Cass Business School
CITY UNIVERSITY LONDON

A decade as Cass Business School

Specialist Masters Programme

Course handbook
MSc/PG Diploma in Actuarial Management

September 2012

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Section 5 – Additional Information

Section 1 – Course Director's Welcome

Dear Student

On behalf of the Faculty of Actuarial Science and Insurance, I am delighted to welcome you to the MSc/ Postgraduate Diploma in Actuarial Management.

The programme began in 1997 and the course design and content are reviewed annually to reflect new developments in the field of actuarial science and the needs of potential employers.

The Faculty of Actuarial Science and Insurance, which became part of Cass Business School in August 2002, is one of the world's leading academic centres in this field. It was originally established in 1974 as the Department of Actuarial Science and Statistics within City University and was developed with the direct support of the actuarial profession and insurance companies. The Faculty benefits from a strong and long-standing relationship with the profession. Much of the current research is pursued in pioneering areas such as the application of mathematical, statistical and financial models to investment, insurance, health and pensions.

The teaching quality and the support that we provide our students reflect our significant experience in these fields.

In addition, the programme also draws on the expertise of both the Faculty of Finance and the Faculty of Management within Cass Business School.

Since 1999, the programme has been accredited by the Actuarial Profession, and exemptions are currently available in five Core Technical subjects (CT2, CT4, CT5, CT6 and CT8), Actuarial Risk Management (CA1), Communications (CA3) and the Specialist Technical subjects (ST1, ST2, ST4, ST5, ST6 and ST7 – we may also apply for further exemptions in ST8 and/or ST9 during this academic year).

My colleagues and I aim to help you to realise your potential so that you can derive the maximum benefit from the MSc programme.

Dr Douglas Wright
Course Director
MSc Actuarial Management

Section 2 – Programme Information

2.1 Programme Aims

(1) To give students the opportunity to study actuarial science, insurance, finance and investment both at a general level and in relation to specific areas of practice. This includes the opportunity of studying material directly relevant to the Core Technical, Core Application and Specialist Technical subjects of the examinations of the Actuarial Profession.

(2) To provide suitable preparation for students wishing to proceed with postgraduate study or enter employment in financial services, both in traditional and wider fields.

(3) To enable students to develop their own interests in the field of actuarial science, either through the completion of a research-based project in a specialised subject of their own choice, or by completion of the required third term elective modules covering both current research topics in actuarial science and relevant issues from wider fields including insurance, finance and management.

(3) pertains only to the MSc in Actuarial Management, whereas (1) and (2) apply to the Graduate Diploma, Postgraduate Diploma and the MSc Actuarial Management.

Knowledge and Understanding

Upon successful completion of this programme, you will be expected to be able to:

- Demonstrate knowledge and understanding of the main areas of actuarial practice.
- Demonstrate knowledge and understanding of the general commercial environment.
- Demonstrate knowledge and understanding of the use of the actuarial control cycle.
- Demonstrate knowledge and understanding of how to monitor, measure and manage risk effectively.
- Demonstrate depth and breadth of understanding and the ability to apply this understanding in these areas of knowledge.

Skills

- Use mathematics to solve quantitative problems.
- Apply actuarial, statistical and related methods to assess and managed risk.

- Present reasoned arguments in clear concise English.
- Apply the principals of the actuarial control cycle to the main areas of actuarial work.
- Communicate effectively with non-specialists in the area.
- Read and understand specialist literature.

  Develop and present reasoned arguments, both in technical and non-technical language.

2.2 Programme Structure

The MSc in Actuarial Management is made up of two stages:

- Stage One leads to the award of a Postgraduate Diploma (or the lesser award of a Graduate Diploma) in Actuarial Management; and
- Stage Two converts the Postgraduate Diploma into an MSc.

Note that students achieving only the Graduate Diploma at Stage One will **not** be eligible to convert this award to an MSc.

Stage One covers Subjects CA1, CA2 and the ST subjects of the Actuarial Profession, as well as allowing students to complete outstanding CT subjects, if necessary.

Stage Two allows students to develop their own interests in the field of actuarial science, either through the completion of a research-based project in a specialised subject of their own choice, or by completion of elective modules covering both current research topics in actuarial science and relevant issues from wider fields including insurance, finance and management.

Students who choose to complete Stage Two by means of the research-based project option only will be considered for exemption from Subject CA3 of the Actuarial Profession.

Stage One - Structure of the full-time course

Stage One takes place in Term One and Term Two only.

All students must complete the following **compulsory** modules:

Subject/module	*Credits*
SMM028 Actuarial Risk Management – Part I (CA1)	25
SMM029 Actuarial Risk Management – Part II (CA1)	25

Subject to receiving permission from the Course Director, students who hold a prior exemption in Subject CA1 of the Actuarial Profession may be exempted from these modules.

And the following additional **elective** modules totalling a **minimum** of a further 50 credits:

Subject/module	*Credits*
SMM030 Health and Care (ST1)	25
SMM031 Life Insurance (ST2)	25
SMM033 Pensions and Other Benefits (ST4)	25
SMM034 Finance and Investment A (ST5)	25
SMM035 Finance and Investment B (ST6)	25
SMM036 General Insurance: Reserving & Capital Modelling (ST7)	25
SMM037 General Insurance: Pricing (ST8)	25

In addition, students must complete additional **elective** modules totalling a **minimum** further 20 credits either from the list of elective modules above or from the following list of additional elective modules:

Subject/module	*Credits*
SMM040 Model Documentation, Analysis and Reporting (CA2)	20
SMM062 Finance and Financial Reporting (CT2)	20
SMM064 Modelling (CT4)	30
SMM065 Contingencies (CT5)	30
SMM066 Statistical Methods (CT6)	30
SMM068 Financial Economics (CT8)	30

All modules are based on the material covered by the corresponding subject of the examinations of the Actuarial Profession. However, note that whilst SMM040 covers material corresponding to Subject CA2 of the Actuarial Profession, there is no professional exemption available in this subject at present.

