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## General Information

(<https://warwick.ac.uk/fac/sci/mathscurrentstudents/ughandbook/general/>)

General advice about choosing options, how to study, where to get support in the Mathematics Department, help when things go wrong and how to make the most of your degree.

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## Overview

(<https://warwick.ac.uk/fac/sci/mathematics/currentstudents/ughandbook/general/overview/>)

### An overview of the department

The Mathematics Institute was founded in 1965 by Professor Sir Christopher Zeeman, since when it has gone on to become one of the leading research and teaching departments in the country.

The Institute has over 80 permanent academic staff plus about 50 research fellows and junior and temporary staff along with a large and vibrant postgraduate community. A distinguishing feature of the department is the number of Professors and Readers - among the highest proportion of any UK mathematics department. Academic staff are all active research mathematicians and many are international leaders in their field. There is a lively, informal research atmosphere and the Institute hosts many conferences and workshops involving visiting mathematicians from all over the world. This strong and lively research culture informs and stimulates exciting teaching.

The Institute's research has received excellent scores in all the national research assessment exercises conducted over the last 25 years. In the last such exercise, the 2021 REF (Research Excellence Framework) exercise, Warwick Statistics and the Warwick Mathematics Institute together were highly ranked with 99% of our research activity assessed as either internationally excellent or world leading. More information on our [REF 2021 results can be found here](#).

A summary of the research activities of the department [can be found here](#) and a list of research interests of permanent members of academic staff [here](#).

The undergraduate Mathematics programme at Warwick is distinguished for its ACADEMIC EXCELLENCE and FLEXIBILITY and CHOICE. The course is demanding, challenging and exciting. The large size of the department means that it can offer a rich and varied diet of mathematics modules. Many options from other departments are also available.

A summary of the research interests in Statistics, including many of the staff in Mathematics can be found at  
<http://www2.warwick.ac.uk/fac/sci/statistics/research/paw>.

### Aims of the BSc and MMath courses

All our courses aim to

- attract well-qualified students;
- provide an intellectually stimulating environment;
- help students develop key intellectual skills;
- provide a challenging education, with flexibility and breadth, in mathematics and its applications;
- produce high quality graduates who are well prepared for the next step of their professional lives, whether this involves further research training or moving directly into a career.

The **MMath** course aims additionally to

- enable students to study mathematics in greater depth and/or breadth;

The **joint BSc courses** aim additionally to

- allow students to add a coherent body of specialist knowledge in another discipline to their core mathematical knowledge.

Both degrees are very strong mathematically, and both are extremely well valued by employers. (For most careers, doing well in either one is a good basis for a strong application, and many employers do not distinguish between the two.) They each have their own advantages. The BSc allows one to take more options other than Mathematics modules. So, for example, one could develop a major second discipline in some depth (such as Statistics or Computing or

Physics or spoken languages or many others) or one could add a broad selection of one-off topics from around the university (perhaps a bit of Business Studies together with some Economics and Philosophy) to add a range of different skills and knowledge to your CV. Or of course one could stick to Mathematics modules entirely.

The MMath takes a year longer and so allows one to dive deeper into extremely advanced mathematics. This leaves less room for taking modules outside Mathematics than on the BSc, though it is still possible. So if you are thinking of further study in Mathematics after your degree, or looking at careers in industry that involve mathematical research, or just want to study as much mathematics as possible, then the MMath is a good option.

It is easy to switch between the two courses in the first year (and even in the second), so it doesn't matter which you pick to start on. There are always highly successful students who graduate on both courses, and all students on both courses take lectures and classes together and can work together on the same mathematical problems.

## An outline of the course

### The 3 year BSc degree course

The bachelor degree course lasts three years, leading to a BSc for which honours will usually be awarded. Flexibility is the keynote of the mathematics courses. While you remain in the Mathematics Department, you will study a central core of mathematics. To this core you add optional modules in mathematics, other science subjects or in any of the arts or social science subjects taught at Warwick. Within limits, proportions may be varied to suit individual tastes. The Mathematics Department tries to make as many options as possible available to students; as the University has grown, so has the choice, and we intend this to continue. Joint degree courses with a number of other subjects are available. It is also possible to spend a year abroad or in industry on the so-called Intercalated Year course.

Roughly speaking, the core consists of several basic modules in modern pure mathematics, some differential equations including their use in modelling a variety of simplified real-life problems and calculus in two and three dimensions. The core comprises approximately 80% of the first year and 45-65% of the second year. More detail on the proportions of core and optional modules allowed in each year can be found in the "[Regulations](#)" section.

The Department caters (among others) for students in the following categories:

1. Those whose main interest is pure mathematics.
2. Those who intend to specialise in applied mathematics.
3. Those who want to combine some pure or applied mathematics courses (perhaps as little as 50%) with a selection from a wide area of studies, not necessarily related to mathematics.

If, as you read this, you don't know which category you will fit in, don't worry. You will have plenty of time to decide. We hope to provide you with enough guidance while at Warwick so that you can understand the system and apply it to your own purposes.

### The 4 year MMath degree course

The Master of Mathematics (MMath) course is a 4-year degree course that was set up following an initiative of the London Mathematical Society. The rationale for the 4-year degree is that there is a national need for more graduates in mathematics with a qualification higher than that provided by a 3-year degree, and comparable with the 4- or 5-year first degree courses common in Europe.

The first two years of the degree are in common with those of the BSc course although more mathematics is required in Year 2. The MMath course replaces Year 3 of the BSc with two years of more substantial and specialised mathematics.

You may enrol in the MMath course through UCAS. In addition, students on the BSc course may apply to transfer to the MMath any time during their first two years. If you are at all interested in transferring to the MMath course, you are strongly encouraged to apply before starting Year 2. Transfer from the MMath to the 3 year BSc course is straightforward before the end of Year 2, and is permitted during Year 3, Terms 1 and 2.

To remain on the MMath course after Year 2, a student must average good 2.1 marks from the best 90 CATS from Core and List A maths modules in the 2nd Year examinations. Analysis of marks from previous years has shown that MMath students who obtain less than 65% in year one rarely achieve this target in year two. In addition they make life difficult for themselves in trying to meet the MMath target since they have a larger load of math modules. MMath students who achieve less than 65% in year one are strongly encouraged to switch to the three year bachelors degree. However students on the bachelor degree who achieve this target at the end of Year 2 are invited to transfer to the MMath if they have studied the appropriate modules in Year 2.

MMath students with adequate language skills may be allowed to replace the third year of the MMath degree by an equivalent year of study at a European university (see information on MMath with Study in Europe).

An MMath student whose Year 3 mark is under 55%, or whose best 90 CATS of MA3 or MA4 modules is less than 55%, can be required to graduate with a BSc by the Exam Board. Such marks suggest that they would almost certainly find Year 4 too hard.

Since funding for UK students to take a non-vocational MSc was phased out, the MMath has become the standard route to follow for students interested in studying for a PhD degree.

There are also a number of [Joint Degrees](#) between Mathematics and outside departments which have a large overlap with ours. Transfer between courses is possible with the agreement of the departments concerned and necessary prerequisites having been taken.

## What Can You Gain From A Mathematics Degree?

During your Mathematics Degree, you will be given opportunities to develop many skills. Some of these are specifically related to mathematics, and some have relevance outside it. Those skills that can be used in other contexts - such as the ability to solve problems, communicate well, learn quickly, organise your time - are called **transferable skills**.

[Read more...](#)

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## Transferable Skills

(<https://warwick.ac.uk/fac/sci/mathematics/currentstudents/ughandbook/general/overview/transferableskills/>)

Although it may seem a long way off, chances are that one day, degree-in-hand, you will be looking for a job. Your transferable skills will be of particular interest to potential employers, who will not just be concerned with your performance in your subject, but in the overall contribution you can make to their organisation. If you can convince an employer that you can work well within a team, solve problems, organise, innovate, adapt, and so forth, you will outshine your competitors in the job market.

Below is a list of skills, both transferable and subject-specific, that your Mathematics Degree can offer you. It provides an interesting glimpse into how you might change and develop over the next few years. It will help focus your attention on exactly what you have achieved during your degree course - and this will make you better able to communicate these achievements to others, especially when writing job applications and attending interviews.

So, read on to find out not what you can do for your Mathematics Degree, but what your Mathematics Degree can do for you.

**Mathematical Skills.** As a mathematics student you will study each of the major subject areas of modern mathematics: algebra, analysis, geometry, statistics, and applied mathematics. In the course of this study you will learn:

1. The language of mathematics and the rules of logic.
2. How to state a mathematical idea precisely.
3. How to prove or disprove a mathematical conjecture.
4. How to extract meaning from mathematics on the written page.
5. How to use mathematics to describe the physical world.

**Analytical Skills.** Having done a Mathematics Degree, you will never again be able to tolerate sloppy reasoning. Mathematics will enhance your ability to:

1. Think clearly.
2. Pay attention to detail.
3. Manipulate precise and intricate ideas.
4. Follow complex reasoning.
5. Construct logical arguments and expose illogical ones.

**Problem Solving Skills.** You will be given countless mathematical problems to solve over the course of your degree. Experience with these will teach you to:

1. Formulate a problem in precise terms, identifying the key issues.
2. Present a solution clearly, making your assumptions explicit.
3. Gain insight into a difficult problem by looking at special cases or sub-problems.
4. Be flexible, and approach the same problem from different points of view.
5. Tackle a problem with confidence, even when the solution is not obvious.
6. Seek help when you need it.

