

## Undergraduate FAQs

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## Undergraduate FAQs

### Section A: Entry Requirements

#### Q: What are the entry requirements for the Science programme DN200 MPG?

A: Passes in six subjects including English, Irish, Mathematics (Min OB3/HD3), one laboratory science subject (or Applied Mathematics) (Min OB3/HD3) & two other recognised subjects. Two of the six subjects must be minimum HC3.

**CAO Points Range 2012:** 500-615

**Second Language:** N/A

#### Q: What are the entry requirements for the Science programme DN230 Actuarial and Financial Studies?

A: Passes in six subjects including English, Irish, Mathematics (Min HB1) & three other recognised subjects. Two of the six subjects must be minimum HC3.

**CAO Points Range 2012:** 560 -625

**Second Language:** N/A

#### Q: What are the entry requirements for the Arts programme DN500 Statistics?

A: Passes in six subjects including English, Irish, a third language & three other recognised subjects. Two of the six subjects must be minimum HC3.

**CAO Points Range 2012:** 350-600

**Second Language:** Yes

#### Q: What are the entry requirements for the Arts programme DN500 Mathematical Studies?

A: Passes in six subjects including English, Irish, a third language & three other recognised subjects. Two of the six subjects must be minimum HC3. For the BA in Mathematical Studies it is strongly recommended that you have at least a C or higher in Honours Leaving Certificate Mathematics, or equivalent. (An A in Pass Leaving Certificate Mathematics is not deemed equivalent.)

**CAO Points Range 2012:** 350-600

**Second Language:** Yes

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### Section B: General Mathematical Sciences Questions

#### Q: Why study a mathematical degree with the UCD School of Mathematical Sciences?

**A:** The simple answer is that despite the negative economic situation at the moment, graduates of our degrees are in huge demand. In recent years students have chosen not to study mathematical degrees in Ireland and there is now a real shortage of graduates in this area. Companies cannot find enough graduates with the skills offered in our degrees. Recently we were approached by several major companies based in Ireland who wished us to provide 350 graduates for employment with their companies. There is such a short supply of mathematically trained graduates that all of our graduates find employment each year. Most of them are recruited before they even complete their studies.

Salaries for graduates with any of our degrees are very attractive. Some recent graduates have started in their first jobs on salaries exceeding 50,000 Euro.

#### Q: I like mathematics and I would like to study some but I am not sure which degree to do in University. What is the difference between the Mathematics, ACM, Statistics and Mathematical Sciences degrees?

**A:** In **Mathematics** our main objective is to uncover the fundamental truths of mathematics and to understand why they are true. In doing this, we aim to solve problems and to identify rules, patterns and connections. We are interested in getting to the bottom of the important concepts: number, distance, shape, structure. Topics studied will include calculus, linear algebra, geometry and coding theory, as well as many other subjects not met in school.

**By ACM** we understand Applied and Computation Mathematics. This is the application of mathematics to model and solve problems in physics, nature and engineering. Many of the systems that are considered are complex with many variables. By modelling them with mathematics we hope to understand how they evolve and make predictions concerning their future behaviour.

**Statistics** is a branch of science which can be conveniently thought of gathering, extracting or translating information from data. Statistics is used in many situations: to find pattern in data, to model complex uncertain situations, to estimate risk, to make predictions. Statisticians find employment in a variety of areas such as finance, business, IT, social science. We live in a world where data is cheap, but where the skills needed to usefully analyse data are scarce and are in demand. A degree in statistics will equip you such skills.

The **Mathematical Science** degree at UCD is a degree where students take a combination of Mathematics, ACM and Statistics through their degree.

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### Q: Is mathematics at University very theoretical?

A: If you study mathematics as a subject at University then you will encounter the computational and practical aspects of the subject, but will also be expected to develop your problem-solving abilities and your understanding of mathematical structures, logic and reasoning. This latter activity is more theoretical, but for most university students of mathematics, once they get the hang of it, this is the enjoyable part of the subject. It is more challenging, but also more satisfying: you may come to realize that mathematics is not only very useful but beautiful, intriguing and surprising.