Note that attendance at the lectures for modules CT2, CT4, CT5, CT6 and CT8 is subject to availability, as these modules are hosted by MSc Actuarial Science. However, even if students are unable to attend lectures in these modules they may be completed for both degree and exemption purposes in the usual way.

Students completing Stage One will be eligible for the award of the **Postgraduate Diploma** (or the lesser award of Graduate Diploma) in Actuarial Management.

Stage Two – Structure of the full-time course

Students who wish to be considered for the **MSc in Actuarial Management** must also complete Stage Two of the course.

All students who wish to be considered for the award of the MSc in Actuarial Management must complete the **compulsory** module, Research Project Management Skills (SMM522).

In addition, to complete Stage Two, students are required to either:

- take **five** of the Term Three elective modules, or
- take **one** of the Term Three elective modules **and** complete a Business Research Project (SMM527) of 10,000 (worth **40 credits**) words on a topic of the student's own choosing under the supervision of a faculty member

For students who choose to complete the MSc by means of the Business Research Project, there is the opportunity to gain an exemption in Subject CA3: Communications of the Actuarial Profession.

Rather than being based directly on the quality of the project, the exemption will be based on the ability to communicate the complex ideas within the project to an audience of both specialists and non-specialists as specified by the Actuarial Profession.

To this end, you will be required to prepare an Executive Summary of the project and to give a short presentation to a panel on the main features of the project (i.e. background, methodology and conclusions).

Term structure

Term One consists of ten teaching weeks, during which the compulsory module in Actuarial Risk Management (CA1) – Part I.

In addition, the elective modules in Life Insurance (ST2), Pensions and Other Benefits (ST4), General Insurance: Reserving and Capital Modelling (ST7) and Finance and Financial Reporting (CT2) are also completed.

Whilst it is not compulsory for students to complete one or more of the modules in ST2, ST4 and ST7 during Term One, these modules will assist greatly with the Term Two compulsory module in Actuarial Risk Management (CA1) – Part II. Thus, students are strongly recommended to complete at least one of these modules at this time.

At the end of week three, students will be asked to confirm which Term One modules they intend to complete. Please make your choice carefully, as future changes cannot be guaranteed.

In the two-week period prior to the start of Term Two, the examinations for the completed Term One compulsory and elective modules will take place.

No lectures will be scheduled during this period.

Term Two also consists of ten teaching weeks, during which the compulsory module in Actuarial Risk Management (CA1) – Part II and the remaining elective modules – Health and Care (ST1), Finance & Investment A (ST5), Finance and Investment B (ST6), General

Insurance: Pricing (ST8), Model Documentation, Analysis and Reporting (CA2), Modelling (CT4), Contingencies (CT5), Statistical Methods (CT6), Financial Economics (CT8) – are completed.

At the end of week three, students will be asked to confirm which Term Two modules they intend to complete. Again, please make your choice carefully as future changes cannot be guaranteed.

In the two-week period prior to Term Three the examinations for all the elective modules taught in Term Two will take place.

Term Three consists of six teaching weeks, during which the Stage Two elective modules are completed and, if chosen, students begin the 10,000 Business Research Report.

The submission date for the Business Research Project is 03 September 2012.

Part-time students

Students can complete the MSc/Postgraduate Diploma course on a two-year part-time basis.

In Year One, students must complete the two compulsory Stage One modules in Actuarial Risk Management (CA1) – Part I and Actuarial Risk Management (CA1) – Part II. In addition, students may also choose to complete additional Stage One elective modules from the list above.

However, for consistency with full-time students, please note that any elective modules attempted in Year One must be completed in Year One and, if not, cannot be re-attempted in Year Two.

Then, in Year Two, students must complete additional Stage One elective modules as required to give a minimum total of 120 credits.

For part-time students who wish to be considered for the award of MSc the Term Three elective modules can be spread over Years One and Two. However, the compulsory Research Project Management Skills module (SMM522) and, if chosen, the Business Research Project (SMM527) must be completed in Year Two.

2.3 Assessment Matrix

Module Title	Module Code	Credits	Assessment weightings used to calculate module mark	
			Coursework	Examination
Term One				
Actuarial Risk Management – Part I (CA1) (C)	SMM028	25	20%	80%
Life Insurance (ST2) (E)	SMM031	25	20%	80%
Pensions and Other Benefits (ST4) (E)	SMM033	25	20%	80%
General Insurance: Reserving and Capital Modelling (ST7) (E)	SMM036	25	20%	80%
Finance and Financial Reporting (CT2) (E)	SMM062	20	20%	80%
Term Two				
Actuarial Risk Management – Part II (CA1) (C)	SMM029	25	20%	80%
Health and Care (ST1) (E)	SMM030	25	20%	80%
Finance and Investment A (ST5) (E)	SMM034	25	20%	80%
Finance and Investment B (ST6) (E)	SMM035	25	20%	80%
General Insurance: Pricing (ST8) (E)	SMM036	25	20%	80%
Model Documentation, Analysis and Reporting (CA2) (E)	SMM040	20	100%	
Modelling (CT4) (E)	SMM064	30	20%	80%
Contingencies (CT5) (E)	SMM065	30	20%	80%
Statistical Methods (CT6) (E)	SMM066	30	20%	80%
Financial Economics (CT8) (E)	SMM068	30	20%	80%
RPMS (C)	SMM522	10	100%	
Term Three				
Option One				
Elective 1	SMMXXX	10	100%	
Elective 2	SMMXXX	10	100%	
Elective 3	SMMXXX	10	100%	
Elective 4	SMMXXX	10	100%	
Elective 5	SMMXXX	10	100%	
Option Two				
Business Research Project	SMM527	40	100%	
Elective 1	SMMXXX	10	100%	
Degree Total		180		

C= Core, E= Elective

ECTS equivalencies

Each MSc course is worth between 180 - 210 CAPS credits. As a general rule two CAPS credits equal one ECTS credit. (For example, a course with 180 CAPS credits is worth 90 ECTS credits.)

