded an MMath degree, you must pass at least 90 credits of Level 4 modules.**

Candidates for an MMath degree who have completed, and submitted themselves for assessment on, 120 credits at each of Levels 2, 3 and 4 but have not been recommended for the award of a degree may enter for a subsequent examination for each failed Level 4 module on one further occasion, but will only be eligible for the award of a BSc pass degree.

Classification of Honours Degrees

Under the current Regulations, for each module you complete you will be awarded a mark on the University 100-point scale. This subsection describes the way that these marks contribute to the final degree classification.

The full details are available from the the University's General Regulations for First Degrees at http://calendar.dept.shef.ac.uk/calendar/06d_gen_regs_for_first_degrees.pdf. Here are the main points.

All your module marks (including any for which the mark is 40 or below) for years 2, 3 (and 4 if appropriate) are averaged, but Level 2 marks are given half the weight of Level 3 and Level 4 marks.[1] Then two calculations are made.

Calculation 1 (the weighted mean grade) is made in accordance with the following principles:

- where a candidate's weighted mean grade is of a value indicated in the first column, the outcome of Calculation 1 shall be the corresponding class indicated in the second column

69.5 or higher	:	Class I
59.5 or higher	:	Class II(i)
49.5 or higher	:	Class II(ii)
44.5 or higher	:	Class III
39.5 or higher	:	Pass;

- where a candidate's weighted mean grade falls within the band indicated in the first column, the outcome of Calculation 1 shall be the borderline to the corresponding class indicated in the second column

[1] For students on the MMath Mathematics with Study in Europe, Australia, North America or Year Abroad programmes or the MMath Mathematics with French/German/Spanish Language programmes, Level 2 and Level 3 marks are given half the weight given to Level 4 marks. Also, for candidates on the BSc Mathematics with Study in Europe programme, the year abroad carries the same weight as the Level 2 year.

68.0–69.4	:	Class I
58.0–59.4	:	Class II(i)
48.0–49.4	:	Class II(ii)
44.0–44.4	:	Class III
38.0–39.4	:	Pass.

Calculation 2 (the distribution of grades) is made in accordance with the following principles:

- where the best half of a candidate's weighted grades are of a value indicated in the first column, the outcome of Calculation 2 shall be the corresponding class indicated in the second column

69.5 or higher	:	Class I
59.5 or higher	:	Class II(i)
49.5 or higher	:	Class II(ii)
44.5 or higher	:	Class III
39.5 or higher	:	Pass;

- where the best five twelfths of a candidate's weighted grades are of a value indicated in the first column, the outcome of Calculation 2 shall be the borderline to the corresponding class indicated in the second column above.

In recommending the **class of degree** to be awarded to each candidate, the Examiners shall take into account the outcomes of Calculations 1 and 2 in accordance with the following principles:

- where one Calculation places the candidate in one class and the other Calculation places the candidate in either the same class or the borderline to the same class, the candidate shall normally be recommended for the award of a degree of that class;
- where one Calculation places the candidate in one class, and the other Calculation places the candidate in the borderline to the class immediately above, the candidate shall normally be recommended for the award of a degree of the lower class;
- where one Calculation places the candidate in one class, and the other Calculation places the candidate in the class immediately below, the candidate shall be considered as being in the borderline to the higher class, and the class of the degree to be recommended by the Examiners shall normally correspond to the class indicated by the weighted mean of the grades at the final Level of study;
- where both Calculations place the candidate in the same borderline, the class of the degree to be recommended by the Examiners shall normally correspond to the class indicated by the weighted mean of the grades at the final Level of study;
- where one Calculation places the candidate in one class, or borderline to a class, and the other Calculation places the candidate in another class, or borderline to a class, neither immediately above nor below, the Examiners shall recommend the classification which, having regard to all the evidence before them, best reflects the overall performance of the candidate.

Note that the Examiners are free to vary from the formal rules for any candidate where there is strong evidence to support such a decision. In consideration of such evidence, the Examiners will seek guidance from the School's External Examiners. Also, if a candidate is awarded a classified degree (I, II(i), II(ii), or III) then the degree is an **honours** degree irrespective of whether the candidate has any failed modules.

There is a University appeals procedure, full details of which are displayed on the student notice boards listed later in this handbook. They may be also found on the web at http://www.shef.ac.uk/ssid/procedures/grid.html, or as described at the end of the section entitled 'Where else to find Information' on p.15.

Prizes

The following prize regulations include prizes that may be awarded to Level 2 students.

Sir Edward Collingwood Prizes in Probability and Statistics

This prize was founded in 1970 by the Applied Probability Trust in memory of Sir Edward Collingwood, who was Chairman of the Trust from its inception in 1963 to 1970, and President of the London Mathematical Society in 1970.

1. Frequency of award: Two annually.

2. Value of prizes: £50 each.

3. Eligible candidates: (a) Students who have completed two years of a programme of study containing, in the opinion of the Head of School, a substantial amount of Probability and/or Statistics. (b) Students who are taking the Final Examination for the programmes of study in Mathematics and Statistics.

4. Assessor: The Head of School.

5. Criteria for assessment: The best overall performance in Probability and/or Statistics (not necessarily the highest marks in any examination).

T M Flett Prizes in Pure Mathematics

These prizes were founded in 1977 from subscriptions in memory of Professor T M Flett, member of staff of the Department of Pure Mathematics from 1967 to 1976.

1. Frequency of award: Two annually.

2. Value of prizes: £75

3. Eligible candidates: Students who are taking the Final Examination for a programme of study in which the Pure Mathematics component constitutes at least one half of the Level 3 course.

4. Assessor: The Head of School.

5. Criteria for assessment: The appropriate examination considered in conjunction with course work carried out during the year.

4 Help, Guidance and Information

Personal Tutors

The personal tutorial system operates for the rest of your course. The present arrangements are that students normally continue with the same personal tutor as in the first year. If you envisage any problem with this then please see the Senior Tutor; it is possible for you to request a change of personal tutor. Second-year students should go to see their tutors each semester, at the beginning of Semester 1 and in Semester 2 when the Semester 1 examination results have been published. However, questions about work concerning particular modules should generally be put to the lecturers concerned. All students are encouraged to keep in touch with their tutors who are then in a good position to act as referees when the time for job applications arrives.

There is in addition a Tutor for Women Students, who is available to discuss problems of a more personal or confidential nature. The Senior Tutor acts as a Tutor for Men Students. There is also a Tutor for Mature Students, who acts as personal tutor to a substantial proportion of the mature students in the School.

If you have any difficulty in contacting your personal tutor, or he or she is unable to solve any problem or answer any query, then you can approach the Senior Tutor or other designated staff members (see the list at http://www.maths.dept.shef.ac.uk/maths/contact.php).

Please make sure that your home address is correct on MUSE before you leave at the end of Semester 2. You will have the same University e-mail address in 2011–2012 as this year. You should make sure your tutor knows your e-mail address, and you should check for e-mail messages when you return to Sheffield in September.

Student Advice Centre, SSiD, Counselling Service, and University Health Service

The Student Advice Centre and Student Services Information Desk (SSiD) provide assistance on a wide range of problems. Specifically, they provide advice on housing, finance, problems about harassment, and help to international students; they also help with academic matters. The Counselling Service and the Student Health Service are also there to help you; strict confidence is always observed.

Nightline

Nightline is the University of Sheffield's confidential listening and information telephone service. It is run by trained student volunteers, and operates from 8.00pm until 8.00am every night during term time. It offers students everything from the phone number of a twenty-four hour taxi company, to examination dates, times and locations, and information about many issues that can be encountered within student life. It provides a vital support network for all students, so whatever you need to say, Nightline is listening, and the service can be called free from phones in halls of residence. If you think you would like to volunteer for Nightline, contact nightline@shef.ac.uk for more information.

