Mathematics & Statistics

Degree options in the Faculty of Science or Faculty of Arts

MMath (Integrated Masters degrees)
Mathematics
Applied Mathematics
Pure Mathematics
Statistics

BSc or MA (Single Honours degrees)
Mathematics
Statistics

If you wish to study Arts subjects in your first and second years, apply for the MA rather than the BSc degree – see Cross-Faculty subjects, page 5.

BSc (Joint Honours degrees)
Mathematics and one of:
- Biology
- Chemistry
- Computer Science
- Economics

Statistics and one of:
- Biology
- Computer Science
- Economics

BSc “with” degree
Honours in which two-thirds of the course deals with the first-named subject:
Mathematics with Geography

MPhys (Joint Integrated Masters degree)
Mathematics and Theoretical Physics

MChem “with” degree
Chemistry with Mathematics

MA (Joint Honours degrees)
Mathematics and one of:
- Ancient History
- Arabic
- Art History
- Biblical Studies
- Classical Studies
- Economics
- English
- German

Statistics and one of:
- Economics
- Philosophy

MA “with” degrees
Honours in which two-thirds of the course deals with the first-named subject:
Mathematics with Russian
Mathematics with Spanish

Likely grades considered for an offer
We consider all aspects of every application, including context, equivalent qualifications and the Personal Statement and offers may be higher or lower than the grades stated here.

If you are accepted onto a Single Honours degree in the Faculty of Science in the School of Mathematics & Statistics, then you can change on arrival between any of the three routes below, provided you meet the minimum likely grades.

First year entry
(To complete an MMath in five years, or a BSc/MA in four)

SQA Highers:
AAAB (A in Mathematics)**

GCE A-Levels:
A*AA (A* in Mathematics)

International Baccalaureate Points:
36 including HL6 in Mathematics

Second year entry
(To complete an MMath in four years or a BSc in three. Please note that second year entry is not available into the MA.)

SQA Advanced Highers:
AA including Mathematics (in addition to Highers at AAAB – A in Mathematics)**

GCE A-Levels:
A*AA (A* in Mathematics)

International Baccalaureate Points:
36 including HL6 in Mathematics

For Fast Track MMath degrees
(To complete an MMath in four years, starting with 1000-level modules)

Advanced SQA Highers: BB including Mathematics (in addition to Highers at AAAB – A in Mathematics)**

GCE A-Levels:
A*AA (A* in Mathematics)

International Baccalaureate Points:
36 including HL6 in Mathematics

** For BSc and MMath degrees – in addition to Mathematics, a Higher in Biology (or Human Biology), Chemistry, Computing Science or equivalent, Geography, Physics, or Psychology.
“As well as being great and enthusiastic teachers, all lecturers give an insight into their mathematical research, from Geometric Group Theory to Solar Theory. All the talks and events that the St Andrews Undergraduate Mathematics Society (SUMS) organise give the School a very friendly and intellectually stimulating atmosphere making for a perfect learning and socialising environment.”

Antoine (Bordeaux, France)

For full Faculty entrance requirements, see page 53.

For degrees combining more than one subject, the subject with the higher likely grades determines the grades you need. You will also need to meet any further subject-specific requirements as outlined on their pages.

For further country-specific qualifications and pre-degree foundation programmes see:
www.st-andrews.ac.uk/study/international

Do I need previous knowledge of this subject?
– Yes, see above.

Subject enquiries
Dr Colva M Roney-Dougal
E: maths-admissions@st-andrews.ac.uk

Why study Mathematics or Statistics here?

* We offer a wide variety of ways you can study mathematics, via first year entry, second year entry or Fast Track.
* To complement this, our degrees are extremely flexible: if you apply to the BSc or MMath, then on arrival you will discuss with your Adviser of Studies which of these entry routes would suit you best.
* All degrees have a flexible structure that allows you either to specialise in some particular area (e.g. Pure, Applied or Statistics) or to acquire training across a broader range of topics.
* Strong tutorial support throughout your undergraduate programme with weekly, small group tutorials for all courses in the early years.
* Opportunities to work closely, and undertake project work, with a research group.
* With over 60 Honours modules to choose from, and strong support from your Adviser of Studies, you can put together a programme of studies tailored closely to your individual interests.
* Individual supervision of your Senior Honours Project in your final year.
* Fifth in the UK for the proportion of our research that is world-leading or internationally excellent in the UK Research Excellence Framework 2014.