*CAPS *(Credit Accumulation of Programme Specification)*

*ECTS *(European Credit Transfer and Accumulation System)*

2.4 Term Dates and Assessment Periods

Induction

16 – 28 September 2012

Term One

01 October – 07 December 2012

Term One Examinations

14 – 25 January 2013

Term Two

28 January – 09 April 2013

Term Two Examinations

29 April – 10 May 2013

Term Three

13 May – 28 June 2013

Term Three Assessments

01 – 12 July 2013

Re-sit Examinations and Assessments (terms one, two and three)

19 – 30 August 2013

Business Research Project Submission Date

02 September 2013

Section 3 – Module Descriptions

ACTUARIAL RISK MANAGEMENT (CA1) – PART 1

SMM028

Module leader	Professor Philip Booth and Dr Douglas Wright	
Sessions	10 x 3 hour sessions plus 10 hours online	
Module assessment	Coursework	20%
	Examination	80%

Educational aims

- To understand strategic concepts in the management of the business activities of financial institutions and programmes, including the processes for management of the various types of risk faced
- To analyse the issues and formulate, justify and present plausible and appropriate solutions to business problems

Learning outcomes

On successful completion of this module, you will be expected to be able to:

Knowledge and understanding:

- Demonstrate a knowledge and understanding of the characteristics and properties of the principal investment assets and their markets
- Demonstrate a knowledge and understanding of how actuarial techniques can be used to develop investment strategies
- Demonstrate a knowledge and understanding of the principles of portfolio management as a means of controlling risk
- Demonstrate a knowledge and understanding of the legislative, regulatory and taxation framework underlying investment markets and the management of assets
- Demonstrate a knowledge and understanding of how products, schemes, contracts and other arrangements can provide benefits on contingent events which meet the needs of clients and stakeholders

- Demonstrate a knowledge and understanding of the risk management process for a business that can aid in the design of products, schemes, contracts and other arrangements to provide benefits on contingent events

Skills:

- Use mathematics to solve quantitative problems
- Use actuarial techniques in the valuation of individual assets and asset portfolios
- Present reasoned arguments in clear concise English
- Communicate effectively with non-specialists in the area
- Read and understand the specialist literature
- Develop investment strategies using actuarial techniques such as matching, immunisation, modern portfolio theory and stochastic asset-liability modelling
- Apply actuarial techniques to the evaluation of capital projects
- Construct and use investment indices for a range of asset classes (e.g. equities, government bonds and property)

Syllabus

- How to do a professional job
- Stakeholders and their needs
- Investment environment
- Contract design
- Data
- Modelling
- Investment management
- Relationship between assets and liabilities
- Asset, capital and surplus management

Reading list

Students will be provided with a comprehensive list of core reference texts for the module. Below are the key recommended texts:

Institute and Faculty of Actuaries' Core Reading for Subject CA1. (C)

Adams A. T., Booth P.M., Bowie D. and Freeth D.S. (2003). *Investment Mathematics*. Wiley, London, UK.

Bellis C., Lyon R. and Shepherd J. (2009). *Understanding Actuarial Management: The Actuarial Control Cycle*. Institute of Actuaries of Australia.

Blake D. (1999). *Financial Market Analysis*. John Wiley.

Bodie Z., Kane A. & Marcus A.J. (2008*). Investments*. McGraw-Hill

Booth P.M., Chadburn R.G., Haberman S., James D., Khorasanee Z., Plumb R. & Rickayzen B.D. (2005). *Modern Actuarial Theory and Practice* (2nd edition). Chapman and Hall/CRC Press.

Elton E.J. & Gruber M.J. (2006). *Modern Portfolio Theory and Investment Analysis*. John Wiley.

Hull J.C. (2008). *Options, Futures and Other Derivatives*. Prentice-Hall.

Wilkie A.D. (1995). *More on a Stochastic Asset Model for Actuarial Use. British Actuarial Journal*, 1, 777.

ACTUARIAL RISK MANAGEMENT(CA1) – PART II

SMM029

Module leader	Dr Douglas Wright and David Smith	
Sessions	10 x 3 hour sessions plus 10 hours online	
Module assessment	Coursework	20%
	Examination	80%

Educational aims

- To understand strategic concepts in the management of the business activities of financial institutions and programmes, including the processes for management of the various types of risk faced
- To analyse the issues and formulate, justify and present plausible and appropriate solutions to business problems

Learning outcomes

On successful completion of this module, you will be expected to be able to:

- Demonstrate a knowledge and understanding of the principles and aims of prudential and market conduct regulatory regimes
- Demonstrate a knowledge and understanding of the construction and use of actuarial models to assist with pricing, reserving and risk management decisions
- Demonstrate a knowledge and understanding of the principles behind the determination of assumptions as input to a model relevant to producing a specific solution
- Demonstrate a knowledge and understanding of the Actuarial Control Cycle to manage the emerging risks inherent in financial institutions

Skills:

- Use actuarial techniques in the valuation of uncertain future liability cash flows within both pricing and reserving
- Present reasoned arguments in clear concise English
- Communicate effectively with non-specialists in the area
- Read and understand the specialist literature

Syllabus

- Risk environment
- Regulatory environment
- External environment
- Capital requirements
- Project planning and management
- Risk management
- Assumption setting
- Expenses
- Developing the cost and the price
- Provisioning
- Maintaining profitability
- Determining the expected results
- Reporting actual results
- Asset, capital and surplus management
- Insolvency and closure
- Options and guarantees
- Monitoring

Reading list

Students will be provided with a comprehensive list of core reference texts for the module. Below are the key recommended texts:

Institute and Faculty of Actuaries' Core Reading for Subject CA1. (C)

Bellis C., Lyon R. and Shepherd J. (2009). *Understanding Actuarial Management: The Actuarial Control Cycle. Institute of Actuaries of Australia*.