The Careers Service

The Careers Service (whose web page is at http://www.shef.ac.uk/careers/) offers an excellent provision, backed up with a wealth of experience, to help students decide on a career and to find employment after graduation. You could also talk to the School's Careers Liaison Officer, listed on http://www.maths.dept.shef.ac.uk/maths/contact.php.

Graduates from our degrees go on to a wide range of careers. Many go on to careers for which a mathematical degree is very important; others go on to careers where degree-level education is important, though not necessarily using mathematical skills. Mathematics graduates have a strong range of transferable skills, including excellent numeracy and analytical problem solving skills. Your degrees often make use of computer packages, and these IT skills are often adapatable to IT requirements of employers. Employers also value highly the ability to communicate mathematical ideas to lay audiences.

A number of our graduates have interest in teaching; the Postgraduate Certificate of Education (PGCE) is a common qualification, and is offered in mathematics by the University of Sheffield (and many other universities). It is administered by the Department of Education, and you should contact them for further information. Other graduates go on to more specialised postgraduate qualifications, including our own MSc in Statistics (and the School is implementing an MSc in Mathematics, to begin in 2011–12).

But making good career decisions will involve you in thinking about your qualities and inclinations. Researching possible careers is also highly advisable! The University has an excellent Careers Service (see http://www.sheffield.ac.uk/careers for much more information), who provide many valuable resources, such as on career planning, CV writing, job seeking, interview skills, and much else. They also organise an extensive programme of careers events, which provide valuable opportunities to meet prospective graduate employers, and find out what skills they are looking for.

Students are strongly advised to make use of the wide range of resources that the Careers Service has to offer. The Careers Service is located at 388 Glossop Road, on the corner of Glossop Road and Durham Road. There is also a Student Jobshop in the Student Union.

The Staff-Student Forum

Nominations for the Staff-Student Forum will be requested at the start of the Autumn Semester. Please think about the possibility of standing for election to the Forum. It will give you an opportunity to have a role in the organisation and management of factors influencing student life in the School of Mathematics and Statistics. The Forum usually meets twice a semester. A number of student members serve as student representatives on the School Teaching Committee, and minutes from the Staff-Student Forum are considered by the School Teaching Committee.

Issues may be raised with forum members at any time; a list of members and how to contact them is on the Staff-Student Forum noticeboard, on G Floor, opposite SoMaS Reception G12. You can find more information from the web pages at http://www.maths-ssc.group.shef.ac.uk/ and can also give feedback, anonymously if desired, via the webpage http://www.maths-ssc.group.shef.ac.uk/shef-only/feedback.html.

There are further opportunities for student representation within the Faculty of Science.

Voluntary work

The University encourages its students to consider undertaking some voluntary work. The text below has been provided by the Manager of SheffieldVolunteering, which is based in the Students' Union.

> 'Volunteering is a great way to get to know the city and its people. You can gain career-related experience or simply volunteer for something that appeals.
>
> 'You can do something just for a day or give a couple of hours each week or fortnight. It's really flexible and you won't be asked to help during exams or vacations.
>
> 'Choose from over 100 options — in student neighbourhoods and the city centre. Alternatively, we can help you to develop your own volunteer project involving other students and benefiting the wider community.
>
> 'Our staff can help you to find something that's right for you. Training and out-of-pocket expenses are provided too.
>
> 'Set yourself apart. Visit http://www.sheffieldvolunteering.info or see us in the Source (Level 3, Union Building).'

Where else to find Information

Lists for personal tutors, timetables, draft examination timetables, and examination results will be displayed in the Hicks Building on:

(i) the notice boards between Lecture Theatres 6 and 7 on E Floor;
(ii) the notice boards outside the Computing Room G25 on G Floor;
(iii) the notice boards near SoMaS Reception G12 on G Floor.

Urgent messages will be displayed in the Entrance Foyer, or sent by e-mail. **Please check notice boards and your e-mail regularly.**

Office-holders in the School and Departments

A list of the members of staff who currently hold various Offices in the School of Mathematics and Statistics and its departments can be found at http://www.maths.dept.shef.ac.uk/maths/contact.php.

A list of the members of staff who are currently authorized to sign Add-Drop and Change-of-Status forms can be found at http://www.maths.dept.shef.ac.uk/maths/who_signs.php.

Official University Information for Students on the Web

General regulations (including degree regulations)
http://www.shef.ac.uk/calendar/

General Regulations relating to Academic Appeals
http://calendar.dept.shef.ac.uk/calendar/06h_gen_regs_as_to_academic_appeals.pdf

Regulations and procedures for grievances and complaints, Appeals
http://www.shef.ac.uk/ssid/procedures/grid.html

Specific SoMaS programme regulations
http://www.shef.ac.uk/calendar/regs.html

SSiD web pages (including exam information, fees, finance, etc.)
http://www.shef.ac.uk/ssid/

LeTS (Learning and Teaching Services)
http://www.shef.ac.uk/lets/students.html

CICS IT information for students
http://www.shef.ac.uk/cics/students/

Students' Charter
http://www.shef.ac.uk/ssid/charter/

Help and support for students
http://www.shef.ac.uk/ssid/welfare/

Information guide for disabled students
http://www.shef.ac.uk/disability/

Essential guide for mature students
http://www.shef.ac.uk/ssid/welfare/mature/

Information for international students
http://www.shef.ac.uk/ssid/international/

5 Health and Safety

Smoking

Students are reminded that smoking is prohibited on all University premises – this includes the area under the canopy at the main entrance to the Hicks Building. In addition, we request that you refrain from smoking on the steps immediately outside the Hicks Building.

First Aid

First Aid boxes are available in SoMaS Reception (Room G12), the Porters Lodge (Hicks Foyer, D Floor), and the Physics Departmental Office (Room E34). Lists of qualified first-aiders can be found outside, or near to, these locations.

Fire Alarm

If the fire alarm sounds in the Hicks Building, please proceed calmly to the nearest exit and assemble in the designated area (on the concourse, underneath the road bridge). **Do not** use lifts. **Do not** re-enter the building until you have been told that it is safe to do so by a fire officer. Note that the alarm is tested for about 30 seconds on Mondays at about 9.50.

6 Information on Mathematics and Statistics Courses

The Aims and Learning Outcomes of the Degree Programmes

The mission of the School of Mathematics and Statistics is

- to conduct high quality research in mathematics and statistics;
- to provide an excellent and inspiring education for students;
- to support, to promote and to increase the impact of our disciplines;
- to be a research-led school that maintains high standards in all activities.

Aims

For all the School's undergraduate programmes, the aims are:

- to provide an intellectual environment conducive to learning;
- to prepare students for careers which use their mathematical and/or statistical training;
- to provide teaching which is informed and inspired by the research and scholarship of staff;
- to provide students with assessments of their achievements over a range of mathematical and statistical skills, and to identify and support academic excellence.

There are also additional aims for particular programmes.

- In all its first degrees the School aims to provide programmes with internal choice to accommodate the diversity of students' interests and abilities.
-
  - In its single honours degrees, the School aims to provide a programme in which students may choose either to specialise in one mathematical discipline (Pure Mathematics, Applied Mathematics[2], Probability and Statistics) or to follow a more balanced programme incorporating two or all three of these disciplines.
  - In its dual degree programmes, the School aims to provide an appropriate Mathematics component.

[2]Students on the MMath Mathematics with French/German/Spanish Language programmes are not permitted to take any Applied Mathematics module.

