ACTUARIAL SCIENCE AND FINANCIAL MATHEMATICS

Canterbury
ACADEMIC EXCELLENCE AND INSPIRATIONAL TEACHING

The University of Kent is a highly rated university, ranked in the top 20 in The Guardian University Guide 2015. All of our schools produce world-leading research and Kent is rated as internationally excellent, leading the way in many areas of study.

World-leading research
Research at Kent is rated as internationally excellent and academics within our School are at the forefront of their fields. In the most recent assessment of research quality across UK universities, 65% of our statistics and operational research and 45% of our applied mathematics research were rated ‘world-leading’ or ‘internationally excellent’.

Teaching excellence
The University of Kent is one of a limited number of universities in the UK to teach actuarial science. Actuaries evaluate and manage financial risks, particularly in the financial services industry. They form a small, yet well respected, influential and relatively well-paid profession. If you are good at mathematics and are curious about financial matters, you should enjoy studying actuarial science.

All of the compulsory actuarial science modules are taught by qualified actuaries with many years’ practical experience in consultancy or the insurance industry.

Our Financial Mathematics degree combines mathematical rigour with a practical approach to the skills and techniques used in finance.

Most of the teaching is by lectures and examples classes. You can go to regular supervised classes where you can get help and advice on the way you approach problems. For further help, you can consult individual lecturers during their office hours. We also make full use of email and the virtual learning environment MOODLE. Modules which involve programming or working with computer software packages usually have practical sessions associated with them.

Our school is friendly and supportive and we make a point of trying to get to know our students on a one-to-one basis.

A global outlook
Kent is known as the UK’s European university because of its strong links with top-ranking continental European institutions. Our international reputation attracts a high proportion of students from overseas; in 2013/14, 27% of our students came from countries outside the UK and we have students from 149 nationalities represented on campus. In addition, 38% of our research and academic staff are from outside the UK, creating a cosmopolitan atmosphere and a global learning environment.

The international environment of the School of Mathematics, Statistics & Actuarial Science gives you the chance to look at the subject from a wide range of perspectives. Many of our staff speak a second language or undertake fieldwork abroad.

Professional exemption
For students who wish to qualify as actuaries, recognition of our degree by the Actuarial profession is very important. Our actuarial science programmes are fully accredited by the UK Actuarial profession. Our BSc in Actuarial Science gives you the chance to gain exemptions from eight of the Core Technical subjects (CT1 to CT8) of the professional examinations set by the UK Actuarial profession, and provides you with a firm foundation for the later subjects. If you do well enough in your degree to obtain the full set of exemptions available, you could reduce your time qualifying as an actuary by three years or more.

International recognition
The British actuarial qualifications – Fellowship of the Institute of Actuaries (FIA) or Fellowship of the Faculty of Actuaries (FFA) – are highly valued throughout the world and so are ideal if you are an

DID YOU KNOW?
According to The Guardian University Guide 2015, 85% of Mathematics students at Kent were satisfied with the quality of their course.
Actuarial students get practical experience of working with PROPHET, the market leading actuarial software package, which is used by commercial companies worldwide for profit testing, valuation and model office work. This software package is provided by SunGard, a global leader in providing software solutions for financial services.

**Invicta Actuarial Society**

The Invicta Actuarial Society is a regional actuarial society organised by Kent students and academic staff. Meetings on campus are attended by practising and visiting actuaries who present current research and business problems and provide valuable contact between students and employers.

**Industry experience**

You may choose to spend an additional year working on a placement with an industrial or business organisation, either in the UK or abroad. This gives you the opportunity to put your academic skills into practice and get some paid work experience. It also gives you an idea of your career options and greatly enhances your CV. Prior experience of working in industry is always popular with employers and some Kent students return to work full-time for their placement company. Recent placements have included EY (formerly Ernst & Young); Goldman Sachs; RSA; Deutsche Bank and Travelers insurance.

A successful future

As well as providing a first-rate academic experience, we want you to be able to face the demands of a tough economic environment. During your study, you develop key transferable skills considered essential for a successful career.