Booth P.M., Chadburn R.G., Haberman S., James D., Khorasanee Z., Plumb R. & Rickayzen B.D. (2005). *Modern Actuarial Theory and Practice* (2nd edition). Chapman and Hall/CRC Press.

HEALTH AND CARE (ST1)

SMM030

Module leader	Jean Eu	
Sessions	10 x 3 hour sessions plus 10 hours online	
Module assessment	Coursework	20%
	Examination	80%

Educational aims

- To instil in successful candidates the ability to apply, in simple situations, the principles of actuarial planning and control needed in health and care matters on sound financial lines

Learning outcomes

Knowledge and understanding and subject-specific outcomes:

- Understand health and care insurance terminology
- Understand the key health insurance products
- Understand the key considerations affecting a health insurance company's practices, including product design and risk management
- Demonstrate awareness of the contemporary health insurance practice and market trends evolving in different countries

Skills

- To demonstrate the skill to develop an effective policy design
- To demonstrate an understanding of the general pricing and reserving principles appropriate to different health and care products
- To demonstrate analytical skills to evaluate complex corporate finance decisions.
- To demonstrate an appreciation and knowledge of current market conditions and market requirements
- Understand the perspectives of corporate managers, shareholders, financiers, accountants and financial intermediaries of the key financial decisions in health insurance
- Understand the policyholder perspective

- To appreciate the interactions between companies and capital markets

Syllabus

- Health and care insurance products
- Product design and stakeholder interests
- The general business environment
- State healthcare provision
- Models in health and care insurance
- Data sources and requirements
- Product pricing
- Setting assumptions
- Reserves: supervisory and management
- Nature of risks
- Reinsurance and other risk management techniques
- Investments
- Monitoring experience, including experience analysis, and feedback into the control cycle

Reading list

Students will be provided with a comprehensive list of core reference texts for the module. Below are the key recommended texts:

Institute and Faculty of Actuaries Official Core Reading for Subject ST1 (C).

Booth P.M., Chadburn R.G., Haberman S., James D., Khorasanee Z., Plumb R. & Rickayzen B.D. (2005). Modern *Actuarial Theory and Practice (2nd edition)*. Chapman and Hall/CRC Press.

LIFE INSURANCE (ST2)

SMM031

Module leader	Dr Douglas Wright	
Sessions	10 x 3 hour sessions plus 10 hours online	
Module assessment	Coursework	20%
	Examination	80%

Educational aims

- To instil in successful candidates the principles of actuarial planning and control relevant to life insurance companies
- To instil in successful candidates the mathematical and economic techniques relevant to life insurance companies
- To instil in successful candidates the ability to apply the knowledge and understanding, in simple situations, to ensure the operation of life insurance companies on sound financial grounds

Learning Outcomes

On successful completion of this module, you will be expected to be able to:

- Understand the general commercial environment
- Understand the use of the control cycle in life insurance
- Understand risks in life insurance and the actuarial techniques to assess risks
- Understand use of monitoring and analysis in refining the assessment of risk
- Understand how to manage risk effectively, and reassess risks

Skills:

- Appreciate use of monitoring and analysis
- Ability to appreciate all aspects of control cycle in the operation of life insurance
- Ability to present answers to questions in a clear concise manner
- Some team working
- Interpretation of general principles to particular case studies

Values and attitudes:

- Awareness of professionalism in conduct of life insurance
- Awareness of communication of actuarial implications

Syllabus

- Life insurance products
- Methods of distributing profits
- Asset shares for life insurance contracts
- The general business environment
- Sources of risk
- Reinsurance and underwriting
- Further risk management
- Models in life insurance
- Management of unit-linked life insurance contracts
- Cost of guarantees and options under life insurance contracts
- Alterations to contracts
- Product design
- Supervisory reserves
- Setting assumptions
- Monitoring experience

Reading list

Students will be provided with a comprehensive list of core reference texts for the module. Below are the key recommended texts:

Institute and Faculty of Actuaries Official Core Reading for Subject ST2 (C).

Booth P.M., Chadburn R.G., Haberman S., James D., Khorasanee Z., Plumb R. & Rickayzen B.D. (2005). Modern *Actuarial Theory and Practice (2nd edition)*. Chapman and Hall/CRC Press.

PENSIONS AND OTHER BENEFITS (ST4)

SMM033

Module leader	Dr Zaki Khorasanee	
Sessions	10 x 3 hour sessions plus max. 10 hours online	
Module assessment	Coursework	20%
	Examination	80%

Educational aims

- To instil in successful candidates the ability to apply, in simple situations, the mathematical and economic techniques and the principles of actuarial planning and control needed for the operation on sound financial lines of providers of pensions or other employee benefits

Learning outcomes

Knowledge and understanding and subject-specific outcomes:

- Understand the characteristics of different types of pension scheme
- To apply actuarial modelling techniques to pension schemes
- Understand the issues involved in pension consultancy
- Understand the regulatory framework in which pensions schemes operate

Skills

- To apply actuarial modelling techniques to hypothetical pension schemes
- Answer queries on pension financing, scheme design and pension choices
- Discuss the terms and objectives of pension legislation

Syllabus

- Providers of pensions and other benefits
- Alternative systems of benefit provision
- Methods of financing benefits
- Social security schemes

- Final salary schemes
- Actuarial valuation
- Selecting assumptions
- Risk and uncertainties
- Analysis of surplus
- Discontinuance
- Investment and asset-liability matching
- Sponsor covenant
- Defined contribution schemes
- Individual pension choices
- Scheme design
- Regulation

Reading list

Students will be provided with a comprehensive list of core reference texts for the module. Below are the key recommended texts:

Institute and Faculty of Actuaries Official Core Reading for Subject ST4 (C).