### Q: How do I convert my A Level grades to the equivalent CAO points?

A: Enter your A-Level grades into this calculator via the link:

[https://myucd.ucd.ie/admission/alevel\\_cal.ezc](https://myucd.ucd.ie/admission/alevel_cal.ezc)

## Section C: BSc Mathematics

### Q: What is the BSc Mathematics? What is involved? Is it difficult?

Although you will take modules in other subjects (including elective modules), in each of your four years you will choose from the structured menu of core and option mathematics modules. The modules cover both the computational and the theoretical aspects of mathematics. The topics covered develop in depth and sophistication from year to year as the student grows in experience, knowledge and understanding. It is a challenging degree, but well within the reach of any student who has the interest and the basic mathematical aptitude (eg. a good Honours Leaving Certificate).

### Q: How does the BSc Mathematics degree compare with what you study at secondary school?

A: The mathematics degree builds on the skills and knowledge developed (at Honours level) in your secondary education. At university-level, however, there is a much greater emphasis on understanding, reasoning, problem-solving and thinking for yourself. The goal is to 'really get to the bottom of things'. This is underpinned by small-group tutorials and problem-solving classes. Over the course of a mathematics degree at university, you will discover many new topics and tools of mathematics which are not even hinted at in your secondary education.

### Q: Do I need to get an A in Maths in the Leaving Certificate to succeed in the BSc Mathematics degree?

A: No: An A in Honours Leaving Certificate mathematics is not a requirement to do a mathematics degree at university. You should have at least a B3 in Leaving Certificate Honours mathematics.

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### Section D: BSc Applied and Computational Maths

#### Q: What is a BSc Applied and Computational Maths?

**A:** Applied Mathematics is the study of real-world problems using mathematical methods. The problems are typically very diverse, and include topics in engineering, biology, physics, and finance. An applied mathematician might model the flow of fluids in engineering processes, predict the spread of diseases using mathematical epidemiology, study the analytic properties of the Schrodinger Equation in Quantum Mechanics, or price options using Black-Scholes theory.

Because many of the equations that are used in these models are extremely complicated, the simulation of these models on computers is essential. Thus, Applied Mathematics couples naturally with computation, and an applied mathematician will typically be proficient in high-performance computing, as well as the use of standard software packages and computer programming languages.

A BSc in Applied Mathematics introduces students to all of the ideas and skills listed above. It includes an extensive set of courses (modules) in core mathematics (analysis, algebra, geometry, calculus), as well as modules on applications. Students are also introduced to scientific computing through modules on numerical analysis and Matlab programming. Students also have the possibility to do a joint major with another Science subject, thereby gaining further abilities to apply mathematical techniques to a complementary scientific discipline.

### Section E: BSc Statistics/BA Statistics

#### Q: What is a BSc Statistics/BA Statistics?

**A:** Statistics is often called the science of uncertainty. We live in a world where data is being produced at ever increasing rates; however the skills needed to analyse and extract information from data are scarce. A BSc in statistics will give you precisely this skill set and will leave you in high demand in today's job market. This degree programme will equip you with the necessary technical skills in statistics and mathematics. But you will also become highly skilled in statistical computer programming and in practical aspects of analysing and presenting data.

### Section F: Actuarial and Financial Studies

#### Q: What is the Actuarial and Financial Studies programme? (BAFS)

**A:** The Actuarial and Financial Studies degree is a broad ranging degree in actuarial science but it also involves significant components in statistics, finance, economics and accounting. The Actuarial and Financial Studies degree is an accredited degree with the Actuarial Profession. Through this agreement, the degree can lead to exemptions from nine of the actuarial professional exams (CT1-CT8 and CA1). Thus the degree provides students who are interested in becoming actuaries with a strong basis for completing the professional actuarial qualification.

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**Q: I want to study BAFS but I am worried that I might not get the points, what should I do? Is there a similar course that I can apply for?**

**A:** The Mathematical Sciences degree and Economics & Finance degrees in UCD provide a good background for students who may subsequently wish to become actuaries. The UCD School of Mathematical Sciences offer postgraduate courses in Actuarial Science which suitably qualified graduates from quantitative degrees can apply to. These offer alternative routes into the actuarial profession.