For more information on the careers help we provide at Kent, see p8 or our Employability webpage at www.kent.ac.uk/employability
DID YOU KNOW?
Kent has a cosmopolitan community with students representing 149 nationalities.
SUPERB STUDENT EXPERIENCE

Our campus at Canterbury provides a stunning location for your studies and offers first-class academic and leisure facilities. The campus benefits from a multicultural learning environment and is within easy reach of both London and mainland Europe.

Diverse environment
Our students come from a variety of backgrounds. There is always a number of mature students with work experience, as well as an increasing number of students from overseas. This mix means you not only learn from your lecturers, but also from the experiences of your peers.

Beautiful green campus
Our campus is set in 300 acres of parkland and has plenty of green and tranquil spaces, both lawns and wooded areas. It is set on a hill with a view overlooking the city and Canterbury Cathedral.

For entertainment, the campus has its own cinema, theatre, and a student nightclub. It has a reputation for being a very friendly university with a cosmopolitan environment. There are many restaurants, cafés and bars on campus, as well as a sports centre and gym.

Everything you need on campus is within walking distance, including a general store, an off-licence, a bookshop, a bank, a medical centre and a pharmacy. From campus, it’s a 25-minute walk or a short bus-ride into town.

Attractive location
Canterbury is a lovely city with medieval buildings, lively bars and atmospheric pubs, as well as a wide range of shops. The attractive coastal town of Whitstable is close by and there are sandy beaches further down the coast. London is under an hour away by high-speed train.
Christopher Ju Leong Low is in his third year, studying for a BSc in Actuarial Science.

What attracted you to studying at Kent?
The Actuarial Science programme at the University of Kent is one of the best in the country because it offers eight exemptions from the professional papers. Kent has a huge campus, a vibrant student community and excellent facilities.

How is your course going?
I enjoy solving problems and dealing with numbers. In the first year, the modules were very numerical, very analytical, which I enjoy. I like applying mathematics to solve a problem.

How would you describe your lecturers?
They are very friendly and approachable and have office hours when you can go and ask them how to solve a problem. The lecturers have different teaching techniques. The lecturers at Kent are mostly qualified actuaries, so they include their own practical experiences in their teaching, which is very useful.

What do you think about the level of support in your studies?
The lecturers are supportive and have revision classes towards the exam period and go through exercises with us. The VALUE Programme offers extra help towards exams, too.

Which modules have you enjoyed the most, and why?
In my first year I really enjoyed Financial Mathematics, because it involves a lot of numerical and analytical thinking. You have to look at a situation and think how to approach that problem and come up with formulas to solve it. For example, if premiums are paid every month, quarterly or half-yearly you have to work out cost formulas from the numbers, which I enjoy doing. In the second year, I enjoyed Contingencies, which is similar to Financial Mathematics but is more of a survival model.

How would you describe your fellow students?
They are friendly and supportive. There are a lot of international students here, and it’s good to get to know people from around the world. It was my first time away from home and at first it was quite challenging, but with friendly students around it made it easier to cope with the new lifestyle.

What are the facilities like on campus?
One of the main reasons I chose Kent was because of the facilities. I enjoy playing football; there are three football pitches here and the gym facilities are much more affordable than in London. The University has refurbished the equipment in the gym, so it’s even better now. I also like the library, which has a café so, if you want to take a break or get something to eat, you don’t even have to leave the building.

What sort of things do you do in your spare time?
I am more active in societies this year; the Malaysian Society held an event that involved performing activities reflecting our culture and I took part in a dance. As a mathematics student you don’t often get a chance to perform like this in front of a crowd, so it was a chance to do something different.

What kind of career do you hope to follow when you leave, and why?
It is my dream to be an actuary because there are many different fields you can go into: pensions, insurance, investment banking, risk management… but it’s a very competitive field. A good thing about the degree at Kent is that it offers you a chance to do a placement year and work in a company between your second and third year.

I got a summer internship with Santander, working in the risk department. I would like to work in Britain because the actuarial industry is more established here and you get more hands-on experience. Later, I hope to return to Malaysia to work.

What advice would you give to other students coming to Kent?
I would say don’t procrastinate over your revision! Enjoy the first year, ease yourself into university life, find your feet and make friends… it’s important to make friends with the right people because they are a positive influence in your studies.
A SUCCESSFUL FUTURE

Kent equips you with essential skills to give you a competitive advantage when it comes to getting a job and the University is consistently in the top 20 for graduate starting salaries. Six months after graduation in 2013, less than 6% of Kent graduates were without a job or a further study opportunity.