Booth P.M., Chadburn R.G., Haberman S., James D., Khorasanee Z., Plumb R. & Rickayzen B.D. (2005). *Modern Actuarial Theory and Practice (2nd edition).* Chapman and Hall/CRC Press.

McGill D. M. (2004). *Fundamentals of Private Pensions*. University of Pennsylvania Press.

Pensions Technical Actuarial Standard. Board for Actuarial Standards.

http://www.frc.org.uk/bas/publications/pub2404.html

FINANCE AND INVESTMENT A (ST5)

SMM034

Module leader	Professor Phillip Booth and Dr Zaki Khorasanee	
Sessions	10 x 3 hour sessions plus 10 hours online	
Module assessment	Coursework	20%
	Examination	80%

Educational aims

- To instil in successful candidates the ability to apply, in simple situations, the principles of actuarial planning and control to the appraisal of investments, and to the selection and management of investments appropriate to the needs of investors

Learning outcomes

Knowledge and understanding and subject-specific outcomes:

- Demonstrate a knowledge of the theory of finance
- Describe the typical ways in which investment returns are taxed and the effect of the taxation basis on investor behaviour
- Demonstrate a knowledge and understanding of the characteristics of specialist financial instruments
- Apply appropriate methods for the valuation of individual investments and demonstrate an understanding of their appropriateness in different situations
- Demonstrate a knowledge and understanding of the principal techniques used in portfolio management
- Demonstrate an understanding of the economic background of financial institutions investment analysis and regulation
- Demonstrate an ability to advise on the use of financial securities by institutional investors such as insurance companies and pension funds
- Demonstrate an ability to analyse the possible risks and practice management issues in the use of financial securities and explain how these can be managed
- Demonstrate an ability to apply quantitative techniques to real situations in investment and finance, to interpret incoming information and to formulate hypotheses

- Demonstrate an ability to understand how investment performance can be measured and monitored

Syllabus

- The theory of finance
- Taxation
- Industry classification and investment indices
- Fundamental share analysis
- Specialist asset classes
- Valuation of investments
- Derivatives
- The legislative and regulatory framework
- Environmental influences
- Overall risk control
- Actuarial techniques
- Portfolio management
- Performance measurement

Reading list

Students will be provided with a comprehensive list of core reference texts for the module. Below are the key recommended texts:

Institute and Faculty of Actuaries Official Core Reading for Subject ST5 (C).

Bodie Z., Kane A. and Marcus A. J. (2011). *Investments*. McGraw-Hill.

Booth P.M., Chadburn R.G., Haberman S., James D., Khorasanee Z., Plumb R. & Rickayzen B.D. (2005). *Modern Actuarial Theory and Practice (2nd edition).* Chapman and Hall/CRC Press.

Brealey R. A. and Myers S. C. (2002). *Principles of Corporate Finance*. McGraw-Hill.

De Haan et al (2009), *European Financial Markets and Institutions,* Cambridge University Press.

Elton et al (2011). *Modern Portfolio Theory and Investment Analysis*. Wiley.

Fabozzi F. J. (2005). *Handbook of Fixed Interest Securities*. McGraw-Hill.

Hull J. C. (2011). *Options, Futures and Other Derivatives*. Pearson

Pike R. and Neale W. (1998). *Corporate Finance and Investment*. Pearson Education.

Samuels J. M., Wilkes F. M. and Brayshaw R. E. (1995). *Management of Company Finance.* Thomson Learning.

Saunders A. (2000*). Financial Institutions Management: A Modern Perspective*. McGraw-Hill.

FINANCE AND INVESTMENT B (ST6)

SMM035

Module leader	Dr Dimitrina Dimitrova	
Sessions	10 x 3 hour sessions plus 10 hours online	
Module assessment	Coursework	20%
	Examination	80%

Educational aims

- To instil in successful candidates the ability to value financial derivatives.
- To instil in successful candidates the ability to assess and manage the risks associated with a portfolio of derivatives, including credit derivatives and to value credit derivatives using simple models for credit risk

Learning outcomes

Knowledge and understanding and subject-specific outcomes:

- Demonstrate a thorough knowledge and understanding of how to price, value and use derivatives
- Understand the critical issues about the management of market risks arising from the use of derivatives
- Demonstrate knowledge and understanding of the mathematics underpinning the pricing and hedging of derivative instruments
- Demonstrate an awareness of the problems in pricing American-style and exotic contracts
- Demonstrate an appreciation of the scope and limitations of the Black-Scholes framework

Skills

- Define and describe the different types of derivatives
- Identify and explain the use of derivative instruments in practical applications
- Construct market models in a stochastic framework and demonstrate their use in pricing and hedging of fundamental derivative instruments
- Apply the valuation principles and the pricing procedures to more complex types of contracts

Syllabus

- Unit 1: Derivatives markets
- Unit 2: Forward and futures prices
- Unit 3: Hedging with futures
- Unit 4: Traded derivatives contracts
- Unit 5: Interest rate derivatives
- Unit 6: Exotic options
- Unit 7: Factors affecting option prices
- Unit 8: The binomial model
- Unit 9: The Black-Scholes model
- Unit 10: Further analysis of the Black-Scholes model
- Unit 11: Numerical methods
- Unit 12: Hedging and the “Greeks”
- Unit 13: Interest rate derivatives & the Black model
- Unit 14: The term structure of interest rates
- Unit 15: Structured derivatives & synthetic securities
- Unit 16: Risk management

Reading list

Students will be provided with a comprehensive list of core reference texts for the module. Below are the key recommended texts:

Institute and Faculty of Actuaries Official Core Reading for Subject ST6.