- In all MMath programmes, the School aims to prepare students for progression to a research degree in one of the three mathematical disciplines or for careers in which the use of Mathematics is central.
- In its single honours programmes with Study in Europe and its programmes with French, German or Spanish Language, the School aims to offer students the opportunity to study Mathematics and Statistics in another European country.
- The MMath programmes with a named language also aim to provide language instruction beyond that needed to study Mathematics and Statistics abroad, giving students the opportunity to acquire all-round fluency in the language.
- In its programme Mathematics with Year Abroad, the School aims to give students the opportunity to benefit from the experience of studying in a different educational culture.

Learning Outcomes

In line with the requirements of HEFCE's Teaching Quality Information initiative, the University has introduced programme specifications for undergraduate and postgraduate taught programmes to provide clear and explicit information for existing and potential students so that they can make informed choices about their studies. In addition to the Aims of the School's undergraduate programmes listed above, there are Learning Outcomes that students are expected to have developed upon successful completion of the programme and achievement of which will usually have been demonstrated via the assessment process. These differ for each degree programme offered; students may consult the latest versions at http://www.shef.ac.uk/calendar/progspec.

Module Questionnaires

Students are strongly encouraged to complete Module Questionnaires for every module they take. These questionnaires are now administered electronically, and instructions on how to complete the questionnaires will be issued every semester.

These questionnaires are important to the School. This is your formal opportunity to give your view on aspects of the course – you can also give comments informally via your Personal Tutor, the Staff-Student Forum, to the lecturer directly, etc., and this is also appreciated.

We are always keen to hear ways to improve our teaching and your learning experience. Considered and thoughtful feedback can provide an extremely helpful input into the School's teaching.

In the same way that receiving a piece of marked work with just a mark out of 10 is not as useful as comments showing how you can improve, we would like to encourage you to be specific and constructive in your questionnaire responses. Reasoned and constructive comments you make on modules can be very helpful, both to the individual lecturer concerned, and to the School, so that we can spread good practice.

Lecturers are human beings with feelings, just like students, and if you feel the need to be critical of aspects of a module, please try to offer criticism in a sensitive way. It

is always good to read positive comments as well as critical ones, so if you feel that a lecturer is doing something well, please let them know!

The questionnaires and comments are considered by members of the Staff-Student Forum, and by the School's Teaching Committee. Comments have led to changes in School procedures, as well as to alterations in course content and practice of lecturers. They also form a valuable input to the annual appraisal of staff.

The numerical data is published on the Staff-Student Forum webpage, as well as on the Staff-Student Forum noticeboard; individual comments are seen by Staff-Student Forum members and individual lecturers.

Your considered feedback plays a valuable part in improving our teaching.

Degree Regulations

Full details of these Regulations are available on the web, as described in the section entitled 'Official University Information for Students on the Web' on p.16. However, at the time of publication of this handbook, the Regulations on the web may be for 2010–2011 rather than 2011–2012. In particular, their lists of modules may reflect availability in 2010–2011 rather than in 2011–2012.

All SoMaS Level 2 modules are worth **10 credits**.

Specific degree regulations: Single Honours

BSc Mathematics Year 2, MMath Mathematics Year 2

You must take the two *core modules*:

MAS201 Linear Mathematics for Applications
MAS202 Advanced Calculus

and modules worth **100 credits** from:

MAS203 Mechanics
MAS204 Numerical Linear Algebra
MAS205 Statistics Core
MAS207 Continuity and Integration
MAS208 Topics in Number Theory
MAS270 Vectors and Fluids
MAS271 Methods for Differential Equations
MAS272 Applied Differential Equations
MAS273 Statistical Modelling
MAS274 Statistical Reasoning
MAS275 Probability Modelling
MAS276 Rings and Groups
MAS277 Vector Spaces and Fourier Theory
MAS278 Nonlinear Mathematics
MAS279 Career Development Skills

but you may replace up to 20 credits with unrestricted modules.

MMath Mathematics with Study in Europe Year 2

You must take the two *core modules*:

MAS201 Linear Mathematics for Applications
MAS202 Advanced Calculus,

modules worth **20 credits** from:

MAS203 Mechanics
MAS205 Statistics Core
MAS207 Continuity and Integration,

modules worth **40 credits** from:

MAS270 Vectors and Fluids
MAS271 Methods for Differential Equations
MAS272 Applied Differential Equations
MAS273 Statistical Modelling
MAS274 Statistical Reasoning
MAS275 Probability Modelling
MAS276 Rings and Groups
MAS277 Vector Spaces and Fourier Theory
MAS278 Nonlinear Mathematics,

and either **40 credits** of MLT modules, or **20 credits** of MLT modules together with **20 credits** from

MAS204 Numerical Linear Algebra
MAS208 Topics in Number Theory
MAS275 Probability Modelling.

BSc Financial Mathematics Year 2

Candidates for this degree programme must take **all modules** in the list

MAS201 Linear Mathematics for Applications
MAS202 Advanced Calculus
MAS205 Statistics Core
MAS207 Continuity and Integration
MAS275 Probability Modelling
MGT212 Financial Management [20 credits]
MGT230 Introduction to Corporate Finance and Asset Pricing [20 credits],

and modules to the value of **30 credits** from the list

ECN101 Business Economics
MAS204 Numerical Linear Algebra
MAS271 Methods for Differential Equations
MAS272 Applied Differential Equations
MAS273 Statistical Modelling
MAS274 Statistical Reasoning
MAS276 Rings and Groups
MAS277 Vector Spaces and Fourier Theory
MAS322 Operations Research
MGT213 Issues in Financial Management [20 credits].

MMath Mathematics with Year Abroad Year 2

Candidates for this degree programme must take **all modules** in the list

MAS201 Linear Mathematics for Applications
MAS202 Advanced Calculus
MAS207 Continuity and Integration
MAS276 Rings and Groups
MAS277 Vector Spaces and Fourier Theory
MAS278 Nonlinear Mathematics,

and modules to the value of **60 credits** from the list

MAS203 Mechanics
MAS204 Numerical Linear Algebra
MAS205 Statistics Core
MAS208 Topcis in Number Theory
MAS270 Vectors and Fluids
MAS271 Methods for Differential Equations
MAS272 Applied Differential Equations
MAS273 Statistical Modelling
MAS274 Statistical Reasoning
MAS275 Probability Modelling.

MMath Mathematics with French/German/Spanish Language Year 2

Candidates for this degree programme must take **all modules** in the list

MAS201 Linear Mathematics for Applications
MAS202 Advanced Calculus
MAS205 Statistics Core
MAS207 Continuity and Integration,

modules to the value of **40 credits** from the list

MAS273 Statistical Modelling
MAS274 Statistical Reasoning
MAS275 Probability Modelling
MAS276 Rings and Groups
MAS277 Vector Spaces and Fourier Theory
MAS278 Nonlinear Mathematics,

and **40 credits** in the appropriate European language. See the University Regulations for detailed requirements.

Specific degree regulations: Dual Honours

This booklet contains only the relevant mathematics modules. The requirements laid down by the other subject in the Dual Honours School are contained in the University Regulations: http://www.shef.ac.uk/govern/calendar/regs.html. You must consult the other Department for details of compulsory modules, possible options and prerequisites. You must take care in choosing your modules to check that you have the relevant prerequisites. You should also be careful to avoid timetable clashes (at Level 3 as well as Level 2, if appropriate).

BSc Mathematics and Astronomy, MMath Mathematics and Astronomy Year 2

You must take:

MAS201 Linear Mathematics for Applications
MAS202 Advanced Calculus
MAS203 Mechanics
MAS270 Vectors and Fluids
MAS271 Methods for Differential Equations
MAS272 Applied Differential Equations,

and modules to the value of **60 credits** provided by the Department of Physics and Astronomy as laid down in the University Regulations.