What will I study?

St Andrews provides a stimulating environment in which to pursue Mathematics or Statistics under the tutelage of world-class researchers. Not only will you have the opportunity to pursue an area of interest but also you will acquire the skills and attributes sought after by graduate employers. St Andrews has first-class researchers in the three main areas of the mathematical sciences: Pure, Applied and Statistics. The School of Mathematics & Statistics has several internationally recognised centres, including the Centre for Interdisciplinary Research in Computational Algebra, the Centre for Research into Ecological and Environmental Modelling and the Solar and Magnetospheric MHD Theory Group. The undergraduate courses offered reflect this diversity of interests and provide the focus for specialisation and project work.

Understanding patterns and structure, and developing the tools with which to analyse them, is the primary focus of all mathematics. Whether the patterns relate to physical or biological phenomena or to mathematics itself, the primary aim is to describe, categorise, and understand the processes involved. As a student of Mathematics or Statistics, much of your time here will be concerned with developing the analytical techniques and skills necessary to explore some of these fascinating areas of research. Also, as a consequence of this diversity, we offer a wide range of degrees.

“The School has become a second home for me over these past two years. The lecturers are incredibly kind and supportive, the students are friendly, and there’s always plenty of maths to think about, whether for credit or trying to solve one of the problems someone left on the whiteboard.”

Isabella (San Francisco, California, USA)
Mathematics & Statistics
(continued)

Degree programmes offered
These range from the advanced MMath programmes to the more broadly based joint degrees with another subject. Both single and joint degrees are generally four years long, and are based upon a flexible and innovative module structure built around a core of essential material.

When you are applying, you may not be sure of the type of programme that will most suit you. We offer specialised MMath degrees in Pure Mathematics, Applied Mathematics or Statistics, whilst our MMath Mathematics degree allows you to study topics from any or all of Pure, Applied and Statistics.

If you expect to be well qualified in school mathematics then you should apply for MMath Mathematics which will give you access to everything we offer. You will have a meeting with your Adviser of Studies when you get to St Andrews, and they will help you choose which programme will suit you best.

Second year entry allows you to complete the MMath in four years by taking harder courses from the beginning of your degree, but having only a standard workload over the remaining years of study. In contrast, the Fast Track degrees offer an accelerated sequence of modules in Mathematics and/or Statistics designed in such a way as to permit a gentle start to first year, whilst ensuring that the advanced topics are reached by fourth year. The course structure is unique within Scotland and maintains the flexibility of the St Andrews structure whilst still enabling completion of the MMath degree in four years.

We offer a four-year BSc/MA degree in Mathematics and Statistics for those not wishing to take the advanced MMath route. You take a broad 1000-level programme, which can include up to two other subjects, and the mathematics component concentrates upon reinforcing basic skills and ideas before embarking upon the study of Pure Mathematics, Applied Mathematics and/or Statistics in second year. The BSc is also available with second year entry.

The mathematical/statistical content of the BSc and MA degrees is the same. The difference is in the other subjects available for study alongside mathematics or statistics. Our students do at least 20 credits of Mathematics in first year, and at least 60 credits in second year. Those on BSc degrees must take at least 60 more credits of science subjects (which can be Mathematics), whilst those on MA degrees must take at least 60 more credits of arts subjects (which can also be Mathematics).

The 2000-level modules comprise a central core of material that everyone takes as part of their programme. These provide the foundation for study in years three and four where there are over sixty modules available for study over the two Honours years, of which Single Honours students take roughly five compulsory and twelve “free choice” modules (depending on the degree programme), and Joint Honours students half of those.

Honours modules currently on offer (2016-2017) include:

Pure Mathematics:
- Fractal Geometry
- Galois Theory
- Graph Theory
- Topics in Group Theory

Statistics:
- Time Series Analysis
- Bayesian Inference
- Advanced Data Analysis
- Statistical Modelling

Applied Mathematics:
- Solar Theory
- Advanced Computational Techniques
- Fluid Dynamics
- Mathematical Biology

Mathematics / Statistics element of your Honours degree

First two years of Mathematics or Statistics
At 1000 level you will study between one and three Mathematics modules, and between three and five modules in any other subjects. MT1002 Mathematics is our core compulsory module, and can be studied in either semester. Students with a strong background will take this in Semester 1, whilst those who prefer a gentler route will take MT1001 Introductory Mathematics in Semester 1 and MT1002 in Semester 2. We offer three further 1000-level Mathematics modules.