Hull, J. (2012) *Options, Futures, and Other Derivatives. 8th ed*., Pearson/Prentice Hall.

Shreve, S. (2004) *Stochastic Calculus for Finance II: Continuous-Time Models.* Springer.

Bjork T. (2009). *Arbitrage Theory in Continuous Time*. 3rd ed., Oxford University Press.

Kwok Y. K. (2008). *Mathematical Models of Financial Derivatives*. 2nd ed., Springer.

GENERAL INSURANCE: RESERVING & CAPITAL MODELLING (ST7)

SMM036

Module leader	James Orr	
Sessions	10 x 3 hour sessions plus 10 hours online	
Module assessment	Coursework	20%
	Examination	80%

Educational aims

- To instil in successful candidates the ability to apply, in simple reserving and capital modelling situations, the mathematical and economic techniques and the principles of actuarial planning and control needed for the operation on sound financial lines of general insurers

Learning Outcomes

On successful completion of this module, you will be expected to be able to:

- Understand the commercial environment of the general insurance industry
- Understand the various insurance contracts available and their different risk characteristics
- Understand and apply actuarial models used in reserving and capital modelling for general insurance business.
- Understand the importance of creating asset/liability models to help investment strategy.
- Understand the reasoning behind reinsurance, why different contracts are available and be able to choose the most suitable for particular circumstances.
- Understand the reasoning behind reinsurance, why different contracts are available and be able to choose the most suitable for particular circumstances.
- Create and interpret general insurance accounts.
- Understand how to allocate company expenses across various product lines.

Skills:

- Apply mathematics in a commercial environment.
- Demonstrate an awareness of benefits and limitations of analysing past data to set reserves and capital requirements for current contracts.

- Demonstrate an appreciation of the actuarial control cycle and continual re-evaluation of models.
- Analyse various scenarios and deriving suitable solutions from the possibilities available.
- Apply actuarial planning and control in the context of general insurance.
- Demonstrate an awareness of the underlying assumptions of the reserving models and their suitability.
- Understand the importance of balancing the conflicting aims of profitability and security.

Syllabus

- Insurance products
- Reinsurance products
- The business environment
- Lloyd's market
- Modelling uncertainty
- Data
- Actuarial investigations and analyses
- Reserving bases
- Triangulation methods
- Reserving – Stochastic claims reserving: Mack, Bootstrapping etc
- Assessment of reserving results, including diagnostics
- Reserving – Use of ranges, best estimates
- Investment principles and asset liability matching
- Capital modelling – Methodologies
- Capital modelling – Assessment of capital for various risk types
- Capital modelling – Allowance for diversification
- Capital modelling – Practical considerations
- Determining appropriate reinsurance

- Reserving of proportional and non-proportional reinsurance
- Accounting principles and methods and interpretation of accounts
- Regulation

Reading list

Students will be provided with a comprehensive list of core reference texts for the module. Below are the key recommended texts:

Institute and Faculty of Actuaries Official Core Reading for Subject ST7 (C).

Booth P.M., Chadburn R.G., Haberman S., James D., Khorasanee Z., Plumb R. & Rickayzen B.D. (2005). *Modern Actuarial Theory and Practice (2nd edition).* Chapman and Hall/CRC Press.

Casualty Actuarial Society (2001). *Foundations of casualty actuarial science (4th edition).* Casualty Actuarial Society.

Hart D.G., Buchanan R.A. & Howe B.A. (2007). *Actuarial practice of general insurance (7th edition).* Institute of Actuaries of Australia.

Klugman S.A. et al. (2009). *Loss models: From data to decisions*. John Wiley.

Ryan J. P. and Larmar K. P. W. (1990). The Valuation of General Insurance Companies. Journal of the Institute of Actuaries, 117, 597.

GENERAL INSURANCE: PRICING (ST8)

SMM037

Module leader	Pietro Parodi	
Sessions	10 x 3 hour sessions plus 10 hours online	
Module assessment	Coursework	20%
	Examination	80%

Educational aims

- The aim of this module is to instil in successful candidates the ability to apply, in simple pricing and reinsurance analysis situations, the mathematical and economic techniques and the principles of actuarial planning and control needed for the operation on sound financial lines of general insurers

Learning outcomes

On successful completion of this module, you will be expected to be able to:

- Understand the commercial environment of the general insurance industry
- Understand the various insurance contracts available and their different risk characteristics
- Understand and apply actuarial models used in pricing.
- Understand the different phases of the pricing process, from data gathering to the creation of a stochastic loss models
- Understand the reasoning behind reinsurance, why different contracts are available and be able to choose the most suitable for particular circumstances

Skills

- Apply actuarial planning and control in the context of general insurance
- Demonstrate an awareness of the underlying assumptions of the pricing models and their suitability

Syllabus

GENERAL INSURANCE – PRODUCTS AND BUSINESS ENVIRONMENT

- Principal terms in use in general insurance

- Main types of general insurance and reinsurance products and the purposes for which they may be used
- Describe the general business environment and its implications

USING DATA IN GENERAL INSURANCE PRICING

BASIC PRICING TECHNIQUES

- The pricing process
- Individual risk model and collective risk model and their use to determine the aggregate loss distribution
- Rating methodologies and bases
- Experience rating – Burning cost approach
- Experience rating – Frequency/severity approach
- Exposure rating
- Dealing with uncertainty

ADVANCED PRICING TECHNIQUES

- Extreme value theory
- Multivariate models, especially generalised linear models

REINSURANCE PRICING TECHNIQUES

CATASTROPHE MODELLING

Reading list

Students will be provided with a comprehensive list of core reference texts for the module. Below are the key recommended texts:

Institute and Faculty of Actuaries Official Core Reading for Subject ST8.