BSc Mathematics and Physics, MPhys Physics with Mathematics Year 2

You must take:

MAS201 Linear Mathematics for Applications
MAS202 Advanced Calculus
MAS203 Mechanics
MAS270 Vectors and Fluids
MAS271 Methods for Differential Equations
MAS272 Applied Differential Equations,

and modules to the value of **60 credits** provided by the Department of Physics and Astronomy as laid down in the University Regulations.

BSc Chemistry and Mathematics, MChem Chemistry with Mathematics Year 2

You must take:

MAS103 Differential & Difference Equations
MAS175 Groups and Symmetries
MAS201 Linear Mathematics for Applications
MAS202 Advanced Calculus
MAS271 Methods for Differential Equations,

and modules to the value of **70 credits** provided by the Department of Chemistry as laid down in the University Regulations.

BSc Computer Science and Mathematics, MComp Computer Science with Mathematics Year 2

You must take:

MAS201 Linear Mathematics for Applications
MAS202 Advanced Calculus
MAS207 Continuity and Integration
MAS276 Rings and Groups
MAS277 Vector Spaces and Fourier Theory
MAS278 Nonlinear Mathematics,

and modules to the value of **60 credits** provided by the Department of Computer Science as laid down in the University Regulations.

BSc Mathematics and Philosophy Year 2

You must take:

MAS201 Linear Mathematics for Applications
MAS202 Advanced Calculus
MAS207 Continuity and Integration,

modules to the value of **30 credits** from

MAS208 Topics in Number Theory
MAS276 Rings and Groups
MAS277 Vector Spaces and Fourier Theory
MAS278 Nonlinear Mathematics,

and modules to the value of **60 credits** provided by the Department of Philosophy as laid down in the University Regulations.

BSc Environmental Mathematics Year 2

You must take both:

MAS201 Linear Mathematics for Applications
MAS202 Advanced Calculus,

either all of

MAS203 Mechanics
MAS270 Vectors and Fluids
MAS271 Methods for Differential Equations
MAS272 Applied Differential Equations,

or all of

MAS205 Statistics Core
MAS273 Statistical Modelling
MAS274 Statistical Reasoning
MAS275 Probability Modelling,

and modules to the value of **60 credits** provided by the Department of Geography as laid down in the University Regulations.

BSc Geography and Mathematics Year 2

You must take:

MAS201 Linear Mathematics for Applications
MAS202 Advanced Calculus
MAS205 Statistics Core
MAS273 Statistical Modelling
MAS274 Statistical Reasoning
MAS275 Probability Modelling,

modules to the value of **50 credits** provided by the Department of Geography as laid down in the University Regulations, and

a further **10 credits** provided by the Department of Geography, or alternatively one of

MAS204 Numerical Linear Algebra
MAS207 Continuity and Integration
MAS208 Topics in Number Theory.

BA Accounting and Financial Management and Mathematics, BA Business Management and Mathematics Year 2

You must take:

MAS201 Linear Mathematics for Applications
MAS202 Advanced Calculus
MAS205 Statistics Core
MAS273 Statistical Modelling
MAS274 Statistical Reasoning
MAS275 Probability Modelling,

and modules to the value of **60 credits** provided by the Management School as laid down in the University Regulations.

BSc Economics and Mathematics Year 2

You must take:

MAS201 Linear Mathematics for Applications
MAS202 Advanced Calculus,

one of:

MAS205 Statistics Core
MAS207 Continuity and Integration,

modules to the value of **30 credits** from

MAS273 Statistical Modelling
MAS274 Statistical Reasoning
MAS275 Probability Modelling
MAS276 Rings and Groups
MAS277 Vector Spaces and Fourier Theory
MAS278 Nonlinear Mathematics,

modules to the value of **60 credits** provided by the Department of Economics as laid down in the University Regulations.

SoMaS Level 2 modules

Most of the remainder of this document contains descriptions of the other modules offered by SoMaS at Level 2.

The final section gives a provisional timetable for these modules.

MAS201: Linear Mathematics for Applications

Semester 1 10 credits

Prerequisites:	MAS171 (Matrices and Geometry)
Corequisites:	
Cannot be taken with:	

Description

This course is a sequel to the matrices part of the half-module MAS171 (Matrices and Geometry). Many concepts were introduced in that course for 2×2 and 3×3 matrices, but this course considers much more general situations. The central concept studied is that of a basis for a subspace of $\mathbf{R}^n$. Also, an important aspect of this course concerns applications of linear mathematics, and so various applications will be interspersed with general theory as the course progresses. Several of the applications presented will use eigenvectors of square matrices, and so the theory of eigenvalues and eigenvectors will feature from an early point. During the course, it will be seen that MAPLE can be a powerful aid in calculation in linear algebra.

Aims

- To build on the matrix theory studied in MAS171 (Matrices and Geometry) in order to develop a solid foundation for the study of linear algebra in $\mathbf{R}^n$.
- To demonstrate the importance of the concepts of linear combination, linear independence and basis in the study of subspaces of $\mathbf{R}^n$ and ranks of matrices.
- To illustrate how the theory of eigenvalues and eigenvectors of square matrices can be used to good effect in various applications of linear algebra.
- To demonstrate that MAPLE can be a powerful aid in calculations in linear algebra and its applications.

Outline syllabus

- Row echelon and reduced row echelon forms.
- The space $\mathbf{R}^n$.
- Applications of eigenvector theory to difference equations.
- Subspaces.
- Ranks of matrices.
- Invertible matrices.
- Elementary matrices and normal form.
- Determinants of square matrices.
- Diagonalization.
- Systems of linear differential equations.
- Real symmetric matrices and quadratic forms.
- The rank and signature of a quadratic form.

Module Format

Lectures	22	Tutorials	6	Practicals	0

Recommended books

B Jain and Gunawardena "Linear algebra: an interactive approach" (Shelfmark 512.83(J), ISBN 0534409156)

B Lay "Linear algebra and its applications" (Shelfmark 512.83(L), ISBN 0201824787)

Assessment

One formal 2 hour written examination.

MAS202: Advanced Calculus

Semester 1 10 credits

Prerequisites:	MAS101 (Probability, Sets and Complex Numbers); MAS170 (Practical Calculus)
Corequisites:	
Cannot be taken with:	

Description

This course continues the study of the calculus of functions of two variables, begun in MAS170. It includes the application of partial derivatives to finding and classifying local maxima and minima. The new concept of a line integral is introduced, and related to double integrals via Green's theorem, a kind of two-dimensional Fundamental Theorem of Calculus. Returning to functions of a single variable, the important techniques of Fourier series and Fourier transforms are introduced, with a taste of some of their many applications.

Aims

- Learn some new concepts and techniques involving differentiation and integration.
- Understand why they work.
- Relate them to each other and to what has been seen in other courses.
- See some interesting examples.

Outline syllabus

- Line integrals.
- Double integrals, Green's theorem.
- Differentiation under the integral sign.
- Fourier series.
- Fourier transforms.
- Maxima and minima.

Module Format

Lectures	22	Tutorials	6	Practicals	0

Recommended books

B D.W. Jordan and P. Smith "Mathematical techniques (3rd edition)" (Shelfmark 510 (J), ISBN 0199249725)

B E. Kreyszig "Advanced Engineering Mathematics" (Shelfmark Q 510 (K), ISBN 047133328X)

B M. R. Spiegel "Advanced Calculus" (Shelfmark Q 515.076 (W), ISBN 0071375678)

Assessment

One formal 2 hour written examination.