2000-level will be your first year if you choose second year entry. We offer eight modules across the whole range of mathematics, of which you will take between four and eight, depending on your intended degree. These 2000-level modules are designed to introduce you to the study of more advanced mathematics, opening up access to the diverse range of modules that we offer in higher levels.

Students on the Fast Track route will take a mixture of 1000- and 2000-level modules in their first year, including a specially-designed module purely for Fast Track students, to help rapidly bridge the gap between 1000-level and 2000-level mathematics. In their second year they go on to study a mixture of 2000- and 3000-level modules, enabling completion of the MMath degree in four years.

Typical class sizes and teaching information

First year: lectures 100 - 250, labs 25 - 60, tutorials 8 - 12
Second year: lectures 100 - 250, labs 25 - 60, tutorials 8 - 12
Honours: lectures 5 - 120, tutorials 1 - 30
In the first year activities for each module centre on a daily lecture (five per week). Small group tutorials take place once a week for each module where you prepare solutions to exercises on that week’s topics, which are marked by your tutor and then discussed in class. In addition, computer labs are held once a week for each module, to assist with both IT and problem-solving skills. In your second year you will typically be studying four modules at once, and each fortnight each module will typically comprise five lectures, one tutorial, one computer lab, and one examples class. You will develop increasing independence and initiative as you progress through your degree programme so that by third and fourth year the average teaching load drops to around ten hours of lectures and four of tutorials per week, supplemented by private study. In addition, in fourth year you carry out an extensive Senior Honours Project on a topic of your choice, for which you will receive individual supervision throughout the year from your chosen staff member.

Successful third year students also have the opportunity to undertake summer project work as Vacation Scholars supervised by staff of their choice. This enables them to establish a close working relationship with members of a research group and gain an appreciation of research work and what it entails.

**Typical methods of assessment**

At 1000 and 2000 level all our modules include at least 50% written examinations, with the balance of assessment being made up of coursework. At Honours level the majority of our modules are assessed solely by written examinations.

**Scholarships**

A number of needs-based Entrant Scholarships are awarded each year by the University to students studying Mathematics and/or Statistics. For further information please see: [www.st-andrews.ac.uk/scholarships](http://www.st-andrews.ac.uk/scholarships)

**Study abroad**

All BSc/MA students and non-Fast Track students on the MMath programme may apply to the University’s St Andrews Abroad programme. See page 22.

**Careers**

The demand for mathematically able graduates exceeds the supply and the career prospects are excellent. Graduates in Mathematics, Statistics or a joint degree involving these subjects have a wide selection of opportunities. Around 30% of graduates go on to pursue postgraduate qualifications, either in the UK or abroad, and develop research careers. A small number enter the teaching profession, for which there are various financial incentives. A similar number embark upon Teaching English as a Foreign Language in Japan or China: an opportunity to see the world and experience a different culture in an organised and structured way. Although this may seem an unlikely move for a mathematical scientist it provides a commercially valuable insight into an economically vibrant part of the world.

Of the rest, over 50% of our graduates gain employment with merchant banks, insurance companies, computer consultancies, the civil service, industry, and financial services organisations (e.g. Goldman Sachs, KPMG, PwC, and many more). Clear logical thinking, deductive reasoning, confidence in data handling, and IT skills are attributes that are highly prized by employers.

Graduate recruiters seek numerate, literate, enthusiastic and successful graduates. A degree in Mathematics or Statistics offers the chance to develop such a profile and, of course, a good degree in these subjects is recognised as a substantial achievement in a demanding discipline.

See also page 46 for details of the University’s Careers Centre.

“What makes this School so special for me is the quality of teaching here. I am able to knock on the office door of a lecturer, a leader in their field, for them to explain a concept to me. My peers write questions on the communal dry-wipe boards for us all to try and solve. Meeting likeminded people and studying together has opened up more activities outside of my subject like playing rugby, attending music events and surfing.”

**Bea** (Harrogate, Yorkshire, England)