**Q: Is it correct to advise that if students come in through DN200 MPG, major in a mathematical discipline and choose some of the same modules that form part of the BAFS course, can then go on and do a MSc in Actuarial Science?**

**A:** Yes, this is correct. The Mathematical Sciences students can pick a number of modules that overlap with those taken by BAFS. These would give the student a strong background for commencing the MSc in Actuarial Science.

**Q: Is there any particular subject the School would recommend majoring in e.g. Statistics or Mathematics or Mathematical Science or Applied & Computational Mathematics?**

**A:** In order to cover the maximum number of modules that overlap with BAFS they would ideally major in Statistics or Mathematical Science. However, a Mathematics or Applied & Computational Mathematics major would give a strong grounding too.

**Q: Can students coming in via DN200 MPG sit some of the Core Technical Series (CT1:8) exams if they cover the required modules?**

**A:** A student who does the DN200 MPG course will have a number of courses that overlap with BAFS. At this point in time the Accreditation Agreement between UCD and the actuarial profession only covers BAFS and the postgraduate programmes. However, students can apply on a case-by-case basis to the profession to request exemptions on the basis of their studies. The most relevant core technical subjects for this are CT3, CT4 and CT6.

**Q: What exemptions can students possibly get via the DN200 MPG route?**

**A:** See above answer

**Q: What exemptions can students get if they complete the MSc in Actuarial Science? Will it cover them for the Core Applications Exam CA1 currently covered by BAFS?**

**A:** Yes, the MSc currently gives the possibility of getting exemptions from CT1-8 only and CA1.

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### Section G: BSc Theoretical Physics

#### Q: What is a BSc Theoretical Physics?

**A:** The aim of Theoretical Physics is to provide a unified description of the fundamental laws of nature. These laws govern the behaviour of all physical objects in the universe from the very large where Einstein's laws of general relativity allow us to predict the motion of stars around black holes and the behaviour of the universe as a whole to the very small where atomistic modelling allows us to understand nature's use of quantum coherence and entanglement in light harvesting nanosystems. Theoretical Physics requires the use of advanced mathematics, indeed since the time of Newton, advances in Mathematics and advances in Theoretical Physics go hand-in-hand and this continues to this day, for example, in the relation between mathematics, string theory and other approaches to reconciling gravitational physics with the quantum world.

The BSc in Theoretical Physics will provide you with the modern skills required, providing a balanced programme starting from fundamental aspects of physics and mathematics and developing to emergent areas such as nanophysics, gravitational wave astronomy and the computer simulation of large, complex physical systems.

### Section H: BA Mathematical Studies?

#### Q: What is a BA Mathematical Studies?

**A:** BA in Mathematical Studies is a three year honours degree in Mathematics, taken in conjunction with another Arts subject, for example, with English, History, Music etc. While all core areas of mathematics are covered, including, Calculus, Analysis, Algebra and Geometry, this is a well rounded degree also introducing the student to the fundamentals of Probability, Statistics, Financial Mathematics and History of Mathematics, among other topics. Students can further flesh out their program by using their elective modules (2 modules each year) to pursue topics of special mathematical interest. Common to all of the above-mentioned topic areas, is an emphasis throughout on understanding and the development of logical independent thinking and problem solving, skills which translate no matter what eventual career a student may wish to follow.

### Section I: Careers

#### Q: I want to become a mathematics teacher. What do I study?

**A:** The best advice is either to pursue the [new education pathway in Science \(DN200\)](#) - particularly if you would like to combine mathematics with another science subject - or else if you want to be able to teach an arts subject together with mathematics - to take Mathematical Studies as a subject in the BA degree, followed by the (PDE) Professional Diploma in Education.

