Financial Mathematics and Actuarial Science

BSc

College of Science, Engineering and Food Science

UCC
University College Cork, Ireland
Coláiste na hOllscoile Corcaigh

CK407

Introduction
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.

Why Study
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.

Graduates who wish to pursue an actuarial career may qualify for exemptions from some of the professional actuarial examinations (CT1–CT8), depending on performance and choice of electives, and will have the necessary preparation to undertake the remaining Actuarial examinations.

Careers
Designing solutions to mathematical problems involving financial risk or future uncertainty, places graduates among the most highly-valued professionals in the financial world. This, together with the increasing sophistication of modern financial products, has led to an increasing demand for graduates from the areas of Financial Mathematics and Actuarial Science.

Further Study
- One year full time (or two years part-time) professional diplomas
- Research MSc
- PhD.

DEGREE OUTLET
COURSE PAGE ONLINE
www.ucc.ie/en/ck407/financial-actuarial

CONTACT INFORMATION
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NIALL O'MAHONY
BSC FINANCIAL MATHEMATICS & ACTUARIAL SCIENCE, YEAR 4.

"The wide range of skills taught on the course, and the supportive nature and industry knowledge the lecturers possess, enabled me to excel very quickly. Choosing FMAS equipped me with the professional skills and knowledge for a promising career in the actuarial industry."

#uccmakeyourmark

KEY FACTS

- **The programme provides a solid education in the principles of financial mathematics and actuarial science and a grounding in the core disciplines of the mathematical sciences**
- **The programme emphasises the fundamental mathematics and statistics that support financial mathematics and actuarial as well as the developing interactions between financial mathematics and actuarial science**
- **The breadth of the programme avoids early over-specialisation and provides valuable education in key areas of the financial and insurance industry**

Year 1 Modules

CORE: AM1052 Introduction to Mechanics (5 credits); **AM1053** Introduction to Mathematical Modelling (5 credits); **AM1054** Mathematical Software (5 credits); **MA1057** Introduction to Abstract Algebra (5 credits); **MA1058** Introduction to Linear Algebra (5 credits); **MA1059** Calculus (5 credits); **MA1060** Introduction to Analysis (5 credits); **ST1051** Introduction to Probability and Statistics (5 credits)

ELECTIVES: AC1107 Investment in Capital Assets (5 credits); **AC1108** Introduction to Valuation and Risk (5 credits); **BL1006** Habitats and Eco Systems (5 credits); **CM1006** Introduction to Chemistry for Physicists and Mathematicians (10 credits); **CS1061** Programming in C (5 credits); **CS1065** Computer Applications with Visual Basic (5 credits); **CS1069** Introduction to Internet Technologies (5 credits); **EC1213** Principles of Economic Analysis 1 (5 credits); **EC1214** Principles of Economic Analysis 2 (5 credits); **PA1003** Principles of Market Analysis (10 credits); **GL1001** Introduction to Geology (5 credits); **PY1052** Introductory Physics I (10 credits); **PY1053** Introductory Physics II (10 credits); **PY1054** Special Topics in Physics (5 credits)

Year 2 Modules

Fourier Methods; Mathematical Analysis; Ordinary Differential Equations; Linear Algebra; Multivariable Calculus; Discrete Time Financial Models; Financial Mathematics; Financial Modelling for Actuarial Science; Regression Analysis; Probability & Mathematical Statistics

Year 3 Modules

CORE: C/C++Programming with Applications; Mathematical Analysis; Derivatives, Securities & Option Pricing; Financial Modelling for Actuarial Science; Stochastic Modelling; Generalised Linear Models; Statistical Theory of Estimation; Statistical Theory of Hypothesis Testing

ELECTIVES: International Finance; Mathematical Modelling; Computer Modelling & Numerical Techniques; Vector & Tensor Methods; Partial Differential Equations with Applications; Computational Techniques; Complex Analysis; Metric Spaces & Topology; Principles of Market Analysis; Survival Analysis; Stochastic & Survival Models for Actuarial Science; Methods of Reporting in Actuarial Science

NOTE: Choice of Electives in Year 3 will have a direct bearing on the number of recommendations for exemptions from professional actuarial examinations for which a FMAS graduate may be eligible.

Year 4 Modules

CORE: Measure Theory & Martingales; Continuous Time Financial Models; Computational Finance; Stochastic Modelling; Statistical Methods in Insurance; Time Series

ELECTIVES: Securities Analysis; Empirical & Behavioural Finance; Corporate Financing; International Finance; Vector & Tensor Methods; Nonlinear Dynamics & Control; Partial Differential Equations with Applications; Computational Techniques; Topics in Applied Mathematics; Applied Stochastic Differential Equations; Perturbation & Asymptotic Methods; Complex Analysis; Metric Spaces & Topology; Functional Analysis; Project; Topics in Modern Algebra; Topics in Differential Geometry; Survival Analysis; Stochastic & Survival Models for Actuarial Science; Financial Mathematics Project; Methods of Reporting in Actuarial Science; Statistical Consulting; Statistical Methods in Insurance; Practical Implementation of Statistical Analysis Techniques; Contingencies; Computational Statistical Methods for Actuarial Science