**Investigative Skills.** During your studies you will sometimes find yourself trying to understand mathematics that seems too hard, and trying to solve problems that at first seem impossible. You may also be asked to do essays and projects which involve you privately investigating an area of mathematics you know nothing about. All this will turn you into an amateur sleuth, on the trail of information and inspiration. You should find yourself:

1. Looking up lecture notes, text books and reference books.
2. Scouring the library.
3. Searching databases for references.
4. Extracting information from every mathematician you meet (other undergraduates, postgraduates, tutors and lecturers).
5. Thinking!

**Communication Skills.** A Mathematics Degree will develop your capacity to assimilate and communicate highly technical information. During lectures you will be required to organise and record a mass of mathematical detail, both spoken and written. Homework exercises, and any essays and projects you do, will call for clear mathematical exposition. During supervisions you will find yourself exchanging mathematical ideas with your supervisor and fellow students. You may well find yourself discussing mathematics in conversation with your fellow students and your lecturers. In your later years you may be given the opportunity to teach other undergraduates. Through these experiences you will have the opportunity to learn how to:

1. Listen effectively.
2. Write mathematics well.
3. Write essays and reports.
4. Give a mathematical presentation to a group.

**IT Skills.** During your degree you will have access to computing facilities. You will have the opportunity to:

1. Learn a programming language.
2. Solve problems using mathematical software.
3. Learn word-processing, of both text and mathematics.

**Good Working Habits.** To be a successful mathematics student you will have to:

1. Be thorough and painstaking in your work.
2. Organise your time and meet deadlines.
3. Work under pressure, especially near exam time.
4. Work independently, without constant support from teachers.
5. Work co-operatively with others to solve common problems.

**Useful Personality Traits.** One mathematics professor used to tell each incoming first year class that doing a Maths Degree would change them for life. Battling successfully with ideas that are hard to understand and problems that are hard to solve fosters:

1. Determination
2. Perseverance
3. Creativity
4. Self-confidence, and
5. Intellectual rigour.

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(<https://warwick.ac.uk/fac/sci/mathematics/currentstudents/ughandbook/general/overview/research/>)

Although only founded in 1965, Warwick is now one of the largest mathematics departments in England (together with Oxford and Cambridge), and is a world centre of mathematics research. We have about 100 graduate students, and around 15-20 Ph.D.s graduate each year. Many Warwick graduates are mathematics lecturers or professors at top universities in Britain, the United States and other countries.

You may not feel that you, as an undergraduate, are in direct contact with research mathematics, but the research strength of the Warwick Department provides many important benefits. Your graduate supervisor, and most of your lecturers, were attracted and kept here by the research quality and the unique atmosphere. Your lecturers are playing a leading role in many areas of mathematics, and are in contact with many of the world's top mathematicians. Lecturers involved in research are interested in their subject, and enthusiastic in lectures; there's nothing worse than a lecturer bored with his subject!

The Warwick Mathematics Institute is involved in running a number of Centres:

**Mathematical Interdisciplinary Research at Warwick (MIR@W, Director: Robert MacKay)** The guiding principle behind MIR@W is a view of the relation between maths and other sciences that is broader than traditional applied mathematics, and accommodates new and rapidly growing areas such as mathematical biology, computer science and information technology, economics, finance and the environmental sciences. Eleven Warwick departments currently belong to MIR@W: Biological Sciences, Chemistry, Computer Science, Economics, Engineering, Mathematics, Physics, Psychology, Maths Education, Statistics, Warwick Business School. MIR@W activities include an M.Sc./Ph.D. programme, an active series of workshops on focussed topics, and interdepartmental research seminars and projects.

**Mathematics Research Centre (MRC, Director: Keith Ball)** The MRC was Christopher Zeeman's brainchild, and has been the life and soul of maths at Warwick for the last 45 years. It runs a symposium and several short workshops each year. A Warwick symposium is a year-long conference on a chosen field of mathematics, supported by a main grant from the British EPSRC (Engineering and Physical Sciences Research Council), and attracting mathematics visitors from all over the world. The curiously shaped (but very comfortable) houses behind the Gibbet Hill cafeteria were built with a grant from the Nuffield Foundation in the late 1960s to house some of these visitors.

Warwick Symposia have taken place most years since 1965 in almost every field of mathematics research. The themes over the last ten years have been

2008-09 Challenges in Scientific Computing

2009-10 Complexity and systems biology

2010-11 Ergodic Theory and Dynamical Systems

2011-12 Probability

2012-13 Number Theory

2013-14 Statistical Mechanics / Mathematics of Phase Transitions

2014-15 Derived Categories and Applications

2015-16 Fluctuation-driven phenomena and large deviations

2016-17 Partial Differential Equations and their Applications

2017-18 Geometry, Topology and Dynamics in Low Dimensions

**Complexity Science (Co-Director: Colm Connaughton)** The University of Warwick leads the UK with a ground-breaking "Complexity Complex" to connect and develop interdisciplinary research in complexity science at all levels, train a new generation of complexity scientists via a doctoral training centre, understand, control and design complex systems, produce break-throughs in the principles and applications of complexity science, link with end-users as sources of real-world problems and beneficiaries from the resulting knowledge and trainees, and sustain a lively intellectual and practically based environment for complexity science.

**Discrete Mathematics and its Applications (DIMAP, Director: Artur Czumaj, Computer Science)** DIMAP is a collaboration between Department of Computer Science, the Warwick Mathematics Institute, and the Operational Research and Management Sciences group in the Warwick Business School. The goal of the DIMAP Centre is to establish a strong multidisciplinary research centre supporting an internationally competitive programme of research in discrete modelling, algorithmic analysis, and combinatorial (discrete) optimization. It aims to support a thriving Industrial Affiliates Programme, and develop collaborative research rooted in discrete mathematics, involving researchers at other UK universities.

**Systems Biology and Infectious Disease Epidemiology Research (Director: Matt Keeling)** Systems biology involves developing the understanding of a biological system through the mathematical and computational modelling of the interactions of components of the system, leading to the expression of this understanding in qualitative and quantitative terms. Epidemiology research attempts to model the spread of various diseases through mathematical modelling, to understand how diseases spread and how this spread can be curtailed or how they may be prevented. This research centre is joint with the School of Life Sciences.

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## Tutors, Supervisors, Classes and Lectures

(<https://warwick.ac.uk/fac/sci/mathematics/currentstudents/ughandbook/general/support/>)

University mathematics is very different to 'A' level or equivalent, in both material and how it is taught. As first year students begin their University career it can be quite a leap from sitting in a classroom of 20 students to suddenly spending most of their "contact time" with lecturers in theatres of 300 students or more. For this reason we provide additional support during the first year in the form of Supervisions. But by the time you graduate, we have gradually reduced this level of support and you should all have become more independent learners, if there is something you don't understand then you have learnt the tools to find resources to help, and to tackle the problem in a systematic manner.

To this end, the first years receive the most support, mainly through Personal Tutor groups, twice weekly meetings with Supervisors, both in groups of 5, and compulsory weekly assignments. In the second year core modules now only have fortnightly compulsory assignments but smaller support classes are introduced for these core modules (classes of approximately 30 to 50 students given by postgraduates). By the third year most modules will have only support classes. Fourth year modules will also sometimes have support classes, but it is not always the case.

Throughout this time your Personal Tutor will also be there to help you, although once you reach the third year they will be less familiar with specific modules if they are not in their own research areas. This, of course, becomes worse for year 4 modules since many of them are at the cutting edge of current research and so the lecturer or support class TA are often the only port of call for queries. We try to keep you with the same Personal Tutor throughout your degree if we can, but this is often not possible if the tutor takes research leave, for example.

During all this time you will be receiving **feedback** on your work and understanding of the material. This comes in many forms, feedback is not just written comments on a piece of work. For example:

- Assignment sheets marked by your supervisor will have written comments on as well as the mark, and your supervisions will be crucial to aiding your understanding of the work and where you could improve.
- Assignment sheets marked by Support Class TAs will often have less written feedback on due to the number they have to mark in a short time so they can get it back to you as soon as possible. However, the marks you receive for each question, or part of question, will tell you how you have done and the Support Classes will often highlight common mistakes. These classes are also the opportunity to ask questions, don't be shy.
- Any mark you get is feedback. If you get a bad mark then try to understand **why** you got that mark, don't just bury the piece of work until you start revising for exams.
- In the first year you will have some multiple choice tests for MA132 Foundations, for which you are given the solutions as you leave. This is instant feedback, and although it may take a few days to get the result of the tests, you know straight away if you understood the material you were being tested on.
- For the second year essay (core), third year essay (option) and fourth year project there is ample opportunity to get feedback, although don't expect to have someone looking over your shoulder. To get feedback you need to produce some work and hand it in to the supervisor of that module (your Personal Tutor for the 2nd year essay).

More information on each of these headings is below:

- [Lectures](#)
- [Personal Tutors](#)
- [Supervisions](#)
- [Support Classes](#)

Please note that when given sufficient warning we will email you to let you know if any class has had to be cancelled.

## Text Books and the University library

[Library Home Page](#) | [Searchable catalogues](#)

In the Student Reference Collection (SRC) you will find copies of the most useful textbooks for undergraduate study, with very restricted borrowing to make sure that they are available to the largest possible number of people. Bear in mind that many of your textbooks will now be available through the library as electronic copies.

In the main part of the University Library is an excellent wider collection of mathematics books. Get into the habit of browsing - books contain all sorts of interesting things! If you don't understand part of a module, try to find the material in a book. Learn how to track down books on a particular topic by browsing, using the library online catalogues and the review journals, guessing, and, when all else fails, searching physically through large numbers of books.

You can't be a serious academic or scientist without detective work in libraries, and although resources available on the Internet are easier to locate there is still no substitute for browsing books.