#### Q: If I study engineering, I become an engineer, if I study law, I become a lawyer, what do I become if I study the:

- BSc Applied and Computational Maths?
- BSc Theoretical Physics?
- BSc Statistics/BA Statistics

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- **Actuarial and Financial Studies?**
- **BA Mathematical Studies?**
- **BA Statistics?**

### **BSc Applied and Computational Science:**

**A:** Unlike vocational degrees, we provide a set of skills, not a job title. For some, this can be a liberating prospect, and the hard mathematical skills provided by the BSc in ACM open up a range of different jobs. These jobs can be in engineering (Computational Fluid Dynamics), Finance (Actuarial Science, Financial Engineering, Risk Management), or commercial Research and Development.

The training provided by the degree has generic aspects, and encompasses transferable skills such as the ability to analyze a problem and find solutions, modelling, data analysis, teamwork (via group projects), and communication skills. For this reason, many students find work in areas not directly related to ACM (e.g. Management Consultancy). This list is far from exhaustive, and mapping out a career path requires imagination and initiative. Many students use the summers to find internships in fields that interest them. This also improves CVs and is often the springboard into an interesting career.

### **BSc Theoretical Physics**

**A:** The Theoretical Physics degree programme allows you to acquire an excellent all-round knowledge of physics, mathematics and computer simulation. These theoretical skills open career opportunities in many areas reflected in the directions taken by former graduates: the Financial and Banking Sector; Software Design; Meteorology; Pharmaceutical Research; Government Statistics; Agricultural and Veterinary Research; Health Care; Mathematical and Statistical Modelling in for example the Oil Industry, Electricity Supply and Environmental Services. In addition, many of our students go on to pursue higher research degrees at the world's leading universities.

### **BSc Statistics/BA Statistics?**

**A:** There has never been a better time to be a graduate statistician. There are ever increasing employment opportunities for statisticians in traditional areas such as the pharmaceutical industry, the financial sector, management science, but also in new and emerging areas including social media companies. In short, wherever data is being produced, statisticians are needed!

### **Actuarial and Financial Studies:**

**A:** The Actuarial and Financial Studies degree opens up a number of potential career paths. Most graduates of the degree commence work as trainee actuaries and complete their professional exams when studying. This is similar to how accounting graduates complete their professional qualification after their degree and law students complete their professional exams.

Actuaries work in a very wide range of areas but a common theme to their work is that they study uncertainty. Their job usually involves quantifying and understanding the uncertainty in any

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situation. Examples include quantifying the risk of an investment, setting investment prices company to reduce the probability of a large loss for the company, assessing the exposure of a pension fund to losses, studying mortality at old ages so that economically viable pensions can be planned. The range of areas where actuaries work is more broad now than it was traditionally. Traditionally the insurance and pensions industry employed most actuaries. Now the financial, gambling, insurance, pensions, regulatory authorities all employ actuaries.

Some graduates from the Actuarial and Financial Studies programme follow alternative career paths by working in finance, statistics or accounting. The degree gives a good background knowledge for pursuing these careers.

### BA Mathematical Studies

**A:** The BA in Mathematical Studies produces numerate graduates who are also trained in logical thinking and problem solving. This skill set makes the graduates of this program flexible and sought after in a wide variety of areas, rather than being trained for one specific job. Recent graduates have pursued careers in IT, Finance, Banking, Accounting, Teaching, Management Consultancy, Research and many other areas. While most of these will require additional, often on-the-job, training, there is an established demand for mathematically trained graduates that is not as susceptible to the vagaries of the economy as many other career options. So, with a good BA in Mathematical Studies you become eminently employable in many different areas.

### Section J: Useful Links

**Admissions Queries:** <https://myucd.ucd.ie/prospectivestudents/prospects.ezc>

**A Level Grades Points Calculator:** [https://myucd.ucd.ie/admission/alevel\\_cal.ezc](https://myucd.ucd.ie/admission/alevel_cal.ezc)

**Fees & Grants:** <http://www.ucd.ie/registry/adminservices/fees/2012/>

**Academic Term Dates:** <http://www.ucd.ie/students/keydates.htm>

**School of Mathematical Sciences Web Site:** [www.ucd.ie/mathsciences](http://www.ucd.ie/mathsciences)

**College of Science Web Site:** [www.ucd.ie/science](http://www.ucd.ie/science)

**UCD International Office:** <http://www.ucd.ie/international/>

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