Good career prospects
The UK actuarial profession is small but influential and well rewarded. Our actuarial graduates have found work in insurance companies and consultancy practices, the Government Actuary’s Department, the London Stock Exchange and other areas of financial management, or have gone on to further study. Graduates in Financial Mathematics have found employment in banking, insurance, equity and commodity trading.

All of the School of Mathematics, Statistics & Actuarial Science three-year undergraduate programmes, except Mathematics with Secondary Education (QTS), offer the chance of a one-year placement between the second and final year of study.

This Placement Year is also known as a Year in Industry. Among the advantages of undertaking a placement year are that you gain relevant work experience; it’s a chance to try a career and to earn a salary and you may be offered a graduate job at the end of your placement, and an actuarial placement, in a relevant area, may count towards the work experience required for Actuarial profession qualifications.

Gain transferable skills
Through your studies, you acquire communication, time-management and planning skills, the ability to work in a team and independently, and learn how to present information clearly and concisely.

Careers advice
The Careers and Employability Service can give you advice on how to choose your future career, how to apply for jobs, how to write a good CV and how to perform well in interviews and aptitude tests. It also provides up-to-date information on graduate opportunities before and after you graduate.

Further information
For more information on the careers help we provide at Kent, see our Employability webpage at www.kent.ac.uk/employability

“This course has given me the skills to tackle real-world problems and work well within a team, which I believe has provided me with a solid foundation on which I can build a career.”

Krishan Dhanjee
Financial Mathematics
Vikram Joshi studied Actuarial Science at Kent and graduated in 2012. He is now working for AXA Insurance in London.

Why did you choose to study at Kent?
I was attracted by the University and the campus. Out of a very few universities that teach Actuarial Science, only Kent offered the opportunity of eight professional exemptions. Also, being in Canterbury allowed me to live away from home for three years, which was an amazing experience.

What attracted you to the course?
The opportunity to obtain so many professional exemptions. I wanted to be an actuary, so I knew this course would be perfect to help me achieve that goal.

What was your degree like?
It was intense but enjoyable. I had to make sure I stayed on top of everything, especially in the second and third year, where the subjects became more challenging.

How did your degree lay the foundations for your chosen career path?
Studying actuarial science gave me a strong foundation in the concepts of the profession, which I believe set me apart from other candidates who had studied straight maths.

How do the skills you gained at Kent help you in your present career?
I learnt how to discipline myself when it comes to exams, alongside balancing a social life. These are useful skills in the workplace, where you have deadlines and need to focus on the task at hand.

How did your career progress after graduation?
After graduation I enjoyed the summer, then I concentrated on job applications, alongside working part-time at Tesco (I believe a part-time job, no matter what it is, is crucial). My supermarket job allowed me to build many competencies for interviews. After three months of rejections I finally got an offer from AXA – and here I am as an Actuarial Analyst.

What advice would you give to someone thinking of coming to Kent?
Work hard, play hard.

Ming Jie Hao graduated in 2012 with a BSc in Actuarial Science and is now studying for a PhD in Applied Actuarial Science.

Why did you choose to study at Kent?
Kent is one of the few universities in the UK that offer exemptions from professional exams and the compulsory modules are taught by qualified actuaries with years of experience in industry.

How did your degree course lay the foundations for your chosen career path?
It provided a solid technical foundation for my chosen career path and it encompassed most of the foundational knowledge used in daily actuarial work: valuation, pricing, reserving and so on. And professional exemptions make you stand out from other graduates. It also polished my interpersonal skills, such as communication, team working, problem solving and time management, all of which are crucial in the workplace.

What are your future plans?
After gaining my MSc, I hope to get a consulting role in an actuarial firm, and strive to achieve my dream of becoming a professional actuary.

Do you have any other memories of Kent that you would like to share with us?
The International Development team hold events for international students, such as celebrations for Chinese New Year and parties for international students who stay at the University during holidays, which is always fun.

