



NUI Galway
OÉ Gaillimh

Studying Mathematics

at NUI Galway



Mathematics has developed from counting, calculating and measurement through the use of abstraction and logical reasoning. At a practical level, mathematics underpins many other disciplines such as Physics, Economics and Engineering, along with newer areas like Molecular Biology. Mathematics is the language for the logical study of the structure of our world. The School of Mathematics offers programmes in Financial Mathematics and Economics, Mathematics and Education, Mathematical Science and the opportunity to study Applied Mathematics in various courses.

www.maths.nuigalway.ie

Financial Mathematics and Economics

This programme consists of courses in Mathematics, Probability and Statistics, Economics and Computer Science. It gives a rigorous training in the area of Financial Mathematics (including Actuarial), which has widespread applications in a number of diverse areas. This programme is perfect for students who have an aptitude for Mathematics but are also interested in examining economic factors that underlie decision-making by individuals and by society. The programme is also attractive to those who are interested in statistics, risk and uncertainty and in applying mathematical knowledge to future uncertainties.

Course Facts

Bachelor of Science (Financial Mathematics and Economics)

CAO Code: GY309

Entry points (2011): 430

Duration: 4 years

Average intake: 20

Entry requirements Minimum HC3 in two subjects and passes in four other subjects at H or O Level in the Leaving Certificate including: Irish, English, Mathematics, a third language or a laboratory science subject (i.e. Chemistry, Physics, Biology, Physics with Chemistry (joint) or Agricultural Science) and any two other subjects recognised for entry purposes. A HC3 in Mathematics is required.

Additional requirements This programme is an inter-college programme of the College of Science and the College of Business, Public Policy and Law. The entry requirements of either College may be applied whichever is the more advantageous to the applicant.

Did you know

Students who graduate with the B.Sc. in Financial Mathematics and Economics who subsequently enroll for professional actuarial exams may be granted some actuarial exam exemptions.

Course Outline

Year 1

- Mathematics
- Financial Management
- Economics
- Computer Science
- Statistics and Probability
- Mathematics of Finance I
- Mathematical Methods

Year 2

- Mathematics
- Microeconomics
- Statistics and Probability
- Computer Science
- Macroeconomics
- Introduction to Financial Economics
- Mathematical Methods II

Year 3

- Metric Spaces
- Business Finance 1
- Group Theory
- Economic Theory
- Actuarial Mathematics
- Annuities and Life Assurance
- Topology
- Applied Statistics
- Mathematical Modelling
- Advanced Economic Theory
- Economics of Financial Markets
- Money and Banking

Year 4

- Numerical Analysis
- Measure Theory
- Differential Equations with Financial Derivatives
- Seminar in Financial Markets I
- Seminar in Financial Markets II
- Stochastic Processes
- Neural Networks
- Actuarial Mathematics: Life Contingencies
- Non-Linear Systems
- International Monetary Economics
- Final Year Project

What our students say...



Noel Lawless
BSc (Financial Maths and Economics)

"When I left school, I was not sure what I wanted to

do, so I thought it best to keep my options open. I have now started as a trainee actuary and the groundwork I have already completed on my undergraduate programme is invaluable."

Career opportunities

The employment prospects for graduates in Financial Mathematics and Economics are excellent. There are challenging and financially rewarding opportunities in different areas including the financial services industry, the actuarial profession, in the public sector and in areas such as accountancy, tax or economics.

Further education

Honours graduates can pursue higher degrees in a wide range of related disciplines, including mathematics, actuarial science, financial economics, financial mathematics, statistics and economics.

Did you know

Professor John McHale (an NUI Galway Professor of Economics) is Chairman of the Irish Fiscal Advisory Council. The Council's objective is to determine whether the Irish government is adhering to its own fiscal targets. It measures the appropriateness and soundness of the government's macroeconomic projections, budgetary projections and fiscal stance.

Find out more:

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Mathematics and Education

The BA in Mathematics and Education is a four-year, full-time undergraduate degree which offers two valuable qualifications: an honours degree in Mathematics and a second-level teaching qualification.

Graduates of the programme will be regarded as excellent mathematicians and will be recognised by the Teaching Council of Ireland as qualified post-primary teachers of Mathematics and Applied Mathematics to honours Leaving Certificate level. In addition, graduates will be trained in the most current technology available to enhance mathematics teaching and learning.

Course Facts

Bachelor of Arts (Mathematics and Education)

CAO Code: GY109

Entry points (2011): 420

Duration: 4 years

Average intake: 25

Entry requirements Minimum Grade HC3 in two subjects and passes in four other subjects at H or O level in the Leaving Certificate including: Irish, English, another language and three other subjects recognised for entry purposes.

Additional requirements A HC3 or OA2 in Mathematics is also a requirement.