During your first week at Warwick you should make yourself familiar with the Central Campus Library, there are excellent resources on their website to introduce you to the facilities available. If you need further help during your course, ask at the Enquiry Desk on Floor 1 during office hours, consult the printed guides and leaflets available on each floor or contact the Library's Science Team. Chris Vernon (email: christopher.vernon@warwick.ac.uk) is the Subject Librarian for Mathematics and the departmental library representative is Sheetal Sharma. Contact either of them about any books which you feel ought to be in the Library, or if there are not enough copies of key texts. (Library matters can also be raised at SSLC meetings.)

We do not expect you to buy your own copies of textbooks, but for some modules you may find it useful to do so, especially modules that you may find yourself struggling on. The University has an arrangement with Blackwells which includes a price match guarantee:

<https://warwick.ac.uk/services/retail/shops/booksgifts>. Standard maths textbooks will typically be around 40 pounds to buy from new, but cheaper copies can be found online second-hand (Amazon is good for this), or sometimes you can find students from higher years selling their old copies through the Student Union.

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## Lectures

(<https://warwick.ac.uk/fac/sci/mathematics/currentstudents/ughandbook/general/support/lectures/>)

The most formal teaching sessions are lectures, which may now sometimes include online streamed lectures, but the vast majority will be in person. The lecturer is not just a teacher but is someone with considerable professional experience of the subject, who probably knows vastly more about it than you would ever remotely imagine. The lecturer tells you a substantial part of the material you need to know, and the rate of progress is much faster than in A-level teaching. Don't miss even one: even if you copy the notes from a friend or get them from the web, the effect is not the same as the live performance. This is just as applicable to lectures that are streamed live online. (The exception is if you are the student who gets full marks in all the assignments the lecturer sets, and helps all your friends with their difficulties - then if you find that reading an advanced textbook is more useful, you may be able to afford to miss some lectures.) Lecturers usually distribute example sheets and assignments to help you learn. Some assignments may be for credit, or there may be in-class tests. Some modules are not taught by lectures: there are reading modules (you learn directly from a book or similar), laboratories, seminars, essays and projects.

Tip: if you are having problems understanding the lectures, for example you cannot hear the lecturer or they don't write large enough on the boards, don't wait until the Evaluation Forms are distributed... tell the lecturer! They want you to be able to understand what they are telling you, and may not realise there is a problem. They won't bite!

**Evaluation forms** are made available online twice a term in every module. An initial one near the start of the module for instant feedback to the lecturer about what problems there may be, and a more in-depth one near the end of the module which also allows comments on the back. Lecturers will see the results of these evaluation forms, as will the Head of Department and Director of Undergraduate Studies, and although the final forms will not effect that module, they are invaluable for improving future lectures so please do take the time to fill them in.

**Lecture Notes:** Many modules will produce lecture notes for you, most commonly as pdfs, these are *not an alternative to going to lectures*. Many lecturers will go through additional material, or leave gaps in these notes for you to fill in, or at the very least give additional insight into the material. The golden rule however is that they are called "lecture notes" because they are the notes that the lecturer lectures from. Don't be surprised if most of what is written on the boards, or covered in lectures, comes from these notes (but also don't assume that everything they write does either). We no longer sell printed copies of lectures notes from the department.

**Try the lectures, taste the module.** When it comes to choosing an optional module check out the Course Handbook entry, look up any books mentioned there, go to the first few lectures and then raise any queries with the lecturer to help you in deciding whether to take it. For Mathematics modules, the process of choosing is quite informal: you may have had to pre-register, but you can change at any time until your last chance to register for an extra module

by the end of week 2 in term 2. (When you decide not to take a module from another department for which you have pre-registered, you must notify the lecturer in charge, especially if there are tutorials or supervisions or lab sessions involved.)

There are so-called unusual options: there is nothing mysterious about these except that you need to fill in a form and get the agreement of your tutor and the module organiser, which will then be signed off by the Director Of Undergraduate Studies subject to certain conditions. Please be aware that timetable clashes may occur when you take List B options or unusual options. We try very hard to minimise them, but eliminating them altogether could only be done by cutting substantial sections from our very popular flexible system.

## Lecture Observation and Peer Review

One of the procedures the Department uses to support the continuous development of individual teaching practice, and to ensure that teaching continues to be innovative, engaging and high quality is to use Peer Dialogue on Teaching, which is the observation of academic staff and their teaching practice by their academic peers. The procedure is particularly beneficial to identify good practice that can be shared amongst peers, as well as recognising opportunities for development and improvement.

From 2020/2021, all modules in the Maths department being delivered within an academic year will be included in the Peer Dialogue process. This process is required for all Academic staff and optional for Postgraduate Research Students who teach. It is managed by the Director of Education and student who have questions about this process should discuss this with the Director of Education in the first instance.

Please see the links below for further details:

### Peer Dialogue on Teaching University Policy Statement

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## Personal Tutors

(<https://warwick.ac.uk/fac/sci/mathematics/currentstudents/ughandbook/general/support/tutors/>)

Your Tutor is your first contact on the University staff. He or she will want to get to know you as an individual, know how you are getting on, what is going really well for you, what problems you have and how you are dealing with them. Then he or she will know you well enough to write references on your behalf when you apply for a job, and to speak on your behalf at exam boards. Tutors can help overcome many of the major or minor problems of university life relatively easily, provided you bring them up in good time. When they can't deal with a particular problem, they can usually direct you to someone who can help. So make sure your tutor knows if you are ill, or in dispute with your landlord. But do tell him or her too if you have been elected to a responsible post in the Union or have made the cross-country skiing team.

**You must see your tutor during the first week of each term** so that we know that you are safely back. Details vary, but usually your tutor will want to see you on the first day of term. This meeting is often used to discuss which modules you are taking, registration formalities, and arrangements for tutorials. If an exam or other really unavoidable cause means you can't come when it is suggested, send an e-mail instead and call at the very first opportunity.

**Academic work with your tutor.** Your tutor is an academic member of staff who will expect to advise you about the choices in your course, and discuss mathematics in detail. In the first year you are likely to have group tutorials; you may also request individual ones. In later years, as modules become more specialised, you will probably receive most of your direct mathematical support from other sources; your tutor will be involved for some modules such as the MA213 Essay (to be replaced by MA262 Scientific Communication for students starting in 2022/23), and will continue to be your first port of call for general mathematical advice about module choices, etc.

**Keep your appointments!** If you are unable to attend a tutorial or supervision which has been arranged for you, don't leave someone wondering why you have not turned up. Send advance notice (e.g. by e-mail or telephone) that you will not be there. If (as in case of sudden illness) this is not possible, you need to send an explanation afterwards as soon as you can. (This is in your own interest as well as being basic courtesy. Remember that at the end of your course, prospective employers are likely to ask your tutor about your *reliability* and *regularity of attendance*. Your tutor's response will be one hundred per cent truthful.)

**Specialist tutors:** The Department has the following specialist tutors who have experience in answering questions and solving problems related to their specialist areas. Please make use of them in addition or in place of your personal tutors.

- Tutor for Women
- Overseas students' tutor
- Maths/Business Studies degree representative
- Maths/Economics degree representative

Please ask in the Undergraduate Office for details of which staff member has each job and how to contact them (e-mail, phone or room numbers).

**Changing your tutor:** Occasionally a student does not get on well with his or her tutor. If this happens to you, you can easily change, and no offence will be taken. Simply ask the Senior Tutor in Mathematics or the Undergraduate Office, to assign you a new tutor. You will not be required to explain your reasons. Note, however, that you will not be able to choose who your next tutor will be!

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## Supervisions

(<https://warwick.ac.uk/fac/sci/mathematics/currentstudents/ughandbook/general/support/supervisions/>)

Every first year undergraduate has a graduate (or 4th year MMath) student as supervisor. Groups of undergraduates see their supervisor regularly in Terms 1 and 2 and for 5 weeks of Term 3. Supervision groups coincide with tutorial groups, and you should find out from your tutor on your first day here who are the other members of your group.

**Aims of the supervision system:** The main aims are

1. to provide an opportunity for you to have written work marked and criticized, and thus get feedback on your progress;
2. to give you a chance to discuss the difficulties you are having with the modules, and
3. to put you in regular close contact with someone who handles on an everyday basis the mathematics you are learning.

**How do students make contact with their supervisors?** We will explain how to first meet your supervisor as part of your induction in Welcome Week, but it won't be until the first week of term.

**When and where do supervisions take place?** It is left to undergraduates to arrange with their supervisors a mutually convenient time and place for supervisions. There are a large number of small areas with blackboards dotted around and about the department, but supervisions can take place anywhere else on campus. Initially you should arrange your supervisions for week 2, and for each subsequent week of the term. To do this, you will need to have made some progress towards choosing the optional modules you will take this term, and thus to fix your lecture timetable.

**The structure of First Year supervisions.** The weekly supervisions will focus on written homework for the core modules. This homework counts for 15% of your final mark in each of these modules. It will be marked by your supervisor in the week when you hand it in online, and marked as soon as your supervisor is able (we expect this to be within a week). You and your supervisor will then go over this work, and sort out the difficulties it brings to light. Supervisors should be ready to deal with difficulties raised by the undergraduates themselves; they can also ask their undergraduates to make short presentations at the blackboard, or stimulate discussion by asking questions in the supervisions. In Term 3, besides going over written homework, most supervisors will encourage their undergraduates to try their hand at past exam questions, and will go over their solutions with them.

**What more is there to say?** Mathematics is not a spectator sport. The key to learning is doing mathematics yourself. The written homework is designed to get you doing this; the benefit you will get from working hard on the homework is far greater than the 15% of your mark that it can contribute. The same goes for supervisions. Don't expect your supervisor to have all the ideas or to make all the running. Come with questions of your own (and bring lecture notes and textbooks for the modules whose content you wish to discuss). Get together with the other members of your supervision group outside supervisions and decide together what you'd like to do in your supervisions. Ask your supervisor the questions that are bothering you, even if you are afraid that they might be "silly" questions. You will gain nothing by hiding your difficulties; they may not be as silly as you think.