Finally, what advice would you give to someone thinking of coming to Kent?
Kent is a nice place to live and study. The high quality teaching standards and close links with industry build a bridge between academic excellence and practical applications. I recommend Kent as the place where you can start your dream.
Not sure which degree programme to choose? Here’s a quick guide to the degrees on offer within the School.

**Actuarial Science**
This three-year full-time programme can get you well on the way to becoming a fully qualified actuary. It is an excellent foundation for careers in many other areas of finance and risk. As well as developing a core understanding of mathematical and statistical methods, the course offers the opportunity to gain exemption from eight of the Core Technical Subjects (CT1 to CT8) of the professional examinations of the Institute and Faculty of Actuaries. The programme is fully accredited by the UK Actuarial profession.

**Financial Mathematics**
This programme, studied over three years, empowers students to master general mathematical principles while gaining specialist skills relevant to the financial sector. The first year gives a solid grounding in mathematics, economics, statistics and financial concepts. In the remaining years, you build on these areas and learn more about the applications of mathematics and statistics to financial problems and the skills required. The final year includes project work and a choice of modules, giving the opportunity to specialise in areas of mathematics that hold a particular interest for you.

**Year in Industry**
With either of these programmes, you may choose to spend an additional year working on a placement with a business organisation. This allows you to hone your theoretical skills by applying them to real-life situations. It also gives you a clearer idea of career options and greatly enhances your CV. The Year in Industry takes place between your second and final years of full-time study and counts towards your final degree result. The Placement Officer is on hand to assist you before and throughout your placement.

**Foundation year**
Students without the background to go directly into degree-level studies can gain entry to the BSc in Financial Mathematics by completing a foundation year in Mathematics. The foundation year covers the mathematical skills you need to enter Stage 1 of the degree.

There is no foundation-year entry route directly into Actuarial Science, but if you wish to study Actuarial Science and you come from a region where A levels or equivalent qualifications are not available, you could consider entry via a Foundation Year in Mathematics followed by enrolling in a BSc in Financial Mathematics. It is possible, subject to conditions, to transfer to the BSc Actuarial Science degree for Stages 2 and 3.

We do not recommend the Foundation Year in Mathematics as an entry route to Actuarial Science if you can take A levels or equivalent qualifications instead.

For details of other undergraduate degrees offered by the School of Mathematics, Statistics & Actuarial Science, see: [www.kent.ac.uk/smsas](http://www.kent.ac.uk/smsas)

You can order subject leaflets or download a pdf at: [www.kent.ac.uk/studying/leaflets](http://www.kent.ac.uk/studying/leaflets)
STUDYING AT STAGE 1

Stage 1 represents the first year of your degree programme. At Stage 1, the marks do not count towards your final degree result.

In the first year, and to a lesser extent in the second year, both the Actuarial Science and Financial Mathematics programmes have some overlap with other mathematical degrees. This gives you the flexibility to transfer to certain other degrees at the end of your first year or, in some cases, at the end of your second year.

Transfer from Actuarial Science into Financial Mathematics after successfully completing Stage 1 is usually possible without any special requirements. Transfer from Financial Mathematics into Actuarial Science at the end of Stage 1 is possible for students meeting a minimum standard who undertake some self-study during the vacation period before Stage 2.

In the first year, all Actuarial Science and Financial Mathematics students take the following modules:
- Business Economics
- Calculus and Mathematical Modelling (counts as two modules)
- Matrices and Computing
- Proofs and Numbers.

Actuarial Science students also take:
- Financial Mathematics (counts as two modules)
- Probability and Statistics for Actuarial Science.

Financial Mathematics students also take:
- Finance 1
- Introduction to Financial Concepts
- Statistics.

Calculus and Mathematical Modelling

In the first part of the module, we take a calculus approach to mathematical analysis and provide rigorous proofs of various fundamental results in classical analysis. In the second part, the calculus techniques are used to solve differential and difference equations; numerous applications are discussed.

Finance 1

This module builds on the compound interest concepts studied in Introduction to Financial Concepts. The concepts are applied to analyse elementary compound interest problems and to carry out the valuation of different kinds of cash flow streams.