Did you know

Graduates of the programme will be recognised by the Teaching Council of Ireland as qualified post-primary teachers of Mathematics and Applied Mathematics

Course Outline

Year 1

- History and Structure of Irish Education
- Principles of Second-Level Mathematics
- Introduction to Educational Sciences
- Practical Teaching Programme
- Mathematics: Analysis & Algebra
- Introduction to Applied Mathematics
- Introduction to Mathematical Modelling

Year 2

- Philosophical Foundations of Education
- Mathematics Methodology and Skills of Teaching
- Practical Teaching Programme
- Curriculum Studies in Mathematics
- Analysis I (Real Analysis)
- Geometry
- Probability and Statistics I
- Linear Algebra
- Probability and Statistics II

Year 3

- Curriculum and Assessment
- Psychology, Sociology and Catering for Diversity
- Professional Studies: Integrated Project
- Practical Teaching Programme
- Research Literacies for Professional Development & Lifelong Learning
- Groups I
- Modelling I
- Discrete Mathematics
- Modelling II
- Analysis II (Complex Analysis)
- One further Maths Option (see below)

Final Year

- Practical Teaching Programme: Integrated Project
- Final Year Education Symposium
- Final Year Mathematics Project
- Block Teaching Practice

Further Mathematics Options (4 taken)

- Topology
- Advanced Statistical Methods for Business
- Functional Analysis
- Field Theory
- Mathematical Methods II
- History of Mathematics
- Cryptography
- Group Theory II
- Numerical Analysis
- Non Linear Systems

What our students say...



Nichola Leonard
Year Two, BA (Mathematics and Education)

“At first I was a little apprehensive about taking this course especially when I learned that we would have to study applied maths, but surprisingly I actually enjoyed this element of the course along with the maths and education. The lecturers are very approachable and I would encourage anyone who is doing this course to ask questions if they are having difficulties and they will help you also to avail of the new support SUMS Centre.”

Special features of this course

This programme not only contains core mathematics courses, it also has a number of customised lecture courses designed with the concerns of the second-level mathematics teacher in mind. Is féidir an chúrsa (Mata) a bhaint trí Ghaeilge sa chéad bhliain. Extensive use is made of mathematical software (geogebra, Maple, LaTeX)

Work placement

There are a variety of practical teaching experiences throughout this programme, in post-primary schools and other educational settings.

Career opportunities

While this programme will produce excellent post-primary mathematics teachers, graduates are not limited to teaching. Mathematics graduates have a wide range of career options including IT, finance, actuarial work and academia, as well as a wide range of educational careers in the further and higher education sectors.

Find out more:
School of Mathematics, Statistics & Applied Mathematics
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School of Education
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www.nuigalway.ie/education

“Education is the acquisition of the art of the utilisation of knowledge” - A.N. Whitehead

Mathematical Science

The Bachelor of Science (Mathematical Science) is a new four year honours degree programme that covers diverse aspects of Mathematics and its applications, giving students a solid foundation in the Mathematical Sciences. As students advance through the programme they will have the opportunity to specialise in subjects such as Mathematics, Applied Mathematics, Theoretical Physics, Financial Mathematics, Computer Science, Statistics and Bioinformatics.

Course Facts

Bachelor of Science (Mathematical Science)	
CAO Code:	GY319
Entry points (2011):	455
Duration:	4 years
Average intake:	20
Entry requirements	Minimum Higher C3 in two subjects and passes in four other subjects at Higher or Ordinary Level in the Leaving Certificate including: Irish, English, Mathematics, a laboratory science subject (i.e. Chemistry, Physics, Biology, Physics with Chemistry (joint) or Agricultural Science) and any two other subjects recognised for entry purposes.
Additional requirements	HC3 or OA2 is required in Mathematics.



Did you know

Student Undergraduate Mathematics Support - We provide a SUMS Centre for our students. This is a centre where students can come and work on their maths or stats problems in an informal environment. SUMS is staffed by a team of friendly and experienced tutors who are ready for your questions.

Course Outline

Year 1

- Applied Mathematics
- Computer Science
- Mathematics
- Probability and Statistics
- One of: Biology, Chemistry, Earth and Ocean Sciences, Physics

Year 2

Curriculum core consists of components from the following subjects:

- Linear Algebra
- Discrete Mathematics,
- Analysis
- Probability
- Statistical Inference
- Mechanics
- Mathematical Methods

Up to one third of second-year curriculum content can be selected from a list of additional options. Some options are offered from within the School such as, Numerical Analysis, Mathematical Biology, Programming and Operating Systems, Algorithms and Scientific Computing Methodology or Information Systems and some options available from within other Science subjects, subject to first year prerequisites.

Year 3 and 4

Selection of specialised subjects from chosen areas of the Mathematical Sciences. Choices are flexible and possibilities include:

- Mathematics, Statistics and Computing: Metric spaces, Topology, Groups, Measure Theory, Functional Analysis, Rings, Field Theory, Numerical Analysis, Applied Statistics, Stochastic Processes, Annuities & Life Assurance, Actuarial Mathematics, Life Contingencies, Bioinformatics, Cryptography, Mathematical and Logical aspects of Computing, Networking, Elements of Software Engineering, Object Oriented Programming, Advanced programming, Artificial Intelligence, Neural Network, Graphics and Image Processing, Human Computer Interaction.
- Applied Mathematics: Non Linear Systems, Non Linear Elasticity, Quantum Mechanics, Partial Differential Equations, Electromagnetism, Fluid Mechanics, Modelling, Cosmology and General Relativity.
- Final Year Project.