**Plagiarism:** remember that although we encourage you to work together on your weekly assignments you MUST WRITE UP YOUR SOLUTIONS BY YOURSELF. If you copy your friends answers and hand them in, there is a strong possibility this will be noticed and the consequences could be severe (see [Expected Behaviour](#)).

However, as well as a possible penalty, if you cannot answer a question but copy it from a friend, your Supervisor will think that you understand it and will not then go through it with you in the Supervision! It is OK to hand in wrong answers, or half attempted ones... don't think you HAVE to hand in perfect solutions.

Finally, if there is any aspect of your supervisions that you are not happy with (and this goes for the marking of your written homework too), don't let matters slide; discuss it with your supervisor, your tutor, or, in the last instance, contact the academic responsible for supervisions and support classes, [Richard Lissaman](#).

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## Support Classes

(<https://warwick.ac.uk/fac/sci/mathematics/currentstudents/ughandbook/general/support/supportclasses/>)

Many lectures will have support classes associated with them. Especially core second year modules, and most third year modules. Support classes vary in appearance depending on the material, and in what way they support the lectures. Some will spend most of the time going over the assignments sheets (assessed or otherwise), and if these sheets are assessed it is usually the TA (Teaching Assistant) of the support class that marks them. Other classes will go over particularly tricky parts of the module, or additional examples that give a better insight.

Don't go to a support class expecting the TA to know what you have been struggling with, they will welcome feedback from you on what you would like help with and would probably be happy to receive an email to give them sufficient time to prepare. Also, make sure **you** are prepared: that you have attended the lectures beforehand, and have attempted the assignment sheets that are going to be covered. There is nothing worse, for a TA than 30 students sitting in silence in a room expecting to be spoon-fed answers to all the exercises that they haven't attempted yet.

What you can expect from the TA of your support class:

- They should turn up to the classes promptly and be well prepared.
- Due to the nature of employing TAs from postgraduate students the style and standard of the teaching may vary, but you should as a minimum expect the TA to be competent and prepared to answer relevant questions. In particular, most of the TAs will not be experts on the course they are covering so cannot be expected to answer questions outside of the material covered in lectures (although of course many will still do so).
- The TA will mark any assessed work and return marks to the lecturer promptly. The University expects all work to be returned within 20 working days of the submission deadline, but for support classes you should typically get it returned within at least 2 weeks.
- If you have minor concerns about your support class (can't hear the TA, can't read writing, don't feel they're going over the things you need help with) then talk to the TA! Often this could be the first time they have taught a support class and would welcome any feedback that would improve their performance.
- If you have any **serious** concerns about your support class you should address complaints to the Director of Undergraduate Studies **immediately**.
- You are encouraged to email your TA with suggestions for topics you are particularly having problems with, but it is not the TAs job to email individual solutions to students. That is what the support classes are for.
- If the TA will unavoidably miss a support class they or the lecturer will notify you beforehand and if possible arrange a replacement class.

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## Help and Advice

(<https://warwick.ac.uk/fac/sci/mathematics/currentstudents/ughandbook/general/help/>)

If things start going wrong, or you need some support then there is an abundance of help within the University and Department. If it is something serious and you need immediate help please contact Student Support Services (see below) or Security (22083) where appropriate. Otherwise the Taught Programmes Office in the department is a good place to start, or your Personal Tutor, where they will be able to direct you to the best person to talk to further if necessary. the Undergraduate Programme Manager will often be able to help with immediate problems (her office is next door to the Undergraduate Office). If you have concerns don't keep them to yourself and suffer in silence.

The University's Student Support Services has a wide range of services on offer, which we may put you in touch with or you can access directly. In the latter case, if there is something affecting your studies do still let us know (by talking to the Undergraduate Office) so that we can offer additional support and advice or take into account as Mitigating Circumstances in the Exam Boards.

You may find [this video](#) helpful, and there is further information about who you can speak to in the Maths Department [here](#).

## Personal tutoring and support for students

The University of Warwick is committed to providing a supportive and positive environment for all members of its community and a high-quality student experience.

We recognise that there will be times in everybody's university life when things do not go as well as you would wish. In times like these, it's important to know that there is a comprehensive support and welfare structure available to help with all kinds of different problems.

The information accessible on, and from, this web page outlines the support services available to Warwick students. There may be more than one option available, so please use the information on this page, as well as the individual service websites, to help you decide the best place for you to go.

### Support within your department - Personal Tutors

A personal tutor is an academic member of staff, assigned to each student on arrival at Warwick, who will act as the initial point of contact for discussion of academic and pastoral matters throughout a student's undergraduate and postgraduate career.

The Personal Tutor system at the University of Warwick is a vital and central part of campus life. Personal tutors and research supervisors, working in conjunction with the wide range of services available to students, are expected to provide such support, advice and guidance to students as may be necessary or appropriate to enable them to gain the most from their studies at the University.

Details on how the personal tutor system at Warwick should operate are outlined in the [Personal Tutor Guidelines](#).

We recommend that you consult these guidelines, as they represent the university's official policy on personal tutoring. The following extract summarises the roles of the key figures in the university's personal tutoring system:

The role of the **Personal Tutor**, who will be a member of academic staff, is:

- To assist students with the process of induction and orientation into University life and to retain an interest in their personal and academic development throughout their academic careers;
- To provide academic advice to personal tutees on their progress and development;
- To respond as promptly as possible to requests for help and advice about pastoral/non-academic matters insofar as s/he is competent to do so;
- To signpost and refer students on to professional University support services for further assistance if necessary;
- To signpost students to relevant careers/skills provision;
- To act as the student's advocate when advocacy is needed.
- To act as a possible referee

- To keep a record of discussions and any agreed follow-up actions

The role of the **Personal Tutee** is:

- To be responsible for their own academic development and achievement by contributing positively to a productive working relationship with the personal tutor;
- To attend all arranged meetings and respond promptly to communications from their department;
- To inform their personal tutor promptly of any factors that might be impacting significantly on their ability to meet the requirements of their course, it being understood that personal tutors cannot advise and support students if they are unaware of such factors and that personal tutors are required to treat all information disclosed confidentially and to disclose to a third party only by agreement with the student;
- To be an active engaged member of their departmental academic community.

**Who is my personal tutor/supervisor?**

Departments are required to post lists of personal tutors on noticeboards and online. If you have a query about who your personal tutor is, you should contact the departmental secretary/administrator/undergraduate office for further information.

**When should I see my personal tutor/supervisor?**

- If you want feedback on your general academic progress.
- If you have enquiries about course regulations, e.g. choice of module options, understanding degree classification conventions
- If you are concerned about any issues you feel may be impacting on your ability to do your academic work effectively
- If you want advice on how to access specialist support e.g. on mental health, disability support, financial matters, study skills, career planning

**What is the role of the Department Senior Tutor?**

The role of the **Department Senior Tutor**, who will be an experienced member of academic staff, is:

- To be responsible for the effective operation of the personal tutor system in their department, including making sure that students know who their personal tutor is;
- To post personal tutor lists on the department's website;
- To provide support and guidance to students if the personal tutor is unavailable;
- To facilitate a change of personal tutor if requested by a personal tutee
- To provide support and guidance to members of academic staff who are personal tutors;
- To consult with the Dean of Students about possible changes to the operation of personal tutoring in their department.

## Other University support

As well as the Personal Tutor system, the University provides a comprehensive support network of specialised services. Each of the below services can be accessed via the [Wellbeing Support Services website](#).

### Wellbeing Support Services

*- provide a range of services that can help you to develop the personal resources and skills you need to navigate the challenges and opportunities of student life*

They offer support in a variety of ways.

First step: A **brief consultation** to help you identify next steps and decide on the type of support you may need such as:

- Self-help resources
- Workshops
- One-to-one appointments
- Psychological interventions
- Email counselling
- Therapy groups
- Mentoring

Their teams are ready to work with you:

The **Wellbeing Support Team** offers practical advice and emotional support for your wellbeing and help accessing other services.

The **Disability Team** offers support to manage the impact of a disability, including specific learning differences, mental health, autism spectrum and long term medical conditions.

The **Counselling and Psychology Interventions Team** offers a range of therapeutic interventions for students experiencing emotional or psychological issues.

If you would like to contact Wellbeing Support Services, please visit the [Wellbeing Portal - wellbeing.warwick.ac.uk](#).

Office hours Mon-Fri 8.30am - 5pm (Fri until 4pm).

Brief consultations (available Mon-Fri 10am - 3pm).

**Location:** Senate House, ground floor

**Website:** [warwick.ac.uk/supportservices](http://warwick.ac.uk/supportservices)

**Tel:** 024 7657 5570

### The Dean of Students Office (and Faculty Senior Tutors)

- *promotes the academic welfare of students*

The Dean of Students is an academic member of staff whom you can turn to in confidence for support regarding difficulties with your studies e.g. changing course, withdrawing, appeals, difficulties with your department etc.

She is responsible for the personal tutor system.

**Website:** [warwick.ac.uk/deanofstudents](http://warwick.ac.uk/deanofstudents)

**Email:** senior.tutor@warwick.ac.uk

**Tel:** 024 7652 2761

### The Residential Life Team

- *work and live alongside students in halls of residence*

The Residential Life Team works and lives alongside students in halls of residence and are a key part of the University's welfare and support network.

Contact your resident tutor in hall, if you have any difficulties or queries (from homesickness to accommodation problems, or anything else). If they cannot help you, they will refer you to someone else. If you do not live on campus, you can contact Wellbeing Support Services (as above).