MAS203: Mechanics

Semester 1 10 credits

Prerequisites:	MAS112 (Vectors and Mechanics)
Corequisites:	
Cannot be taken with:	

Description

This module extends the Newtonian mechanics studied in MAS112. The three main topics treated are (i) extensions of the work-energy principle and conservation of energy, (ii) a full treatment of planetary and satellite motion, including the theoretical explanation of Kepler's Laws and (iii) the elements of rigid body motion. Essential mathematical techniques are developed as required: these include double integrals, use of integration to determine centres of mass and moments of inertia, line integrals and the gradient operator.

Aims

- To consolidate, and extend, previous work on the mathematical techniques used in Newtonian mechanics.
- To develop an understanding of planetary, and cognate, motions.
- To introduce the principles of rigid body motion.

Outline syllabus

- **Double Integrals:** Definition as volume under a surface. Evaluation as a repeated integral. Change of variables.
- **Centres of Mass and Moments of Inertia:** Definition of centre of mass; examples of its application. Definition of moment of inertia; examples of its application. The kinetic energy of a rigid body rotating about a fixed axis.
- **Work-Energy Principle:** Work done as a line integral. Conservative forces. Principle of conservation of energy. The gradient operator and simple applications.
- **Planetary Orbits:** Kepler's Laws. Conservation of angular momentum. Equation of orbit in polar coordinates. Conservation of energy. Theoretical derivation of Kepler's Laws. Worked examples.
- **Central Force Motions:** Worked examples (including hyperbolic and parabolic orbits under inverse square law of gravitation).
- **Rigid Body Rotating about a Fixed Axis:** Internal and external forces. Rate of change of angular momentum. Conservation of energy. Motion of centre of mass. Worked examples.

Module Format

Lectures	22	Tutorials	6	Practicals	0

Recommended books

B Burghes "Further Mechanics" (Shelfmark 531 (B), ISBN 0435516094)

B Collinson "Particle Mechanics" (Shelfmark 531 (C), ISBN 0340610468)

B Dyke "Guide to Mechanics" (Shelfmark 531 (D), ISBN 0333793005)

C Synge "Principles of Mechanics" (Shelfmark 531 (S), ISBN b5910893)

Assessment

One formal 2 hour written examination.

MAS204: Numerical Linear Algebra

Semester 1 10 credits

Prerequisites:	MAS171 (Matrices and Geometry)
Corequisites:	MAS201 (Linear Mathematics for Applications)
Cannot be taken with:	

Description

Many problems in applied mathematics and engineering can be solved only by numerical methods. This module begins by deriving and then examining the properties of norms: means of measuring the differences between vectors and matrices; as a result, the concept of "ill-conditioning" can be more clearly defined. Elementary work on interpolation is extended to include least squares data fitting for discrete data subject to experimental errors. The module also covers methods for solving large systems of linear algebraic equations and numerical methods for calculating eigenvalues.

Aims

- To consolidate previous knowledge of numerical analysis.
- To broaden the students knowledge of numerical analysis.

Outline syllabus

- **Norms:** Vector, matrix, and subordinate norms. Ill-conditioned systems. Condition numbers. LU decomposition.
- **Data Fitting:** Lagrange interpolation. Least-squares approximations of the form $f(x) = \sum a_i \phi_i(x)$ (Discrete data). Equivalence to Least Squares solution of overdetermined systems of linear algebraic equations.
  Use of Householder orthogonal transforms.
- **Linear Systems:** Jacobi, Gauss-Seidel, and Successive Over Relaxation methods. Convergence theory.
- **Eigenvalues and Eigenvectors:** Power method for a single eigenvalue. Inverse Power method. Deflation techniques.

Module Format

Lectures	22	Tutorials	5	Practicals	0

Recommended books

B C.F. Gerald and P.O. Wheatley "Applied Numerical Analysis" (Shelfmark 518 (G), ISBN 0321133048)

B J. Douglas Faires, Richard Burden "Numerical Methods" (Shelfmark 518 (F), ISBN 0534407617)

C L. V. Atkinson, P.J. Harley, J.D. Hudson "Numerical Methods with FORTRAN 77" (Shelfmark 517.62 (A), ISBN 0201174308)

Assessment

One formal 2 hour written examination.

MAS205: Statistics Core

Semester 1 10 credits

Prerequisites:	MAS173 (Probability and Inference)
Corequisites:	MAS201 (Linear Mathematics for Applications); MAS202 (Advanced Calculus)
Cannot be taken with:	

Description

This unit develops tools and ideas underpinning probability and statistics at Level 2 and higher. It introduces some standard distributions beyond those met in MAS173, and uses the package R to study them. It proceeds to a systematic treatment of continuous multivariate distributions, with particular emphasis on the multivariate normal distribution. Transformations of univariate and multivariate continuous distributions are studied, with the derivation of sampling distributions of important summary statistics as applications. The idea of likelihood is developed, including the exploration and visualization of likelihood functions and surfaces using R, and the concept of maximum likelihood estimation.

Aims

- Extend students' familiarity with standard probability distributions.
- Give practice in handling discrete and continuous distributions, especially continuous multivariate ones.
- Instil an understanding of the rationale and techniques of likelihood exploration and maximisation.
- Extend students' experience of using R for numerical and graphical tasks.

Outline syllabus

- **Univariate distribution theory:** Further standard univariate distributions: hypergeometric, negative binomial, beta. Use of R to visualise univariate probability distributions. Transformations of random variables.
- **Continuous multivariate distributions:** Joint, marginal and conditional distributions for continuous random variables. The bivariate normal; definition, correlation and covariance, conditional distributions. Functions of more than one random variable; distributions of summary/test statistics as examples.
- **Likelihood:** Definition. One-parameter and multi-parameter examples. Plotting and exploring likelihood functions and surfaces. The idea of maximum likelihood estimation; informal ideas of interval estimation based on likelihood. Techniques for manipulating and maximizing likelihood; link with MAS202. Use of Maple/R.
- **The multivariate normal:** Extension of definition of bivariate normal to n-dimensional case. Covariance matrices. Basic properties; joint conditional distributions.

Module Format

Lectures	22	Tutorials	5	Practicals	0

Recommended books

B A.M. Mood, F.A. Graybill, D.C. Boes "Introduction to the Theory of Statistics" (Shelfmark 519.5 (M), ISBN 0070854653)

Assessment

One formal 2 hour restricted open book examination.

MAS207: Continuity and Integration

Semester 1 10 credits

Prerequisites:	MAS105 (Numbers and Proofs); MAS170 (Practical Calculus)
Corequisites:	
Cannot be taken with:	

Description

The calculus of A-level and first year courses is sufficient for many intermediate applications, but quite inadequate as a foundation for more advanced studies. The theory of Fourier series shows its shortcomings very well, and generalisations of the calculus to infinite-dimensional spaces (which are very valuable in clarifying more difficult problems) are impossible without a more accurate appreciation of how single variable calculus works. This course provides just such a rigorous analysis of single variable calculus and, in doing so, challenges the imagination with weird examples showing how strange functions can be, while still being amenable to study.

Aims

- To give students an understanding of and facility with rigorous real analysis, and an appreciation of the need for rigour.
- To give students an understanding of integration defined in terms of areas and its relation to integration as the inverse of differentiation.

Outline syllabus

- Introduction.
- Limits.
- Continuity.
- Differentiation.
- Integration.

Module Format

Lectures	22	Tutorials	6	Practicals	0

Recommended books

B K.G. Binmore "Mathematical Analysis: a Straightforward Approach" (Shelfmark 517 (B), ISBN 0521288827)

B V.W. Bryant "Yet another Introduction to Analysis" (Shelfmark 517 (B), ISBN 052138835X)

Assessment

One formal 2 hour written examination.