Career opportunities

Career opportunities for graduates in the Mathematical Sciences are diverse. Our graduates are employed in many different sectors such as Financial and Actuarial services, Teaching, IT, Pharmaceuticals, Clinical research, Meteorology and in the Civil Service.

Further education

Graduates have a broad range of options for postgraduate work available to them. Opportunities for postgraduate research including MSc or PhD programmes exist at NUI Galway and further afield in all areas of the Mathematical Sciences. Interdisciplinary research opportunities are also available. For graduates who wish to broaden their general mathematical education before embarking on research, they can earn an MSc in Mathematical Science through further course work.

What our lecturers say...

Dr Emma Holian
Lecturer in Statistics

"If you are strong in mathematics and curious to explore mathematical applications in science then this degree programme is for you. The programme offers the foundation to each of the main mathematical disciplines in first and second year, while the vast choice of courses offered in the latter years of the degree allow you to specialise in topics of interest to you. This flexibility combined with the opportunity to see how mathematics impacts developments in numerous fields of scientific discovery makes the programme a very attractive choice with many interesting career opportunities."

What our students say...

Kyra Coyne,
2nd year student.

"For me, maths was a passion in school so when I heard about this course I knew it was for me. In second year we get to sample the many strands of maths before choosing one next year. Each day is a challenge and each day my curiosity and love of Maths grows."

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If you think you'd like to study towards a mathematical degree but want to keep your options open...

The majority of students in the College of Science opt for the 4-year undenominated honours BSc degree. In their first year students choose four subjects from Mathematics, Applied Mathematics, Computing, Biology, Chemistry, Physics, Earth and Ocean science. Students typically retain two principal subjects in their second year. They pursue one main subject in their third and fourth years.

There are three undenominated mathematical BSc degrees:

BSc in Mathematics

Students take Mathematics as one of their first and second year subjects. They specialize in Mathematics in their third and fourth year. (CAO code GY301)

BSc in Applied Mathematics

Students take Applied Mathematics as one of their first and second year subjects. They specialize in Applied Mathematics in their third and fourth year. (CAO code GY301)

BSc in Computing

Students take Computing and Mathematics as two of their first and second year subjects. They specialize in Computing and Mathematics in their third and fourth year. (CAO code GY301).

If you'd like to study for an Arts degree in Mathematics and some other subject

The Bachelor of Arts (BA) is a broad 3-year degree. Four subjects are taken in First Arts from the 21 subjects on offer. In Second Arts, two of the subjects chosen at First Arts are pursued and these two subjects are completed in Final Arts. An advantage of the wide choice available, and of having to take four subjects, is the opportunity to take new subjects and to make interesting combinations of familiar and new subjects. There are two mathematical BA degrees:

BA in Mathematics and another subject

Students take Mathematics as one of four subjects in their first year, and as one of two subjects in their second and third years. (CAO code GY109)

BA in Mathematical Studies and another Arts subject

Students take Mathematics as one of four subjects in their first year. They take Mathematical Studies as one of two subjects in their second and third years. (CAO code GY109)

Did you know

"Mathematician" and other jobs relying heavily on mathematical skills (Actuary, Statistician, Computer Programmer and Analyst, etc.) consistently rank among the 10 "best jobs in the world" for best work environment, low physical and stress demands, better than average salaries and strong hiring prospects.

Applied Mathematics

Applied Mathematics uses mathematical tools to address real-world problems. In Applied Mathematics we construct mathematical models to explain what we know and (hopefully) to predict what we don't know, about a given set of objects and circumstances. The problems investigated arise in Physics, Chemistry, Biology, Economics, Computer Science, Engineering, Mechanics, Social Sciences and many others fields.

Why study Applied Mathematics?

Applied Mathematics has appeal for all who are interested in the use of mathematics to understand, model and interpret not only Nature but also the engineering world around us. A good aptitude for Mathematics is recommended for those who wish to pursue advanced studies in Applied Mathematics beyond first year.

Career opportunities

Skills acquired through the study of Applied Mathematics – the ability to develop mathematical models and to apply them in practical setting – will prove to be extremely useful and will be highly valued by an employer. Graduates have found employment in Met Éireann, the Central Statistics Office, telecommunications, the computer industry, financial and actuarial institutions, industrial research and development, teaching and research institutes.

If you like Physics AND Applied Mathematics

Consider one of the following degrees:

Undenominated BSc in Physics and Applied Mathematics (GY301, last intake September 2012)

Denominated BSc in Physics with option in Theoretical Physics (first intake September 2013)

Find out more:

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