**Website:** [warwick.ac.uk/residentiallife](http://warwick.ac.uk/residentiallife)

### Health Centre - an NHS doctors' surgery on the University campus

- *providing primary health care GP services to registered patients*

Students registered with the Health Centre can make contact if they require a consultation with a doctor or nurse, an emergency appointment, emergency contraception, vaccinations or advice on vaccinations, or sickness certification.

**Location:** Health Centre Road - main campus

**Website:** [uwhc.org.uk](http://uwhc.org.uk)

**Tel:** 024 7771 0998

### The Chaplaincy

- *provides pastoral and spiritual care to all members of the University community, of all faiths and none*

The Chaplaincy is the focus of Spiritual life on campus; it provides a meeting place for Christian, Jewish and Muslim prayer and worship. It is a focal point for different faith groups and student societies and offers a safe, supportive space at the centre of campus where people can "learn to live well together".

Students of all faiths and none can come and find a friendly place to chat and eat. A chapel, three kitchens, meeting rooms and an Islamic prayer hall make the Chaplaincy an inclusive, spiritual and social space that welcomes the whole University community.

**Location:** Main campus

**Website:** [warwick.ac.uk/chaplaincy](http://warwick.ac.uk/chaplaincy)

**Email:** chaplaincy@warwick.ac.uk

**Tel:** 024 7652 3519

### The Students' Union Advice Centre

- *provides an independent, free and confidential service for all Warwick students, offering information, advice and representation*

Visit the Student Advice Centre if you have a housing problem (off or on-campus; University or private), have academic problems and difficulties such as exams, wrong course, appeals and complaints, have immigration problems - such as entry clearance, family members and working, have money, debt and legal difficulties, or are not sure who to talk to or where to get help.

**Location:** Main campus - SUHQ

**Website:** [warwicksu.com/advice](http://warwicksu.com/advice)

**Email:** advice@warwicksu.ac.uk

**Tel:** 024 7657 2824

### Student Funding

- *offers advice and guidance on all aspects of financial support*

Visit Student Funding if you want to know what financial support you may be entitled to, want to know more about the scholarships and bursaries, are having difficulty paying for your day-to-day living expenses, or have additional financial needs because you are caring for a child or have a disability.

**Location:** Senate House

**Website:** [warwick.ac.uk/studentfunding](http://warwick.ac.uk/studentfunding)

**Email:** studentfunding at warwick dot ac dot uk

**Tel:** 024 7615 0096

### Campus Security

- *Working to provide a safe, secure and friendly environment for students, staff and visitors to the campus*

The Campus Security team works 24 hours a day to support the University's overall aims by ensuring there is a safe, secure and friendly environment for students, staff and visitors.

**Location:** Campus Security Control Centre - staffed 24/7

**Website:** [warwick.ac.uk/security](http://warwick.ac.uk/security)

**Email:** security at warwick dot ac dot uk

**Tel:** 024 7652 2083

### The International Student Office

- *supports EU and international students both before and during their stay at Warwick*

They are able to assist with immigration advice (on issues including visa extensions, working, dependant visas, travel visas etc), practical support (police registration, banking, bringing your family to the UK) and enhancing your student experience (induction events, social trips etc).

**Location:** University House, first floor

**Website:** [warwick.ac.uk/internationaloffice](http://warwick.ac.uk/internationaloffice)

**Email:** global dot reception at warwick dot ac dot uk

**Tel:** 024 7652 3706

### External Services

You might also find it helpful to access support from external agencies.

If you can't find the information you need, contact wellbeing at warwick dot ac dot uk or tel: 024 7657 5570.

If you require out-of-hours emergency support, please contact Campus Security on 024 7652 2222 or internal extension 22222.

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### Computers and LaTeX

(<https://warwick.ac.uk/fac/sci/mathematics/currentstudents/ughandbook/general/computers/>)

### Computers, e-mail, TeX and word-processing

The ability to communicate via a keyboard is what makes humans different from other animals.

You are given a computer account when you join the University.

You need to log on frequently - several times a week - to check your mail, because that's one of our main ways of communicating with you. If you are not receiving the messages addressed to your year of Mathematics students, tell the Taught Programmes Office in room B0.02 (so that they can check you are a member of the alias used).

If you forward your University email to another account (e.g. gmail) then it is **your responsibility** to make sure that you are still receiving important emails from the department and they are not being deleted as spam.

We give you every encouragement to use a word-processors, for example writing essays, for assessed work in other departments, and for business letters such as job applications. But there are also specialised packages for writing mathematics.

The best way to typeset your work is using TeX, which (together with its macro packages LaTeX and AMSTeX) is now the standard computer language for typesetting mathematics, and will be around in the scientific world for decades to come. You input a text file of Roman letters, describing mathematical symbols and components of equations in terms of control sequences (such as `\alpha` or `\matrix`), which is typeset by TeX and written to a file which can be printed out. The majority of printed lecture notes and assignment sheets will be typeset by LaTeX.

There is a useful guide written by one of our students on installing and starting to use LaTeX on your own computer which can be found here. The manuals on LaTeX by L. Lamport, and on Word, are available in the SRC in the Library and there are many introductory webpages on getting started with LaTeX online. Beware of spending too much time learning the intricacies of your chosen system. It may be fun, even addictive, but it is not mathematics.

Please also see resources given in the Second Year Essay pages for other places to get help.

**NOTE:** Keep **backups** of any important work that you store on your computer/laptop/tablet. If you lose work through theft of your device or software/hardware faults you will not be able to ask for extensions or special dispensation. These days backing up is easy through memory sticks, online storage or simply emailing it to yourself. There is no excuse.

A good source on style in mathematical writing is Steven G. Krantz, *A primer of mathematical writing*. For a good cheap readable book of English grammar for reference, try W. Struik and E.B. White, *The Elements of Style*.

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## Study Guide

(<https://warwick.ac.uk/fac/sci/mathematics/currentstudents/ughandbook/general/studyguide/>)

### The process of learning mathematics

University modules go much faster than A-level teaching. (They make the sixth form seem like a lazy idyll in lotus-land.) Therefore beginning a Mathematics degree is always a shock. We ease the transition for you by taking the first year gently, but it's still easy to fall at any stage into the trap of doing too little work.

**Work at those exercises!** It is essential to back up every hour of lecture time with at least one hour of private study on the same topic. (Your social or sporting life is important too - nobody denies that - but if you don't limit those pleasant activities, expect only a third-class degree.) When you get an example sheet, the ideal is to do all the exercises within a week, by your own effort. Only the best students will manage this all the time. Often there are Sections A, B and C on an example sheet. Section A is the most straightforward, Section B is slightly harder, and contains the exercises for handing in, while Section C contains exercises that go a little further afield. Some of these are quite hard, while others touch on topics that stray from the syllabus, but that the lecturer couldn't bear to leave out. But you can tell you're really falling behind if you don't even try to do all the questions in Section B! You should certainly do all the questions which you are asked to hand in. (Marks on written assignments tend to average around 70%: be aware that examination questions may be rather harder.) Discuss with the people in your supervision group, or with friends from lectures, those questions which you (or they) can't do. If you are really stumped by a large proportion of the exercises, talk about it to your tutor, who may well be able to help.

**Solving is winning.** "Each time you succeed with a problem, you have won a small victory over the mathematics." It boosts you psychologically, and your mind stores the mathematical ideas involved without the pain of rote-learning.

**Mathematics is not a spectator sport.** It's tempting to ask your supervisor to show you how to work out the problems. But it only does a tenth of the good. "Oh, YES, now I see" - but have you really learned anything? Given the same type of problem two weeks later, you may well have forgotten. Some lecturers prepare solutions for posting on the web. Usually only the solutions to Section B are given. If, before hearing how to do a problem, you had worked on it by

yourself or with a friend, you'd be much more likely to take it in. Working on a problem yourself helps to make nets for catching ideas with. If you haven't done the work, the ideas just fly right by you.

"I [don't] understand" can be misleading. How often have you said something like, ``I understood everything she said in that lecture''? Doubtless she's an excellent and popular teacher. But can you do the exercises she set you? If not, sorry, but you don't really yet understand what she said. On the other hand, if you *can* do the questions for some module, then you *are* understanding it (and so you needn't worry too much).

**Mathematics takes time to absorb.** The absorption takes place as you do your written work. So write early and write often.

**Files and ring-binders are hopeless at learning mathematics.** Don't collect lecture notes and store them away in a file or folder on your computer. Air them, read them, discuss them with your friends, your supervisor, your tutor. Ask the lecturer questions too: he wants to share his enthusiasm with you. Talking mathematics makes it live. Then read your notes again - and then see how any remaining problems have become more transparent.

## Personal organization and work

Your most important resource, which to get a good degree you need to draw heavily on, is your own effort and determination. Try to be reasonably organised and systematic. Try to keep on top of your work. Most of your time is not scheduled by the university, but when exams loom you'll find you wish you had done more work earlier. Many maths students found it possible to revise for A-level modules in the few days before the exam, but this is usually a disastrous strategy for university modules. Modules cannot be learnt in a week. You need time to think about the theory and practice on examples.

If you have problems understanding things, ask people: other students (in your own or higher years), your supervisor, your tutor, the lecturer.

**Study Skills.** New students (and some experienced ones too!) may need to build up their study skills to get the best out of the effort they put in to their work. The university library keeps books on study skills under LB1049 or LB2395; you are encouraged to spend some time looking at these. We recommend books by W. Cassie, R. Freeman, A. Howe, L. Marshall and A. Northedge, and the pamphlet, D. Burkhardt (Ed.), *Study Skills in Mathematics*. This last contains some good hints on problem solving, and you will get more from G. Pólya, *How to Solve it*.