Booth P.M., Chadburn R.G., Haberman S., James D., Khorasanee M.Z., Plumb R.H. and Rickayzen B.D. (2004). *Modern actuarial theory and practice (2nd edition).* Chapman & Hall.

Casualty Actuarial Society (2001). *Foundations of casualty actuarial science (4th edition).* Casualty Actuarial Society.

Hart D.G., Buchanan R.A. & Howe B.A. (2007). *Actuarial practice of general insurance (7th edition).* Institute of Actuaries of Australia.

Klugman S.A. et al. (2009). *Loss models: From data to decisions*. John Wiley.

MODEL DOCUMENTATION, ANALYSIS AND REPORTING (CA2)

SMM040

Module leader	Dr Russell Gerrard and David Smith	
Sessions	10 x 3 hour sessions plus 10 hours online	
Module assessment	Coursework	100%

Educational aims

- The aim of this module is to ensure that the successful candidate can model data, document the work (including maintaining an audit trail), analyse the methods used and outputs generated and communicate the approach, results and conclusions

Learning outcomes

Knowledge and understanding and subject-specific outcomes:

- To demonstrate an understanding of how to construct actuarial models in Excel
- To demonstrate an understanding of how to construct actuarial models using VBA

Skills:

- Ability to apply and interpret the results from an actuarial model
- Ability to communicate the approach, results and conclusions from an actuarial modelling exercise to a technical audience

Syllabus

- Introduction to Excel techniques
- Case studies on how to build an actuarial model in Excel
- Audit trails
- Interpretation and communication of results
- Introduction to VBA
- Error handling and data verification using VBA
- Applications of VBA to actuarial modelling

Reading list

Students will be provided with a comprehensive list of core reference texts for the module. Below are the key recommended texts:

Institute and Faculty of Actuaries' Core Reading for Subject CA2. (C)

Jelen B. and Syrstad T. (2007). *VBA and Macros for Microsoft Office Excel 2007*. QUE.

Walkenbach J. (2007). *Excel 2007 Power Programming with VBA*. John Wiley and Sons.

FINANCE AND FINANCIAL REPORTING (CT2)

SMM062

Module leader	Alison Osbourne	
Sessions	10 x 3 hour sessions plus 10 hours online	
Module assessment	Coursework	20%
	Examination	80%

Educational aims

- To provide the student with a basic understanding of the methods and types of instrument used by companies to raise finance
- To enable students to interpret the published financial statements of companies and financial institutions

Learning outcomes

Knowledge and understanding and subject-specific outcomes:

- To demonstrate knowledge of the structure of limited companies, and of principal forms of financial instruments, and to discuss characteristics of different financial instruments
- To demonstrate mastery of the principles underlying the construction of financial statements
- To demonstrate the ability to apply and evaluate alternative approaches in interpreting the financial statements of companies and financial institutions, and to be able to construct financial statements in a form suitable for publication

Cognitive and transferable outcomes:

- To be able to evaluate and interpret complex financial data, solve specialised numerical problems related to the financial situation of companies and institutions, present ideas in clear concise English, and communicate effectively with other finance professionals

Syllabus

- Key principles of finance
- Limited company and other business entities

- Capital structure of a limited company
- Personal and corporate taxation
- Capital markets and financial instruments
- Financial institutions
- Cost of capital and dividend policy
- Assessment of capital investment projects
- Legal requirements that apply to financial reporting
- Fundamental accounting concepts and financial statements
- Construction of simple financial statements and group accounts
- Financial statements of insurance companies.
- Interpretation of accounts by the calculation of simple ratios
- Limitations to the interpretation of accounts

Reading list

Students will be provided with a comprehensive list of core reference texts for the module. Below are the key recommended texts:

Institute and Faculty of Actuaries' Core Reading for Subject CT2. (C)

G. Holmes and A. Sugden. (2008). *Interpreting Company Reports and Accounts*. Prentice-Hall.

R.A. Brealey and S.C. Myers. (2010). *Principles of Corporate Finance*. McGraw.

MODELLING (CT4)

SMM064

Module leader	Dr Iqbal Owadally	
Sessions	10 x 4 hour sessions plus 10 hours online	
Module assessment	Coursework	20%
	Examination	80%

Educational aims

- To explore stochastic processes and survival models and their applications in finance and actuarial science

Learning outcomes

Knowledge and understanding and subject-specific outcomes:

- To demonstrate understanding of modelling principles, stochastic processes, the Markov property, and Markov processes. To be able to construct mathematical models for business problems involving uncertainty, design and to calibrate stochastic models and analyse univariate time series

- To demonstrate mastery of the theory of survival models and multiple state transfer models, including transition intensities and conditional probabilities. To be able to estimate mortality and hazard rates and carry out and test graduations of mortality data

Cognitive and transferable outcomes and values and attitudes:

- To design and apply mathematical models in different business situations. To demonstrate higher-level mathematical skills, apply probability theory in specialised models and apply mathematics to complex business models

Values and attitudes:

- To appreciate the actuarial control cycle, the importance of stochastic processes in various disciplines and the benefits and limitations of stochastic modelling

Syllabus

- Fundamental modelling principles, deterministic v stochastic models, interpretation of results

- Simulation of stochastic models

- Definition and classification of stochastic processes, filtration, Markov property
- Markov chains on finite and infinite state spaces and in discrete and continuous time, simple random walk, Poisson process, Chapman-Kolmogorov equation, Kolmogorov differential equations, stationary distribution and equilibrium, applications and simulation
- Statistical models of lifetime and of transfer between multiple states
- Estimation procedures for survival models and multiple-state transfer models
- Estimating between-state transition intensities from data grouped by age, exactly and using the census approximation, and the problems caused by heterogeneous data
- Testing experience data for consistency with a standard basis or with a set of graduated estimates
- Graduation

Reading list

Students will be provided with a comprehensive list of core reference texts for the module. Below are the key recommended texts:

Institute and Faculty of Actuaries Official Core Reading for Subject CT4 (C).