MAS208: Topics in Number Theory

Semester 1 10 credits

Prerequisites:	MAS105 (Numbers and Proofs)
Corequisites:	
Cannot be taken with:	MAS330 (Topics in Number Theory)

Description

This unit aims to investigate some of the properties of the natural numbers $1, 2, 3, \ldots$. Topics covered include linear and quadratic congruences, Fermat's Little Theorem, the RSA cryptosystem, the Law of Quadratic Reciprocity, perfect numbers, Mersenne primes, Fermat's Last Theorem, continued fractions, Pell's equation, and Fibonacci numbers

Aims

- To introduce various topics in non-analytic Number Theory.

Outline syllabus

- Linear congruences.
- Fermat's Little Theorem.
- The RSA cryptosystem.
- Quadratic congruences with prime moduli.
- Perfect numbers.
- Mersenne primes.
- Fermat numbers.
- Pythagorean triples.
- Fermat's Last Theorem.
- Continued fractions.
- Pell's equation.
- Fibonacci numbers.

Module Format

Lectures	22	Tutorials	5	Practicals	0

Recommended books

B Burton "Elementary number theory" (Shelfmark 512.81 (B), ISBN 0071121749)

C Singh "Fermat's Last Theorem" (Shelfmark 511.52 (S), ISBN 000724181X)

Assessment

One formal 2 hour written examination.

MAS270: Vectors and Fluids

Semester 2 10 credits

Prerequisites:	MAS203 (Mechanics)
Corequisites:	
Cannot be taken with:	

Description

The course introduces the calculus of vectors in 3 dimensions, such as the gradient of a scalar field and the divergence and curl of a vector field, as well as the important integral theorems of Gauss and Stokes. This material is needed in subjects such as fluid mechanics and electrodynamics. In this course the vector methods are used in an introduction to the study of inviscid (i.e., frictionless) fluids. The emphasis is placed on the concepts involved, and not on difficult mathematical manipulations. The course is a prerequisite for students wishing to pursue higher level modules in fluid mechanics.

Aims

- To provide students with basic knowledge and understanding of vector calculus.
- To provide students with basic knowledge and understanding of some coordinate systems which are more general than the Cartesian system.
- To provide students with basic knowledge and understanding of inviscid fluid dynamics.

Outline syllabus

- **Gradient, Divergence and Curl**
- **Suffix Notation:** The summation convention. Kronecker delta and alternating tensor. Use in vector calculus.
- **Rotation of Axes:** The transformation matrix and its properties.
- **Orthogonal Curvilinear Coordinates:** Cylindrical and spherical polar coordinates. The formulae for gradient, divergence and curl. Surface and volume integrals.
- **Integral Theorems:** Gauss's theorem. Stokes's theorem.
- **Introduction to Fluid Mechanics:** The continuum hypothesis. Eulerian and Lagrangian descriptions. The continuity equation. Vorticity and circulation.
- **Equations of Motion for Inviscid Fluid:** Euler's equation. Boundary conditions. Bernoulli Integral.
- **Irrotational Flow:** Velocity potential. Flow around a cylinder.

Module Format

Lectures	22	Tutorials	6	Practicals	0

Recommended books

B Acheson "Elementary Fluid Dynamics" (Shelfmark 532.5 (A), ISBN 0198596790)

B Matthews "Vector Calculus" (Shelfmark 515.63 (M), ISBN 3540761802)

B Paterson "A First Course in Fluid Dynamics" (Shelfmark 532.51 (P), ISBN 0521274249)

C Spiegel "Vector Analysis" (ISBN 007060228X)

Assessment

One formal 2 hour written examination [80%]. Four marked homeworks [20%].

MAS271: Methods for Differential Equations

Semester 2 10 credits

Prerequisites:	MAS103 (Differential and Difference Equations)
Corequisites:	
Cannot be taken with:	

Description

Differential equations arise in most models of real phenomena, including particle mechanics, biology and economics. This module firstly consolidates and develops Level 1 work. There follows a thorough discussion of systems of linear ordinary differential equations. The last part of the course is concerned with the geometrical approach to non-linear second-order systems (for which the solutions can be visualised as curves in a plane).

Aims

- To consolidate previous knowledge and develop Level 1 work.
- To develop analytical techniques for solving systems of first order differential equations.
- To introduce phase portraits of two-dimensional systems.
- To extend the student's knowledge of linear and non-linear ordinary differential equations.

Outline syllabus

- **Stability:** Equilibrium points and their classification for linear systems. Stability and asymptotic stability. Linear approximation near equilibrium points, relationship to full system. Global stability. Definition and use of Liapunov functions.
- **Second-order Linear Ordinary Differential Equations:** Introductory examples, Regular and singular Sturm-Liouville problems, eigenvalues, eigenfunctions, orthogonality. Self-adjoint and normal forms. Ordinary and regular singular points, solutions as Taylor series, Frobenius series. Examples to include Legendre's equation, Bessel's equation.

Module Format

Lectures	22	Tutorials	6	Practicals	0

Recommended books

B A.C. King, J. Billingham and S.R. Otto "Differential Equations: Linear, Nonlinear, Ordinary, Partial" (Shelfmark 515.35 (K), ISBN 0521016878)

B G.F. Simmons "Differential Equations with Applications and Historical Notes" (Shelfmark 517.9 (S), ISBN 0071128077)

B W.E. Boyce and R.C. Diprima "Elementary Differential Equations and Boundary value Problems" (Shelfmark 517.9 (B), ISBN 0471644544)

Assessment

One formal 2 hour written examination.

MAS272: Applied Differential Equations

Semester 2 10 credits

Prerequisites:	MAS202 (Advanced Calculus)
Corequisites:	MAS271 (Methods for Differential Equations)
Cannot be taken with:	

Description

Many problems in applied mathematics and the physical sciences lead to ordinary differential equations which can be solved only by numerical methods. This module consolidates Level 1 work and develops these ideas to give both a theoretical and practical treatment of the subject. Computer programming is not required. The final part of the module provides an introduction to analytical methods for the solution of partial differential equations.

Aims

- To consolidate previous knowledge on numerical methods.
- To develop numerical techniques for solving ordinary differential equations.
- To introduce the theoretical analysis of the numerical methods.
- To introduce analytical methods for the solution to partial differential equations.

Outline syllabus

- **Ordinary Differential Equations (Initial value problems):** Taylor series solutions. Runge-Kutta methods; Adams-Bashforth and Adams-Moulton methods; convergence, consistency and stability; local error estimate and control (Milne's device); absolute stability for the test equation; simultaneous first-order equations and higher-order equations.
- **Ordinary Differential Equations (Boundary value problems):** Shooting method for solving linear second-order equations; approximation of second-order linear problems by finite-difference equations.
- **Partial Differential Equations:** Classification; the method of separation of variables to find the Fourier series to the heat equation, Laplace's equation and the wave equation; D'Alembert's solution of the wave equation; Laplce's equation in polar coordinates.

Module Format

Lectures	20	Tutorials	6	Practicals	0

Recommended books

B D.W. Trim "Applied Partial Differential Equations" (Shelfmark 517.944 (T), ISBN 0534982433)

B L.V. Fausett "Applied Numerical Analysis using Matlab" (Shelfmark 518.0285 (F), ISBN 0132397285)

B L.W. Johnson and R.D. Riess "Numerical Analysis" (Shelfmark 518 (J), ISBN 0201103923)

B R.L. Burden and J.D. Faires "Numerical Analysis" (Shelfmark 518 (B), ISBN 0534404995)

C A. Iserles "A First Course in the Numerical Analysis of Differential Equations" (Shelfmark 518.61 (I), ISBN 0521556554)

C J.D. Lambert "Numerical methods for Ordinary Differential Systems" (Shelfmark 517.382 (L), ISBN 0471929905)

C L.F. Shampine and M.K. Gordon "Computer Solution of Ordinary Differential Equations" (Shelfmark 517.9 (S), ISBN 0716704617)

Assessment

One formal 2 hour written examination. Format: 4 questions.

