



BSc FINANCIAL MATHEMATICS & ACTUARIAL SCIENCE

Course Code: CK407 Mathematical Sciences

Duration: 4 years

Further Information:

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Why study Financial Mathematics and Actuarial Science?

In recent times there has been a revolution in the extent of the application of mathematics to finance and investment. This has been driven by breakthroughs in the mathematical valuation of complicated financial transactions. Financial decision making has been transformed by the development of sophisticated mathematical models, and their computer implementations, that have in turn allowed the introduction of financial and insurance products of increasing complexity. These developments have led to increasing demand by the finance and insurance industry for graduate mathematicians who are knowledgeable about Financial Mathematics.

Actuarial Science is the discipline which assesses risk in the insurance and financial industries. The applications of Actuarial Science are quite diverse, ranging from assessment of life risks to the costing of insurance premiums, the formulation of investment strategies, and the design of pension plans. Central is the prediction of the longer term financial consequences of current and past decisions, taking due account of various risk factors. Consequently mathematical models for uncertainty, as provided by the theory and methods of probability and statistics, are fundamental to the work of the actuary.



Programme Overview

The UCC programme emphasises the fundamental Mathematics and Statistics that support Financial Mathematics and Actuarial Science, and the coverage of both of these areas in the programme reflects the developing interactions between Financial Mathematics and Actuarial Science. Furthermore, the breadth of the programme is intended to avoid over-specialisation at too early a stage in the student's academic studies, while still providing valuable education in key areas of the financial and insurance industry.

This degree programme is offered by the School of Mathematical Sciences and provides a solid education in the fundamentals of Financial Mathematics and Actuarial Science, as well as a strong grounding in the core disciplines of the Mathematical Sciences.

Career Opportunities

Graduates of Financial Mathematics and Actuarial Science can look forward to careers offering intellectual challenge, professional status, job satisfaction and high earnings. Designing solutions to mathematical problems involving financial risk or future uncertainty places them among the most highly-valued professionals in the financial world. The recent past has seen enormous growth in the financial services industry world-wide. This, together with the increasing sophistication of modern financial products, has led to increasing demand for graduates from the areas of Financial Mathematics and Actuarial Science. Graduates of the BSc (Hons) programme in Financial Mathematics and Actuarial Science who wish to pursue an actuarial career may qualify for exemptions from a number of the professional actuarial examinations, depending on their performance and choice of electives, and will have a thorough preparation to enable them to undertake the remaining examinations. It must also be emphasised that this degree programme provides an excellent education in the Mathematical Sciences, as well as a preparation for a career with a financial focus.



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What will you be studying?

Year 1

Core Modules:

- Introduction to Mechanics (5 credits)
- Introduction to Mathematical Modelling (5 credits)
- Mathematical Software (5 credits)
- Calculus (5 credits)
- Introduction to Analysis (5 credits)
- Introduction to Abstract Algebra (5 credits)
- Introduction to Linear Algebra (5 credits)
- Introduction to Probability and Statistics (5 credits)

Elective Modules: (20 credits chosen from)

- Business Finance (10 credits)
- Market Analysis (10 credits)
- Computer Science (15 credits)
- Physics (20 credits)

Year 2

Core Modules:

- Introduction to Financial Mathematics
- Discrete Time Financial Models
- Fourier Methods
- Mathematical Analysis I
- Ordinary Differential Equations
- Linear Algebra
- Multivariable Calculus
- Probability and Mathematical Statistics
- Introduction to Regression Analysis
- Financial Modelling for Actuarial Science I

Year 3

Core Modules:

- Derivatives, Securities and Option Pricing
- Financial Modelling for Actuarial Science II
- Mathematical Analysis II
- Statistical Theory
- Stochastic Modelling I
- Generalised Linear Models
- Stochastic and Survival Models for Actuarial Science
- C/C++ Programming with Applications

Elective Modules: Students can choose a range of modules in the area of Mathematics, Statistics and Applied Mathematics

Year 4

Core Modules:

- Continuous Time Financial Models
- Computational Finance
- Project
- Stochastic Modelling II
- Statistical Methods for Insurance
- Measure Theory and Martingales
- Time Series
- Project

Elective Modules: Students can choose a range of modules in the area of Mathematics, Statistics and Applied Mathematics

Postgraduate Opportunities in UCC

Graduates can undertake a wide range of one year fulltime (or two year part-time) professional diplomas, as well as research MSc and PhD degrees.

Graduate Profile

Conor Twomey

BSc (Hons) (Financial Mathematics and Actuarial Science) 2008

**Position: Financial Engineer,
First Derivatives plc, New York City.**



When I was in school I enjoyed working on problems that I came across while studying maths and the idea of solving complex problems in the financial world was something that really appealed to me.

The classes and courses that I took as part of the Financial Mathematics and Actuarial Science (FMAS) programme at UCC provided me with the skill-set and knowledge needed to enter the finance industry. When I graduated it was a very interesting and volatile time in the world of financial markets. The need for graduates with a strong foundation in quantitative, numerical and analytical skills increased despite a slowing economy. I work as a Financial Engineer for a Northern Ireland based consultancy firm, First Derivatives Plc, and with them I have spent significant time in London, New York and Tokyo working as a consultant for three of the world's biggest financial houses. Whether I am building trading algorithms on a trading desk or designing multi-billion dollar risk systems, I find that I am constantly using the skills acquired from the FMAS programme. The course has gained great recognition since its inception in 2002 and I would thoroughly recommend the FMAS degree programme to anyone who is looking for a challenging and very rewarding course of study.

Entry Requirements

Minimum HC3 in two subjects & passes in four subjects at H or O level in the Leaving Certificate, from Irish, English, Mathematics and three other subjects recognised for entry purposes. Additional programme requirements include HB3 in Mathematics in the Leaving Certificate. In addition students must have the requisite points for entry to this particular course.



For further information contact:
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