CONTINUED OVERLEAF
**Financial Mathematics**

This module introduces the concept of 'interest', the price for the use of money, which is fundamental to all long-term financial contracts. Interest is said to be 'compounded' if interest is payable on the interest previously earned. This module deals with accumulation of past payments and the discounting of future payments at fixed and varying rates of compound interest. The concepts are applied to analyse various financial problems and to carry out the valuation of different kinds of cash flow streams.

**Introduction to Financial Concepts**

This module introduces two concepts that are fundamental to the theory and practice of finance: probability and compound interest. The probability component introduces the main concepts in elementary probability theory, and lays the foundations for the Statistics module which follows. The second component introduces the idea of 'interest', the price for the use of money. Interest is said to be 'compound' if interest is payable on the interest previously earned. This module deals with accumulation of past payments and the discounting of future payments at fixed and varying rates of compound interest.

**Matrices and Computing**

This module involves two parts (a) computing and (b) matrix algebra. The first part provides an introduction to some basic IT using the MAPLE, EXCEL and R packages as principal models for mathematical, spreadsheet and statistical applications. The introduction to MAPLE covers elementary functions and commands. The introduction to EXCEL covers the efficient use of spreadsheets. In the introduction to R, you learn the elementary commands and actions that are necessary for basic plots and data handling.

The second part serves as an introduction to matrix algebra and the ideas of linear spaces, starting with the systematic solution of systems of linear equations. Topics include: systems of linear equations and Gaussian elimination; determinants; Eigenvalues and Eigenvectors; vector spaces; vectors in dimensions two and three and linear systems of differential equations.

**Proofs and Numbers**

Numbers and proofs are central notions in modern mathematics that have not only found applications in many other sciences but also in our everyday life. For instance, the security of our mobile phones relies on properties of integers. In this module you are introduced to some of the fundamental results in number theory, and gain an appreciation of the concept of proof in mathematics.

**Statistics**

This module introduces you to the basic concepts of statistics. The material is related to real data at every stage and MINITAB is used to provide statistical computing facilities for all the material studied. Data description and data summary are studied, followed by an introduction to the main methods of inference. Most material is based on the Normal, t, and F distributions, but some simple non-parametric procedures are also covered. Topics covered in the module include: graphical representation of data; numerical summaries of data; sampling distributions; point estimation; interval estimation; hypothesis tests; association between variables and an introduction to nonparametric procedures.
STUDYING AT STAGES 2 AND 3

Stages 2 and 3 represent the second and final years of your degree programme.

Both your second and final-year marks count towards your final degree result. Most modules are assessed by a combination of end-of-year examinations and coursework.

In the second year, all Actuarial Science and Financial Mathematics students take the following modules:
• Analysis
• Linear Algebra.

Actuarial Science students also take:
• Actuarial Practice
• Contingencies 1
• Corporate Finance for Actuaries
• Financial Reports and their Analysis

Financial Mathematics students also take:
• Corporate Finance for Financial Mathematicians
• Economics 2
• Portfolio Theory and Asset Pricing Models
• Probability and Inference
• Probability and Measure Theory
• Regression.

In their final year, Actuarial Science students take:
• Contingencies 2
• Financial Modelling
• Mathematics of Financial Derivatives
• Portfolio Theory and Asset Pricing Models

Financial Mathematics: Stage 3 is currently undergoing some review. Probable modules include:
• A mini-projects module tailored towards financial topics
• Mathematics of Financial Derivatives
• Stochastic Processes
• Time Series Modelling and Simulation.

And four further modules chosen from:
• Analysis of Variance
• Applied Stochastic Modelling and Data Analysis
• Calculus of Variations
• Computational Mathematics*
• Discrete Mathematics
• Elements of Abstract Analysis
• Games and Networks
• Groups and Representations
• Groups and Rings*
• Linear Programming and its Applications
• Mathematical Techniques and Differential Equations*
• Nonlinear Systems and Mathematical Biology
• Numerical Solutions of Differential Equations
• Polynomials in Several Variables
• Practical Multivariate Analysis
• Several Variable Calculus.*

We expect to add another optional module on stochastic calculus.

*Students may take no more than three out of the four modules marked with an asterisk.