MAS273: Statistical Modelling

Semester 2 10 credits

Prerequisites:	MAS201 (Linear Mathematics for Applications); MAS202 (Advanced Calculus); MAS205 (Statistics Core)
Corequisites:	
Cannot be taken with:	

Description

This unit develops the idea of constructing simple statistical models to describe processes in the real world, for example patient responses to different treatments, or the effects of class sizes on examination results. In the presence of uncertainty, modelling can be used to infer relationships between different variables in the process and make predictions about future observations. A single class of models known as linear models will be considered, and it will be shown how these models are applicable in a wide variety of circumstances. Modelling and data analysis will be performed on practical examples using the software package R.

Aims

- To consider linear regression models in detail.
- To extend the comparison of means from two to several groups through ANOVA models.
- To give students experience in the use of R for fitting linear models.

Outline syllabus

- **The general linear model:** Matrix representation of a linear model. Linear regression, polynomial regression and ANOVA models as examples of linear models.
- **Least squares:** Parameter estimation using least squares; least squares estimators in matrix notation.
- **Straight line regression:** Fitting linear models in R and interpreting the output. Illustrate the use of distributional relationships between Normal, χ^2 and f distributions. Distributional properties of least squares estimators and the residual sum of squares. Hypothesis testing via model comparisons; the f-test for comparing nested linear models and relationship with ANOVA tables. Confidence intervals and prediction intervals. Model checking using standardized residuals; transformations; R^2. Introduction to polynomial and multiple regression.
- **One-way Analysis of Variance:** Indicator variables. Fitting into general theory.
- **Introduction to two-way Analysis of Variance:** Balanced two-way data (blocks and treatments or 2-factors) with replicates and interactions.

Module Format

Lectures	22	Tutorials	2	Practicals	4

Recommended books

B D.G. Kleinbaum, L.L. Kupper, K.E. Muller and A. Nizam "Applied Regression Analysis and Other Multivariable Methods" (Shelfmark 519.536 (A), ISBN 0495384968)

B Julian J. Faraway "Linear models with R" (Shelfmark 519.538 (F), ISBN 1584884258)

B N. Draper and H. Smith "Applied Regression Analysis" (Shelfmark 519.536 (D), ISBN 0471170828)

Assessment

One formal 2 hour restricted open book examination [85%]. Format: 3 questions from 4. Practical file [15%].

MAS274: Statistical Reasoning

Semester 2 10 credits

Prerequisites:	MAS202 (Advanced Calculus); MAS205 (Statistics Core)
Corequisites:	
Cannot be taken with:	

Description

Statistics is about learning from data – often uncertain and variable – about underlying regularities of the real world. At first sight the methods for statistical analysis can appear particular to each application. This unit however shows that they can be founded on simple universal principles of statistical reasoning. There are two principal forms of statistical reasoning, known as frequentist and Bayesian inference. These principles simplify understanding and give powerful tools for analysing new problems. They form the basis for more specialist modules in Level 3/Level 4. The course will show how practical analyses follow from the principles, and will illustrate their power through a set of case studies of real-world problems from areas such as medicine, economics, technology and the environment.

Aims

- To formulate the process of inference in terms of parametric models.
- To introduce both frequentist and Bayesian inferential frameworks.
- To illustrate the scope of the principles with practical applications.

Outline syllabus

- **Inference and reasoning:** the nature of statistical reasoning, inference and the likelihood function.
- **Case studies** drawn from areas such as medicine, business, science, technology and the environment will be introduced early in the module and used throughout to illustrate the applicability and power of the methods.
- **Likelihood:** definition, examples, numerical calculation; maximum likelihood estimates and likelihood intervals.
- **Frequentist methods:** inference rules, point estimation, interval estimation and hypothesis testing; unbiasedness, mean square error and minimum variance unbiased estimators; confidence intervals; null and alternative hypotheses, power and significance tests.
- **Bayesian methods:** parameters as values of random variables, combination of prior information and observed data to yield a posterior distribution for a parameter, nature of prior information, use of posterior distribution to make summary statements an formal inferences about parameters.

Module Format

Lectures	22	Tutorials	6	Practicals	0

Recommended books

B J.G. Kalbfleisch "Probability and Statistical Inference Vol 2: Statistical Inference" (Shelfmark 519.2 (K), ISBN 3540961836)

B P.M. Lee "Bayesian Statistics: An Introduction" (Shelfmark 519.542 (L), ISBN 0340814055)

C A. Azzalini "Statistical Inference: Based on the Likelihood" (Shelfmark 519.54 (A), ISBN 041260650X)

Assessment

One formal 2 hour restricted open book examination. Format: No choice.

MAS275: Probability Modelling

Semester 2 10 credits

Prerequisites:	MAS201 (Linear Mathematics for Applications); MAS202 (Advanced Calculus); MAS205 (Statistics Core)
Corequisites:	
Cannot be taken with:	

Description

The course introduces a number of general models for processes where the state of a system is fluctuating randomly over time. Examples might be the length of a queue, the size of a reproducing population, or the quantity of water in a reservoir. The aim is to familiarize students with an important area of probability modelling.

Aims

- To introduce and study a number of general models for processes where the state of a system is fluctuating over a period of time according to some random mechanism.
- To illustrate the above models by example and by simulation.
- To familiarise students with an important area of probability modelling.

Outline syllabus

- **Discrete time renewal processes**
- **Discrete time Markov chains**
- **Random point processes in time and space**

Module Format

Lectures	21	Tutorials	5	Practicals	0

Recommended books

C E. Parzen "Stochastic Processes" (Shelfmark 519.23 (P), ISBN 0898714419)

C G.R. Grimmett, D.R.Stirzaker "Probability and Random Processes" (Shelfmark 519.2 (G), ISBN 0198572220)

C S.M. Ross "Introduction to Probability Models" (Shelfmark 519.2 (R), ISBN 0123736358)

C W. Feller "An Introduction to Probability Theory and its Applications" (Shelfmark 519.2 (F), ISBN 0471257087)

Assessment

One formal 2 hour restricted open book examination. Format: all questions compulsory.

MAS276: Rings and Groups

Semester 2 10 credits

Prerequisites:	MAS175 (Groups and Symmetries)
Corequisites:	
Cannot be taken with:	

Description

The aim is to investigate the ring and group structures in algebra. The concepts of factorisation and unique factorization are central in the discussion of rings. The second part of the course continues the study of groups, begun in MAS175, and introduces the important idea of a quotient group.

Aims

- To understand the ring structure of various key examples, and determine whether given subsets are subrings.
- To understand units and zero-divisors in the ring $\mathbf{Z}_n$.
- To demonstrate irreducibility of particular elements in rings of the form $\mathbf{Z}[\sqrt{d}]$, and to produce examples of non-unique factorizations into irreducible factors.
- To determine whether a given positive integer is a sum of two squares.
- To understand conjugacy in symmetric groups S_n and dihegral groups D_n for small values of n.
- To understand the consequences of the class equation for groups of particular orders.
- To understand normal subgroups, quotient groups, and simple examples.
- To find kernels and images of homomorphisms and apply the first isomorphism theorem.

Outline syllabus

- Introduction to rings.
- Division.
- Factorisation
- Revision of groups.
- Quotient groups.
- Conjugacy.
- Homomorphisms.