**Preparing for Exams.** On starting a module, your first target is to absorb the lectured material and the lecturer's problem sheets. Later in the term, and in the run-up to the exam, test yourself out on past exam papers, which give a good indication of the standard expected.

In the third term, many lecturers give a revision lecture on their module, which should help you see its overall structure.

There's no point in trying to guess what will be on the exam paper - it may or may not be related to last year's paper, or to hints you think the lecturer dropped, and it's extremely unlikely to be related to the silly rumours that sometimes develop in the heat of Term 3. Rather than worrying about what will be on the paper, you're better off thinking through the material of the module, and making sure you know what the theory means in practical problems such as those on the example sheets. Even if you don't have much time, there's just no point in trying to memorise your notes; aim to analyse a corner of the theory, and work it all out in a case you can understand.

## The University Library

[Library Home Page](#) | [Searchable catalogues](#) | [Book suggestions](#)

In the Student Reference Collection (SRC) you will find copies of the most useful textbooks for undergraduate study, with very restricted borrowing to make sure that they are available to the largest possible number of people.

In the main part of the University Library is an excellent wider collection of mathematics books. Get into the habit of browsing - books contain all sorts of interesting things! If you don't understand part of a module, try to find the material in a book. Learn how to track down books on a particular topic by browsing, using the library online catalogues and the review journals, guessing, and, when all else fails, searching physically through large numbers of books. You can't be a serious academic or scientist without detective work in libraries, and although resources available on the Internet are easier to locate there is still no substitute for browsing books.

During your first week at Warwick you should make yourself familiar with the Central Campus Library, there are excellent resources on their website to introduce you to the facilities available. If you need further help during your course, ask at the Enquiry Desk on Floor 1 during office hours, consult the printed guides and leaflets available on each floor or contact the Library's Science Team. Helen Ireland (email: H.Ireland@warwick.ac.uk) is the Subject Librarian for Mathematics and the departmental library representative is Sheetal Sharma. Contact either of them about any books which you feel ought to be in the Library, or if there are not enough copies of key texts. (Library matters can also be raised at SSLC meetings.)

You can also find books in the University bookshop as well as well-known online retailers! We do not expect you to buy your own copies of textbooks, but for some modules you may find it useful to do so, especially modules that you may find yourself struggling on. Standard maths textbooks will typically be around 40 pounds to buy from new, but cheaper copies can be found online second-hand (Amazon is good for this), or sometimes you can find students from higher years selling their old copies through the Student Union. Warwick has an arrangement with Blackwell's that includes a price match guarantee.

## The Mathematics Society: WMS

The Maths Society (WMS) offers opportunities for involvement in both academic and social activities. Although officially a society of the Students Union it also has close links to the department.

They publish guides to the more difficult and important modules for the benefit of first year students. They also arrange extra informal tuition by second and third year students, in addition to official supervisions. They also hope to provide an introductory course and guide to LaTeX, the popular computer typesetting package for maths, which is invaluable for writing essays and projects.

Year 1 regs and modules  
G100 G103 GL11 G1NC

## Year 2 regs and modules

G100 G103 GL11 G1NC

Year 3 regs and modules  
G100 G103

## Year 4 regs and modules

### G103

## Exam information

## Funding and Opportunities

(<https://warwick.ac.uk/fac/sci/mathematics/currentstudents/ughandbook/general/opportunities/>)

Opportunities and funding that may appeal to Mathematics Students:

Warwick In Schools (WinS)

Previously the SAS scheme, this programme is open to students registered for EP304 Introduction to Secondary Maths Teaching.

“ WinS introduces students to teaching as a career by placing students in schools and providing training to prepare them for working with young people.

There is information on the very popular scheme at the website

<https://warwick.ac.uk/fac/soc/cte/professionaldevelopment/wins/>

Warwick In Africa

WinS students will be eligible to apply for a place on the Warwick in Africa Project in the summer. Previous years students have taught in schools in South Africa, Tanzania and Ghana over July and August every year. This is a project supported by Giving to Warwick that started over 10 years ago with a handful of Mathematics undergraduates going out to South Africa, the success of which has led to the scheme expanding to more countries with support for African teachers as well as students.

This is a once in a lifetime opportunity! See the website for more background

<http://www2.warwick.ac.uk/giving/community/wia>

Application information will be available in December, through the WinS Training Sessions.



The Institute for Advanced Teaching and Learning (IATL)

The objective of the Institute for Advanced Teaching and Learning is to help shape teaching and learning across the University and disseminate, embed and raise the profile of new approaches and successful innovation. It aims to promote student engagement wherever possible. Its focus is

- Academic literacy
  - Engagement with global culture
  - Interdisciplinary activity
  - Performance-based learning
  - Research-led teaching

IATL has funds for various activities, with deadlines throughout the year under their "Student as Producer" moniker including "Research Grants" and "Performance Grants" as well as money from their "Collaboration Fund" for joint projects between staff and students. Don't be put off by the names which suggest a theatrical bent, there have already been some successful Mathematics projects and there is another one taking place during the 2014/15 academic year.

More information on the funds can be found at [http://www2.warwick.ac.uk/fac/cross\\_fac/iatl/funding/](http://www2.warwick.ac.uk/fac/cross_fac/iatl/funding/)

## The Undergraduate Research Scholarship Scheme (URSS)



Every year we have a number of students on this scheme spending the summer working on a research project with a member of staff. It pays a modest bursary to allow students to spend their summer having a go at research and has proved very popular in the past. You will need to find a member of staff willing to supervise, sometimes staff members will take the initiative and actively advertise to students, other times it has been the student's initiative to find someone.

Departmental information on the scheme including departmental affiliation can be found [here](#).

University information can be found [here](http://go.warwick.ac.uk/urss)

Deadline for applications is usually around the 1st February.

## The London Mathematical Society (LMS) Undergraduate Research Bursaries

This is an alternative national scheme to the above which is more generous, but is more competitive and has a longer application form (to be completed by the member of staff concerned).

Deadline for applications is again usually early February every year.

More information can be found [here](http://www.lms.ac.uk/grants/undergraduate-research-bursaries)

## Lord Rootes Memorial Fund

The Lord Rootes Memorial Fund is intended to encourage personal development by supporting challenging projects proposed by individual and groups of Warwick students, especially projects:

- involving observation and the intelligent use of experience in the scientific, cultural, environmental or business context.
- demonstrating creativity of thought and the development of an original and personal idea or objective.

More information at <http://www2.warwick.ac.uk/insite/topic/teachinglearning/rootes>

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Year 2 regs and modules  
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Year 3 regs and modules  
G100 G103

Year 4 regs and modules  
G103

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## URSS and Department Affiliation

(<https://warwick.ac.uk/fac/sci/mathematics/currentstudents/ughandbook/general/opportunities/urssmaths/>)

The [Undergraduate Research Support Scheme \(URSS\)](#) allows maths undergraduates to participate in research, supervised by a member of staff, over 6-10 weeks in the summer vacation. The URSS enables undergraduates to enhance their research and transferable skills (e.g. presentation and science communication), making the experience a valuable addition to your CV.

The application deadline is usually in February (check the [URSS website](#)) but you should not leave applications to the last minute. There is an online application form and students and supervisors will have to work together to complete the form.

New to 2021/22 round: the URSS now features a [public engagement](#) strand, with a separate application form, but the same deadline as the research URSS.

## Examples of projects in mathematics

[Here are the titles of funded maths URSS from 2018 to 2021.](#)

Typically there will be 20-30 funded projects each year.

The URSS website also hosts a [Showcase](#) of recent posters and papers.

## LMS undergraduate research scheme

An alternative to the URSS is the LMS undergraduate research bursaries. [More details here.](#)

## Departmental funding

The department may be able to fund a small number of unsuccessful URSS or LMS UG research applications. These will be capped at £1,000.

The department does not fund student research projects that have not been through either the URSS or LMS application process.

## Key info for students

- Browse through the [research groups](#) within the department and see [who does what](#) research.
- Approach staff to supervise a URSS project as early as possible - certainly some time in Term 1. Any later and you will be unlikely to find a supervisor.
- It might be useful to talk to more than one potential supervisor.
- Before you apply, note that the URSS process only ends some time in Term 1 of the following academic year. Along the way, you will be required to produce a variety of research outputs. You will certainly be kept busy.
- Talk to the Maths Society if you are unsure. They may be able to put you in touch with someone who has completed the URSS.
- We strongly encourage applications from students from under-represented backgrounds as part of the Department's commitment to the Athena Swan principles.

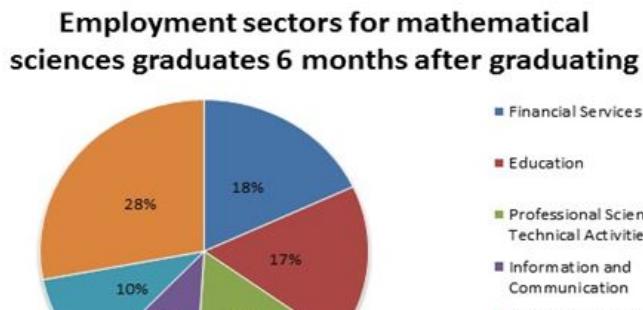
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## Careers

(<https://warwick.ac.uk/fac/sci/mathematics/currentstudents/ughandbook/general/careers/>)

What options will you have with a degree in mathematics?