CONTINUED OVERLEAF
STUDYING AT STAGES 2 AND 3 (CONT)

Modules: Stage 2

Analysis
The concept of a limit is basic to calculus and, unless this concept is defined precisely, uncertainties and paradoxes will creep into the subject. Based on the foundation of the real number system, this module develops the theory of convergence of sequences and series and the study of continuity and differentiability of functions. The notion of Riemann integration is also explored.

Contingencies I
This module introduces the concept of survival models, which model future survival time as a random variable. The concept is combined with the financial mathematics learnt in the first year, making it possible to analyse simple contracts which depend on survival time, such as life insurance and annuities.

Corporate Finance for Actuaries
This module introduces and develops the concepts and elements of corporate finance, including a knowledge of the instruments used by companies to raise finance and manage financial risk.

Corporate Finance for Financial Mathematicians
This module provides a broad introduction to corporate finance. Sufficient basic accounting concepts are covered to underpin the corporate finance topics, which include:
• Types of business entity
• Agency theory and principal/agent problems
• The structure and methods of financing a joint stock company
• The issue of securities and the securities markets
• How taxation affects financing and investment decisions

• Basic derivatives and their use to mitigate risk
• Company capital structure and dividend policy
• Cost of capital and its interaction with investment projects
• Capital project appraisal techniques.

Economics 2
In this module, recent developments and methodologies in economic theory are presented and analysed. The module builds on the economic background developed in Stage 1, enabling you to appreciate recent developments and methodologies in economics and the links between the theory and their practical application, and to critically evaluate such methodologies. At the end of the module, you will be able to understand, analyse and critically assess current micro and macroeconomic problems.

The syllabus includes: consumer demand, firms and supply; equilibrium, efficiency and welfare; motives and organisation of firms; markets for goods and financial services; theories of unemployment and inflation; macroeconomic aggregates and measures; growth theory, neo-classical growth; borrowing, lending and the inter-temporal budget constraint, consumption theory.

Financial Reports and their Analysis
This module introduces the concepts and techniques of financial accounting and enables you to understand and interpret
critically financial reports of companies and financial institutions, including financial statements used by pension funds and insurance companies. You are introduced to the use of spreadsheets in financial analysis.

Linear Algebra
This module considers the abstract theory of linear spaces together with applications to matrix algebra and other areas of mathematics (and its applications). Since linear spaces are of fundamental importance in almost every area of mathematics, the ideas and techniques discussed in this module lie at the heart of mathematics.

Portfolio Theory and Asset Pricing Models
This module examines current theories on portfolio management and developing asset models to assist risk management of financial services firms. Topics covered include: efficient market hypothesis, measures of investment risk, portfolio theory, models of asset returns, asset pricing models, Brownian motion, martingales, stochastic calculus, Itô processes and stochastic models of security prices.

Probability and Inference
This module develops the techniques introduced in the first year probability and statistics modules, and lays the foundation for several third-year statistics modules. The probability component of the module is mainly concerned with how to find probability distributions of functions of random variables, an essential skill in proving standard statistical results and in applying probability and statistics in novel situations.

The study of sampling distributions, which underpin much of statistical inference, provides a bridge to the statistical part of the module. Statistical inference may be divided into point estimation, interval estimation and hypothesis testing. All of these have been introduced in the first-year statistics module. This module extends the range of examples and provides some theoretical justification for the choice of particular techniques in particular cases.

Probability and Measure Theory
This module introduces the basic tools of measure theory, such as measurable functions, sigma-fields and filtrations. It covers the concept of conditional expectation and the use of martingale sequences in discrete and continuous time. You learn how to apply these skills in a financial context.

Probability and Statistics for Actuarial Science 2
This module develops the techniques introduced in the first-year module, Probability and Statistics for Actuarial Science. The probability component of this module is mainly concerned with how to find probability distributions of functions of random variables, an essential skill in proving standard statistical results and in applying probability and statistics in novel situations. The study of sampling distributions, which underpin much of statistical inference, provides a bridge to the statistical part of the module. Statistical inference may be divided into point estimation, interval estimation and hypothesis testing. All of these have been introduced in Probability and Statistics for Actuarial Science in Stage 1. This module extends the range of examples, and provides some theoretical justification for the choice of particular techniques in particular cases.