Module Format

Lectures	21	Tutorials	6	Practicals	0

Recommended books

A A.W. Chatters and C.R. Hajarnavis "An Introductory Course in Commutative Algebra" (Shelfmark 512.8 (C), ISBN 019853423x)

A C.R. Jordan and D.A. Jordan "Groups" (Shelfmark 512.86 (J), ISBN 034061045x)

B R.B.J.T. Allenby "Rings, Fields and Groups" (Shelfmark 512.8 (A), ISBN 0340544406)

Assessment

One formal 2 hour written examination.

MAS277: Vector Spaces and Fourier Theory

Semester 2 10 credits

Prerequisites:	MAS105 (Numbers and Proofs); MAS201 (Linear Mathematics for Applications)
Corequisites:	
Cannot be taken with:	

Description

The first part of the course introduces abstract vector spaces and linear transformations, building on the concrete examples covered in MAS201. Many results that were merely stated in MAS201, or proved by matrix methods, will be given conceptual proofs in this course. The abstract approach will allow us to give efficient proofs that simultaneously tell us interesting things about vectors, matrices, polynomials, sequences, differential equations, and many other objects. A central aim of the course is to help students become comfortable with the required level of abstraction. Next, we introduce inner product spaces, including the space of continuous periodic functions. This allows us to define distances and angles between functions, by analogy with distances and angles between vectors in $\mathbf{R}^3$. We then reinterpret the theory of Fourier series in these terms. We also discuss adjoints of operators. We show that any self-adjoint operator admits an orthonormal basis of eigenvectors, and that the eigenvalues are all real numbers.

Aims

- Introduce the abstract theory of vector spaces and linear maps between them.
- Introduce the abstract theory of inner product spaces.
- Reinterpret Fourier theory in terms of inner product spaces.
- Familiarise students with abstract and axiomatic mathematics.

Outline syllabus

- Vector spaces, linear maps, subspaces.
- Independence and spanning sets.
- Linear maps out of $\mathbf{R}^n$; matrices for linear maps.
- Theorems about bases.
- Eigenvalues and eigenvectors.
- Inner products and the Cauchy-Schwartz inequality.
- Projections and the Gram-Schmidt procedure.
- Adjoints, and diagonalisation of self-adjoint operators.
- Fourier theory and the L^2 convergence theorem.

Module Format

Lectures	22	Tutorials	6	Practicals	0

Recommended books

C P.Halmos "Finite-dimensional vector spaces" (Shelfmark 512.83)

C W.Keith Nicholson "Linear algebra with applications" (Shelfmark 512.5)

Assessment

One formal 2 hour written examination.

MAS278: Nonlinear Mathematics

Semester 2 10 credits

Prerequisites:	MAS201 (Linear Mathematics for Applications); MAS207 (Continuity and Integration)
Corequisites:	
Cannot be taken with:	

Description

Nonlinearity is a fundamental feature of advanced mathematics. Students will already be familiar with converting some nonlinear situations into linear ones, such as when a surface is approximated by a tangent plane. The course treats differentiation in several variables, focusing both on well-behaved and less amenable examples, and on the geometry which maps of several variables represent. Matrices are used systematically as derivatives. In the final part of the course, time permitting, some of the special features of nonlinear phenomena which are lost by linearisation will be treated.

Aims

- To increase familiarity with geometric shapes, both basic and unusual, as given by implicit and parametric equations.
- To reinforce and extend manipulative ability.
- To reinforce and extend knowledge of set notation, and basic set identities, including images and preimages.
- To make the basic topology of Euclidean spaces more familiar.
- To increase students' familiarity with certain basic features of analysis, including the distinction between strict and weak inequalities and the use of arguments by contradiction.
- To demonstrate the advantages of systematically using matrices as the derivatives of maps of several variables.
- To accustom students to thinking of differentiation as a process by which nonlinear problems may be converted into linear ones.

Outline syllabus

- Maps
- Inverses and preimages
- Open sets
- Limits for functions and maps of two or more variables
- Continuity for functions and maps of two or more variables
- Differentiability for functions of two or more variables
- Rank of differentiable maps
- Systems of nonlinear equations
- Inverses of differentiable maps

Module Format

Lectures	22	Tutorials	5	Practicals	0

Recommended books

- There are no recommended books for this course.

Assessment

One formal 2 hour written examination.

MAS279: Career Development Skills

Semester 2 10 credits

Prerequisites:
Corequisites:
Cannot be taken with:

Description

Employability is one of the key aims of the University of Sheffield. This module will consist of various tasks to help students be more employable. Part of this will consist of general "careers skills" – researching careers and employers, CV writing, interview technique – and other parts will be more focused on employment in mathematical areas, where it may be necessary to present technical work to non-mathematicians. *This course is new in 2011–12, and precise details may change from those listed below. In addition, it is possible that the number of students may be capped in the first year of operation of this module.*

Aims

- to encourage students to analyse their own skills, aptitudes and career interests;
- to research a set of career opportunities;
- to gain a greater understanding of what makes a good CV;
- to gain practice in interview technique;
- to undertake a mini-project, with a presentation and written report aimed at a non-mathematical audience.

Outline syllabus

- Self-assessment
- Researching career opportunities
- CV/application writing
- Interviews
- Oral presentations

Module Format

Lectures	5	Tutorials	5	Practicals	5

Recommended books

- There are no recommended books for this course.

Assessment

By a portfolio of work throughout the course. Work on careers skills [50%]; project and presentation [50%]. There is no formal exam for this module.

7 Cover sheet arrangements

There are some special arrangements for when assessed coursework is to be handed in at SoMaS Reception (G12).

(i) All work that needs to be submitted to Reception needs to have a cover sheet.

(ii) Students can access the cover sheet via http://maths.dept.shef.ac.uk/maths/current.php:

  (a) log in with your university user name and password;

  (b) cover sheets become available to students one week before the deadline to avoid early submissions;

  (c) cover sheets are unique to each student – printing out a coversheet for a friend doesn't work!

(iii) This then needs to be stapled (or in a plastic wallet) and then posted into the drop box outside reception (the drop box is provided for work that is either late/early or being submitted out of office opening times).

(iv) Work submitted without a cover sheet will not be scanned in and the student will not receive an email confirming G12 have their work.

If students have any problems with regards to viewing/accessing the cover sheets, contact `hickstudentsupport@sheffield.ac.uk` or visit Reception to try and sort out the problem.

8 Provisional Timetable 2011–2012

Note that these times are provisional, and depend on factors such as availability of rooms. **With the Arts Tower out of operation for much of the year, it is very likely that the actual timetable will differ substantially from the one given below.** If there are changes to timetables of dual degree partners, this may also cause alterations in these times. Nevertheless, we shall try to keep to this timetable as closely as possible. This timetable specifies only the lecture times; the tutorial slots will be given on the timetable issued at the start of each semester.

Autumn Semester 2011–2012

	Monday	Tuesday	Wednesday	Thursday	Friday
09.00–09.50	MAS204	MAS208	MAS205	MAS207	MAS203
10.00–10.50	MAS207		MAS204		
11.10–12.00	MAS201			MAS202	
12.10–13.00	MAS205	MAS201			
14.10–15.00		MAS202			
15.10–16.00				MAS208	
16.10–17.00		MAS203			

Spring Semester 2011–2012

	Monday	Tuesday	Wednesday	Thursday	Friday
09.00–09.50	MAS274	MAS278	MAS273	MAS276	
10.00–10.50	MAS277	MAS272			MAS273
11.10–12.00	MAS272	MAS271		MAS277	MAS278
12.10–13.00	MAS275	MAS275			MAS274
14.10–15.00	MAS276			MAS270	
15.10–16.00		MAS270		MAS271	
16.10–17.00					