- The underpinning skills and knowledge developed on a mathematics degree are highly valued by employers across a variety of sectors. Surveys of graduate career destinations consistently show that approximately 30% of mathematics graduates progress to a career in financial and professional services [What do graduates do](#) and the destinations of Warwick mathematicians are broadly similar [Career destinations for Warwick Mathematics students](#)



Source: *The Institute of Mathematics and its Applications 2013 (Graduates entering further study were not included in this research)*

- It is worth noting that approx. 80% of the top graduate recruiters do not specify a degree discipline - analytical and problem-solving skills are developed to a very high level on a mathematics degree and these skills are very transferable, so you can also realistically also consider a career in non-finance related sectors. A number of Warwick mathematics graduates have successfully developed careers in meteorology, the games industry, software, the arts and the media and data analytics, for example.
- The value of a mathematics degree was highlighted by the Council for Mathematical Sciences (CMS) in their 2015 report which found that the demand for job applicants with numerical qualifications has significantly increased and that almost 2,000,000 people now work in jobs where mathematical sciences qualifications are essential. The research also concluded that this demand is reflected in salary levels, 'In 2012/2013, just six months after graduation, the median salary for mathematical sciences graduates was £24,000. 19% of those graduates were already earning more than £30,000 and 7% were already earning £40,000 or more.' (The Mathematical Sciences People Pipeline, Oct 28<sup>th</sup> 2015)

## Warwick Alumni@work: Consultant Analyst (Grace Rawcliff...)



### What do employers require?

- The Warwick Mathematics degree is a highly credible qualification and has an excellent reputation. Employers do not only require high levels of academic achievement however, they also look for a variety of 'employability skills' [Employability Skills](#) According to the 'High Fliers' annual survey of recruitment in the graduate labour market, nearly 60% of top employers state that graduates have 'little or no chance of finding a graduate level job without work experience' [Value of work experience](#)
- The most convincing way to demonstrate these additional skills is to gain experience – *any* experience is valuable if you present it in a way relevant to the job role and the employer's requirements. During and throughout your degree, consider the opportunities available to you on campus (through volunteering, extra-curricular and society involvement, for example) and through work experience, placements and internships. You can search for opportunities to gain experience on the Careers and Skills portal My Advantage <https://myadvantage.warwick.ac.uk/> and the 'Experience Pool' [Get experience](#)

### What impact will module choices have on my career plans/options?

- If you are worried about how choosing your degree options might affect the choices open to you after graduation this may not have as much impact as you think.
- Generally speaking there are many factors that employers consider before they start looking at the way your degree was structured. They are interested in your *motivations and interests* and why you've chosen a particular career. Option choices can help here, the Challenges of Climate Change module, for example, would indicate commitment and enthusiasm to an employer in the renewables sector.
- For some careers, your general level of academic attainment is important and if you want to enter one of these, it would be a shame to jeopardise a 2.i by choosing an unknown area of study that you might find overly stretching.
- The key message is: if you know what career area you want to enter, option choices are one way to prepare for this and you might want to discuss them with your tutor or a careers consultant. However, if, like many, you have a very open mind as to your future area of work, choose options that you will enjoy and that will hold your interest as these are the ones where you are most likely to find the motivation to work hard and do well.

### What advice and information is available through the universities Careers & Skills Service?

- The departmental careers consultant is Ray Ryan and individual appointments can be booked with him through My Advantage [Book an appointment](#) or by emailing him directly at [r.ryan@warwick.ac.uk](mailto:r.ryan@warwick.ac.uk) The advice offered is impartial, is designed to help you feel more confident about making a career decision and takes place in a confidential setting, either in the Zeeman building or the Learning Grid at University House. The agenda of the careers appointments is set by the student and may include for example:
  - Discussing career options with a mathematics degree
  - Application advice (CVs, on-line applications & cover letters)
  - Preparation for an interview and/or assessment centre
  - Academic support is also available through the Skills team, you may want to develop your study skills, your time management skills to prepare for assignment deadlines or to prepare more effectively for examinations and dissertation writing, for example [Skills](#).
  - If you're hoping to find employment in the UK after graduation and English isn't your first language, think about ways in which you can improve your conversational language skills so that you can approach job interviews, for example, more confidently. The Centre for Applied Linguistics runs classes for our non-native speaking students, [Learning English](#)

### Don't leave it too late!

Don't leave your career planning until your final year though. You are welcome to visit the Careers Service at any time during your academic career. We are happy to see you if you have no idea or lots of ideas about what you want to do next. For those of you looking for career inspiration the Careers Hub and Weblink online resources hold information on a wide range of jobs and you can try your hand at the computer based 'Prospectus Planner' to generate career ideas - see [www.prospects.ac.uk](http://www.prospects.ac.uk). We may also run specialist appointments for maths students – see our Website for information about how to make an appointment.

Second year students in particular: to continue onto the third year of the MMath you need to reach a certain standard at the end of the year. Many of you who are currently on the MMath will not be by the end of year 2 so if you did not get a first in year one there is a strong possibility you could be in your penultimate year now!

Undertaking Volunteer projects can also develop essential transferable skills such as communication, teamwork and project management. Please visit [www.warwick.ac.uk/volunteers](http://www.warwick.ac.uk/volunteers) to access the Warwick Volunteers site. Possible projects include student mentoring, student tutoring, Kidz Kamp and many more.

During the forthcoming academic year, there will be a range of events and sessions relevant to maths students and the careers consultant who works with maths will be available in the department at times throughout the year for appointments (although you can also make appointments throughout the year at University House).

## How to Impress

Look at any recruitment advertisement for graduates and you'll see what they want. Yes, of course they want the applicants to have a good degree, but they want to see good transferable skills as well. Transferable skills? Things like really good communication skills, team-working, negotiation and persuasion, resilience, initiative, planning and organising and problem solving skills. That's just an example of the sort of generic skills, that can be adapted to many different types of workplace, that employers are demanding today.

### **Transferable Skills from the Mathematics degrees**

You can develop your skills in a number of different ways. Firstly, through your studies - mathematicians have good analytical skills, will think logically and be good at solving problems. Secondly, think about how work experience can develop things like team-working, dealing with people, multi-tasking, drive, initiative and taking responsibility. Getting involved in other extra-curricular activities like clubs and societies will also give the opportunity to develop and demonstrate those skills that the employers want to see.

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G103

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## Study Abroad

(<https://warwick.ac.uk/fac/sci/mathematics/currentstudents/ughandbook/general/abroad/>)

This page is for **outgoing** Warwick students interested in going abroad to study mathematics. [Click here for information for incoming students](#) coming to Warwick on an Exchange year.

## Studying abroad

For their year abroad, students pay some tuition fees to the University of Warwick (charged at 15% of the fee for a standard year) and no fees to the host institution, although some universities may charge for a student card which allows students to register and travel at student prices (around £200 per semester). The UK is no longer part of the Erasmus+ scheme; the replacement is the Turing Scheme. More information about funding available under this scheme can be found on the [Mobility Team Webpages](#).

In general teaching at the partner institutions is in the local language (see below). It is normally expected that students applying for a Study Abroad placement will already have basic competence in the relevant language (for example from school, or by taking language modules as options since arriving at Warwick).

The Year Abroad is taken after two complete years of study in Warwick. There are three options:

- **BSc with Intercalated Year (G101):** Open to students with at least a good 2.1 mark. The year abroad does not contribute to the final degree mark; you resume your studies in Warwick with the 3rd year, leading to the BSc degree (G101) from Warwick University.
- **MMath with Intercalated Year (G105):** Open to students on the four-year MMath degree course with at least a good 2.1 mark. The year abroad does not contribute to the final mark; you resume your studies in Warwick with the 3rd year, receiving the MMath degree (G105) from Warwick University after two more years of study.
- **MMath with Study in Europe (G106):** Open to students on the four-year MMath degree course with a First (70%). The year abroad is instead of the 3rd year of studies in Warwick; the marks you obtain whilst abroad contribute to your final degree mark. You resume your studies in Warwick with the 4th year of the MMath. (The Finals Exam Board secretary will confirm how many of your year abroad modules can count towards the MA4 CATS requirement). This leads to an MMath degree (G106) from Warwick University.

Here are the relevant course regulations. The above programs are open to students enrolled in G100 and G103 only. There are further exchange programs open to other students, but they are run by the partner departments: Mathematics and Business Studies (with Intercalated Year) (G1N2) and Mathematics and Economics (with Intercalated Year) (GL12).

Exchanges are only possible with universities that have an official link with the Department of Mathematics, and there are strict restrictions on the number of students sent to each university. Below are the universities with exchange agreements with Warwick for the 2023/24 academic year:

**Belgium:** Université Libre de Bruxelles (ULB), Vrije Universiteit Brussel (VUB).

**France:** Université Grenoble Alpes, Sorbonne Université, Université de Strasbourg.

**Germany:** Universität Bremen, Ludwig-Maximilians-Universität München, Technische Universität Berlin.

**Italy:** Università degli Studi di Padova.

**Spain:** University of Barcelona, Universidad Complutense de Madrid, Universidad Autónoma de Madrid.

**Switzerland:** University of Bern, Université de Genève.

**China:** Shanghai Jiao Tong.

**Hong Kong:** University of Hong Kong (HKU).

**Japan:** University of Tokyo.

**Singapore:** Nanyang Technological University.

NB: Please check the local language. Some universities may offer some classes in English. Please read the experiences of other students to see whether there are options in English at the university of your choice or visit the university website.

**Read about the experiences of former students.** See also the information from the Student Mobility team at Warwick.

**If you are interested in going abroad:** The application forms have now been sent to interested students. The deadline is 5pm on Thursday 15th December.

## Calendar

This is a predicted timeline for applications in the 2022-23 Academic Year. Exact deadlines are subject to confirmation and will be updated.