Regression
This module introduces you to the theory and practice of regression, and associated linear model techniques. Quite often experimenters and researchers wish to express a response variable y as a function of some other (explanatory) variables. For example, y might be the yield of a chemical process and the explanatory variables might be temperature and pressure. Knowing the relationship would enable y to be predicted for particular values of temperature and pressure. In this module, the method of deriving such a relationship is that of least squares and the theoretical and practical aspects of this method are covered in some detail. You will have an opportunity to use computer programs in this module.

Statistics for Insurance
This module covers aspects of Statistics which are particularly relevant to insurance. Some topics (such as risk theory and credibility...
STUDYING AT STAGES 2 AND 3 (CONT)

theory) have been developed specifically for actuarial use. Other areas (such as Bayesian Statistics) have been developed in other contexts but now find applications in actuarial fields. Stochastic processes of events, such as accidents, together with the financial flow of their payouts, underpin much of the work. Since the earliest games of chance, the probability of ruin has been a topic of interest. Topics studied include: decision theory; Bayesian Statistics; loss distributions; reinsurance; credibility theory; empirical Bayes credibility theory; risk models; ruin theory; generalised linear models; run-off triangles.

Time Series Modelling and Simulation
A time series is a collection of observations made sequentially in time. Examples occur in a variety of fields, ranging from economics to engineering, and methods of analysing time series constitute an important area of statistics. This module focuses on various time series models, including some recent developments, and provides modern statistical tools for their analysis. The other part of the module covers extensively simulation methods. These methods are becoming increasingly important tools as simulation models can be easily designed and run on modern PCs. Various practical examples are considered to help you tackle the analysis of real data.

Modules: Stage 3
Financial Mathematics students have a wide choice of optional modules in Stage 3. Please see the brochure for mathematics degrees or go to www.kent.ac.uk/smsas

Actuarial Practice
This module provides you with an understanding of the practical application of the techniques you learn in the BSc in Actuarial Science. It brings together skills from other modules, and ensures that students have the necessary entry-level skills and knowledge to join the actuarial profession or to embark on related careers. It also provides a platform for ongoing professional development.

Contingencies 2
Actuarial techniques are applied to a wide-range of products in this module. In addition, expenses and profitability models for calculating gross premiums are introduced. You also look at population/selection techniques.

Financial Modelling
This module is split into two parts:
1. An introduction to the practical experience of working with the financial model, PROPHET, which is used by commercial companies worldwide for profit testing, valuation and model office work.
2. An introduction to financial models. This shows you how to analyse and summarise data, produce a model with an audit trail and develops your ability to apply the results.
Mathematics of Financial Derivatives
Here, you examine the understanding and pricing of options and derivatives, along with models for interest rates and credit risk models. The syllabus includes: an introduction to derivatives, Greeks, binomial model, Black-Scholes option pricing formula, martingale representation theorem, arbitrage-free pricing, interest rate models, credit risk models.

Portfolio Theory and Asset Pricing Models
This module examines current theories of portfolio management and developing asset models to assist risk management of financial services firms. Topics include: efficient market hypothesis, measures of investment risk, portfolio theory, models of asset returns, asset pricing models, Brownian motion, martingales, stochastic calculus, Ito processes and stochastic models of security prices.

Stochastic Processes
A stochastic process is a process developing in time according to probability rules. For example, models for reserves in insurance companies, queue formation, the behaviour of a population of bacteria, and the persistence (or otherwise) of an unusual surname through successive generations. The syllabus includes coverage of a wide variety of stochastic processes and their applications: Markov chains; processes in continuous-time, such as the Poisson process; the birth and death process and queues.

Survival Models
Calculations in life assurance, pensions and health insurance require reliable estimates of transition intensities/survival rates. This module covers the estimation of these intensities. The syllabus includes the following: principles of actuarial modelling, distribution and density functions of the random future lifetime, the survival function and the force of hazard; estimation procedures for lifetime distributions including censoring, Kaplan-Meier estimate, Nelson-Aalen estimate and Cox model; statistical models of transfers between states; maximum likelihood estimators for the transition intensities; binomial and Poisson models of mortality; estimation of age-dependent transition intensities; the graduation process; testing of graduations; and measuring the exposed-to-risk.