- 24th November 2022: deadline to register your interest in the Year Abroad. Student Mobility hosts briefing meetings throughout this time period.
- 15th December 2022: deadline to submit official application form.
- First week of Term 2: Applicants meet with our Study Abroad Coordinator for a short interview; successful applicants are allocated a university and nominated to the Student Mobility Team.
- January - May 2023: Student Mobility nominates the students to the universities abroad. Please note a nomination is not a guarantee you will be accepted by the host university.
- March - June 2023: selected students will need to complete the host universities' application process. The deadlines will be different for each university - it is your responsibility to ensure your documents are submitted by the correct deadline.
- July 2023: first placements begin.

For further questions, please contact [ugmaths@warwick.ac.uk](mailto:ugmaths@warwick.ac.uk) or Marco Schlichting, the Study Abroad Coordinator in Warwick Mathematics Institute. Please also see the Mobility web page of the University.

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## Student Voice

(<https://warwick.ac.uk/fac/sci/mathematics/currentstudents/ughandbook/general/yourviews/>)

The Department of Mathematics is keen to receive feedback from our students on their experience, and what improvements might be made. If you would like to give feedback, share an idea or make a complaint, there are several ways in which you can do this:

### Student-Staff Liaison Committee (SSLC)

The Student Staff Liaison Committee (SSLC) is a regular forum, meeting twice a term, for matters affecting maths students and staff. **All students are welcome to attend.**

If you have any issues about the course that you would like to raise, please contact your year reps, or simply sending an email to [maths.sslc@warwick.ac.uk](mailto:maths.sslc@warwick.ac.uk). The SSLC also has:

- A big notice board on the ground floor of Zeeman ("the Street")
- A [Moodle page](#), where meeting minutes and outcomes can be downloaded.
- A [Facebook page](#).

In the past, the SSLC has contributed to departmental policy, passing on recommendations for consideration at staff meetings - for example, recommending new modules and fixing timetabling issues. A student member also attends staff meetings and the department's Teaching Committee to present student views.

## Module Feedback

Students are invited to provide module feedback twice a term in every module via online evaluation forms: an initial form near the start of the module for instant feedback to the lecturer regarding perceived problems, and a more in-depth form near the end of the module. Lecturers will see the results of these evaluation forms, as will the Head of Department, Director of Undergraduate Studies and Director of Student Experience. Lecturers will usually provide oral feedback to the initial evaluation, and a written feedback for the end-of-module evaluation.

## Surveys

### 1) National Student Survey

The National Student Survey (NSS) is an annual UK-wide survey for all final-year undergraduates studying at UK universities. It gathers opinions from final-year undergraduates on various aspects of their courses. The NSS is your opportunity to give anonymous feedback about your course, which we use to improve our teaching and the courses we offer. Results are publicly available to prospective students, their families and advisors to help make informed choices of where and what to study.

For finalists graduating in 2020, the NSS will be available in early February. Finalists will be sent a link (by Ipsos MORI who independently collects the data) to the NSS on Thursday 6th February.

Every student who completes the NSS gets a £5 Eating-at-Warwick credit. In addition, £5 will also be donated to a Warwick charity.

For more information about the NSS, please visit the [University's NSS website](#) or contact Dr Siri Chongchitnan.

### 2) Warwick Student Experience Survey

The Warwick Student Experience Survey (WSES) is conducted every autumn by the University. It's a great chance for all students on taught courses to provide feedback on the whole Warwick experience - from arriving at university, to learning, living and campus services. Like the NSS, it also takes just five to ten minutes to fill in and eligible students are strongly encouraged by the University and the department of Mathematics to participate.

For more information please visit the [WSES webpage](#).

### 3) Graduate Outcomes Survey

The Graduate Outcomes survey collects information on the activities and perspectives of graduates approximately 15 months after completion. The survey covers UG, PGT and PGR students, home and overseas, full- and part-time. It is conducted by the Higher Education Statistics Agency and is the biggest annual social survey in the UK. The results provide an insight into the career destinations of recent graduates, which shapes both the delivery of services in Higher Education as well as influencing the government's understanding of the needs of the graduate labour market.

For more information please visit the [Graduate Outcomes website](#).

## Maths Focus Groups

The Department of Mathematics holds different kinds of student focus groups throughout the year to get feedback and views of our students about their courses. Maths focus groups are informal, relaxed events (usually with pizzas). Please look out for emails from Dr Siri Chongchitnan for details on the next focus groups.

## Personal Tutor

Personal tutors are there to be your advocate and can assist you with submitting feedback and give you more information about filing a complaint. All students, undergraduate and postgraduate, are assigned a Personal Tutor. If you have any questions about the Personal Tutor System, please see the [Help and Advice](#) pages or contact the Department Senior Tutor, Dr Florian Theil.

## Complaints

You may like to raise complaints over any of the following issues:

- the quality and standard of service provided by the University, including teaching and learning provision;
- failure to provide a service; unsuitable facilities or learning resources;
- inappropriate behaviour or treatment by a staff member, student or individual associated with the University (including contravening the University's [Dignity at Warwick Policy, which includes harassment, bullying, and discrimination](#));
- failure of the University to follow an appropriate administrative or academic process.

Please try to resolve any issues you may have by speaking to the relevant colleague (e.g. if you are having problems with supervisions then speak to your supervisor initially). If your complaint is with the department of Mathematics, please contact your personal tutor, or the Director of Student Experience (Dr Siri Chongchitnan), or the Department Administrator, [Jen Bowskill](#).

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## Student Experience Feedback

(<https://warwick.ac.uk/fac/sci/mathematics/currentstudents/ughandbook/general/yourviews/studentexperiencefeedback/>)

Do you have any comments or suggestions on how to improve the overall student experience in Maths? We'd be very grateful for your thoughts. Your submission will be anonymous, unless you choose to share your email address.

**Subject**

**Feedback \***

Would you like us to contact you with a response? If you select 'Yes, please provide your email address below.. \*

Yes

No

If you have selected 'yes' above, please provide your Warwick email address here. By providing your email address your feedback will no longer be anonymous.

\* indicates a required field

#### Privacy notice

Although you must sign in to access the form, feedback is anonymous unless you choose to provide your email address. Details from this form will be shared with those responsible for responding to feedback and improving student experience initiatives and strategies.

The University of Warwick is the Data Controller of any information you have entered on this form and is committed to protecting the rights of individuals in line with Data Protection Legislation. The University's [Data Protection webpages](#) provide further information on your rights and how the University processes personal data. If you wish to submit a data subjects rights request, make a complaint or report a suspected personal data breach, please contact the University's Data Protection Officer by email at [infocompliance@warwick.ac.uk](mailto:infocompliance@warwick.ac.uk).

#### Spam prevention

I'm not a robot

reCAPTCHA  
Privacy - Terms

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#### Other Links

(<https://warwick.ac.uk/fac/sci/mathematics/currentstudents/ughandbook/general/links/>)

#### The University Library

[Library Home Page](#) | [Searchable catalogues](#) | [Book suggestions](#)

In the Student Reference Collection (SRC) you will find copies of the most useful textbooks for undergraduate study, with very restricted borrowing to make sure that they are available to the largest possible number of people.

In the main part of the University Library is an excellent wider collection of mathematics books. Get into the habit of browsing - books contain all sorts of interesting things! If you don't understand part of a module, try to find the material in a book. Learn how to track down books on a particular topic by browsing, using the library online catalogues and the review journals, guessing, and, when all else fails, searching physically through large numbers of books.

You can't be a serious academic or scientist without detective work in libraries, and although resources available on the Internet are easier to locate there is still no substitute for browsing books.

During your first week at Warwick you should make yourself familiar with the Central Campus Library, there are excellent resources on their website to introduce you to the facilities available. If you need further help during your course, ask at the Enquiry Desk on Floor 1 during office hours, consult the printed guides and leaflets available on each floor or contact the Library's Science Team. Chris Vernon is the Subject Librarian for Mathematics and the departmental library representative is Sheetal Sharma. Contact either of them about any books which you feel ought to be in the Library, or if there are not enough copies of key texts. (Library matters can also be raised at SSLC meetings.)

You can also find books in the University bookshop as well as well-known online retailers! We do not expect you to buy your own copies of textbooks, but for some modules you may find it useful to do so, especially modules that you may find yourself struggling on. Standard maths textbooks will typically be around 40 pounds to buy from new, but cheaper copies can be found online second-hand (Amazon is good for this), or sometimes you can find students from higher years selling their old copies through the Student Union. Warwick has an arrangement with Blackwell's that includes a price match guarantee.

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## Greek Alphabet

(<https://warwick.ac.uk/fac/sci/mathematics/currentstudents/ughandbook/general/greek/>)

Name	Upper case	Lower case	Often used for:
Alpha	A	$\alpha$	
Beta	B	$\beta$	
Gamma	$\Gamma$	$\gamma$	
Delta	$\Delta$	$\delta$	A small number
Epsilon	E	$\epsilon, \varepsilon$	Another small number
Zeta	Z	$\zeta$	
Eta	H	$\eta$	
Theta	$\Theta$	$\theta, \vartheta$	Angle
Iota	I	$\iota$	
Kappa	K	$\kappa$	
Lambda	$\Lambda$	$\lambda$	Eigenvalue
Mu	M	$\mu$	
Nu	N	$\nu$	
Xi	$\Xi$	$\xi$	Unknown quantity, x

Omicron	$O$	$o$	
Pi	$\Pi, \prod_{i=1}^n$	$\pi, \varpi$	Product, $\pi = 3.14159 \dots$
Rho	$P$	$\rho, \varrho$	
Sigma	$\Sigma, \sum_{i=1}^n$	$\sigma$	Sum, standard deviation
Tau	$T$	$\tau$	
Upsilon	$\Upsilon$	$v$	Rarely, if ever, used
Phi	$\Phi$	$\phi, \varphi$	Another angle
Chi	$X$	$\chi$	
Psi	$\Psi$	$\psi$	
Omega	$\Omega$	$\omega$	Angular velocity, the end.