SCHOLARSHIPS AND BURSARIES
For details of scholarships and bursaries at Kent, see www.kent.ac.uk/scholarships
VISIT THE UNIVERSITY

Come along for an Open Day or a UCAS Visit Day and see what it is like to be a student at Kent.

Open Days
Kent runs Open Days during the summer and autumn. These provide an excellent opportunity for you to discover what it is like to live and study at the University. You can meet academic staff and current students, find out about our courses and attend subject displays, workshops and informal lectures. We also offer tours around the campus to view our sports facilities, the library, and University accommodation.

For further information and details of how to book your place, see www.kent.ac.uk/opendays

UCAS Visit Days
If you apply to study at Kent and we offer you a place (or invite you to attend an interview), you will usually be sent an invitation to one of our UCAS Visit Days. You can book to attend through your online Kent Applicant Portal. The Visit Day includes presentations in your subject area, guided tours of the campus, including University accommodation, and the opportunity to speak with both academic staff and with current students about your chosen subject.

For further information, see www.kent.ac.uk/visitdays

Informal visits
You are also welcome to make an informal visit to our campuses at any time. The University runs tours of the Canterbury and Medway campuses throughout the year for anyone who is unable to attend an Open Day or UCAS Visit Day. It may also be possible to arrange meetings with academic staff, although we cannot guarantee this. For more details and to book your place, see www.kent.ac.uk/informal

Alternatively, we can provide you with a self-guided tour leaflet, which includes the main points of interest. For more details and to download a self-guided tour, go to www.kent.ac.uk/informal
More information
If you have any further queries on how to choose your degree, our admissions procedures, how to prepare for your studies or would like information about the University of Kent’s facilities and services, please contact us.
T: +44 (0)1227 827272
Freephone (UK only): 0800 975 3777
www.kent.ac.uk

How to apply
For admissions enquiries
Tel: 01227 827272
Email: recruitment@kent.ac.uk

For further information about the Actuarial Science and Financial Mathematics degree programmes, please contact:
The Admissions Officer,
School of Mathematics, Statistics and Actuarial Science
University of Kent,
Canterbury, Kent, CT2 7NP
Tel: 01227 827181
Fax: 01227 827932
Email: imsadmirn@kent.ac.uk
www.kent.ac.uk/smsas

Location
Canterbury.

Award
BSc (Hons).

Programme type
Full-time.

UCAS code
Actuarial Science (N323)
Actuarial Science with a Year in Industry (N324)
Financial Mathematics (GN13)
Financial Mathematics with a Year in Industry (NG31)

Offer levels
Actuarial Science
AAA at A level or AAB if Further Mathematics is taken; IB Diploma 34 points, including Mathematics 6 at HL or IB Diploma with 17 points at HL including Mathematics 6 at HL.

Financial Mathematics
ABB at A level, IB Diploma 34 points, including Mathematics 6 at HL or IB Diploma with 16 points at HL, including Mathematics 6 at HL.

Required subjects
A level Mathematics grade A, including the core syllabus of Pure Mathematics (Use of Mathematics is not accepted).

Professional recognition
The Actuarial Science degree has been fully accredited by the UK Actuarial Profession. It can give exemption from eight of the Core Technical subjects (CT1 to CT8) of the professional examinations set by the UK Actuarial profession, and gives a firm foundation for the later subjects. Graduates may also get exemption from some of the examinations set by The Chartered Insurance Institute.

Ofﬁer levels and entry requirements are subject to change. For the latest information, see: www.kent.ac.uk/ug

Terms and conditions: the University reserves the right to make variations to the content and delivery of courses and other services, or to discontinue courses and other services, if such action is reasonably considered to be necessary. If the University discontinues any course, it will endeavour to provide a suitable alternative. To register for a programme of study, all students must agree to abide by the University Regulations (available online at: www.kent.ac.uk/regulations).

Data protection: for administrative, academic and health and safety reasons, the University needs to process information about its students. Full registration as a student of the University is subject to your consent to process such information.
COME AND VISIT US

We hold Open Days at our Canterbury and Medway campuses.
For more information, see: www.kent.ac.uk/opendays