S.M. Ross. (2006). *Introduction to Probability Models*. Academic Press.

N.L. Bowers, M.U. Gerber, J.C. Hickman, D.A. Jones and C.J. Nesbitt. (1997). *Actuarial Mathematics*. The Society of Actuaries.

B. Benjamin and J.H. Pollard. (1993). *The Analysis of Mortality and Other Actuarial Statistics*. Institute and Faculty of Actuaries.

A.S. Puzey. (1986). *Exposed to Risk*. Institute of Actuaries.

CONTINGENCIES (CT5)

SMM065

Module leader	Dr Ben Rickayzen and Dr Pietro Millossovich	
Sessions	10 x 4 hour sessions plus 10 hours online	
Module assessment	Coursework	20%
	Examination	80%

Educational aims

- To provide a grounding in the mathematical techniques of pricing and evaluating insurance and pensions products

Learning outcomes

Knowledge and understanding and subject-specific outcomes:

- To demonstrate knowledge and understanding of a broad range of life insurance products and of their pricing and reserving, and mastery of life insurance mathematics. To understand the problems created by heterogeneity and selection in risk models

- To be able to evaluate means and variances of present values of cash flows for complex insurance contracts, and calculate gross premiums and reserves using the equivalence principle, profit testing and related techniques

Cognitive and transferable outcomes:

- To use mathematics and statistics to solve quantitative and practical problems and to develop and present reasoned arguments

Syllabus

- Simple assurances and annuities
- The evaluation of assurances and annuities
- Net premiums and reserves
- Variable benefits and annuities
- Gross premiums and reserves for fixed and variable benefit contracts
- Annuities and assurances involving two lives

- Competing risks
- Discounted emerging cost techniques

Reading list

Students will be provided with a comprehensive list of core reference texts for the module. Below are the key recommended texts:

Institute and Faculty of Actuaries Official Core Reading for Subject CT5 (C).

N.L. Bowers, M.U. Gerber, J.C. Hickman, D.A. Jones and C.J. Nesbitt. (1997). *Actuarial Mathematics.* The Society of Actuaries.

H.U. Gerber and S.H. Cox. (2004). *Life Insurance Mathematics*. Springer-Verlag.

S. David Promislow. (2006*). Fundamentals of Actuarial Mathematics*. Wiley.

D.C.M. Dickson, M.R. Hardy, H.R. Waters (2009), *Actuarial Mathematics for Life Contingent Risks*, Cambridge University Press.

STATISTICAL METHODS (CT6)

SMM066

Module leader	Dr Vali Asimit	
Sessions	10 x 4 hour sessions plus 10 hours online	
Module assessment	Coursework	20%
	Examination	80%

Educational aims

- To explain the fundamental statistical techniques used in the analysis of short-term insurance contracts

Learning outcomes

Knowledge and understanding and subject-specific outcomes:

- To demonstrate proficiency in the application of models used for insurance losses and show how these models are used to assess insurance premiums. To be able to solve specialised insurance problems and explain the assumptions underlying different statistical models

Cognitive and transferable outcomes:

- To use statistical models and probabilistic arguments to solve specialised insurance problems, develop and present reasoned arguments on statistical inference, and to identify and apply the most suitable statistical methods for a broad range of general insurance problems

Syllabus

- Bayesian methods
- Credibility theory
- Simulation
- Time-series models
- Loss distributions
- Loss run-off triangles
- Reinsurance

- Theory of ruin
- Generalised Linear Models

Reading list

Students will be provided with a comprehensive list of core reference texts for the module. Below are the key recommended texts:

Institute and Faculty of Actuaries Official Core Reading for Subject CT6.

S.A. Klugman, H.H. Panjer, and G.E. Willmot. (2008). *Loss Models: from data to decisions,* 3rd ed. Wiley.

I.B. Hossack, J.H. Pollard and B. Zehnwirth. (1999). *Introductory Statistics with Applications in General Insurance* (2nd edition). Cambridge University Press.

R. Kaas, M. Goovaerts, J. Dhaene & M. Denuit. (2001). *Modern Actuarial Risk Theory*, Kluwer.

P.J. Boland. (2007*). Statistical and Probabilistic Methods in Actuarial Science*. Chapman and Hall/CRC Press.

A.J. Dobson. (2001). *An Introduction to Generalised Linear Models*. Chapman and Hall/CRC Press.

I. Miller and M. Miller. (2003). *John E Freund's Mathematical Statistics*, (7th edition). Prentice-Hall.

C. Chatfield (2004). *The Analysis of Time Series*, 6th ed. Chapman and Hall/CRC.

FINANCIAL ECONOMICS (CT8)

SMM068

Module leader	Dr Iqbal Owadally	
Sessions	10 x 4 hour sessions plus 10 hours online	
Module assessment	Coursework	20%
	Examination	80%

Educational aims

- To use and critically evaluate modern financial theory, to construct asset-liability models and to value financial derivatives

Learning outcomes

Knowledge and understanding and subject-specific outcomes:

- To demonstrate proficiency in the application of models used in financial economics and understand how these models are used
- To explain the assumptions and ideas underlying different financial models, and to apply finance theory to assess risk, make portfolio decisions, model asset prices and interest rates and value derivatives

Cognitive and transferable outcomes:

- To appreciate the strength and limitations of models of financial markets
- To be able to use mathematics and statistics to solve quantitative financial and practical problems. To be able to communicate effectively with other finance professionals

Syllabus

- Utility theory and investment risk measures
- Types of financial securities
- Portfolio theory
- Equilibrium pricing models
- Efficient markets

- Stochastic models of security prices. Brownian motion and stochastic calculus
- Types of derivatives including forwards
- Binomial pricing model
- Black-Scholes pricing model
- Interest rate term-structure models
- Simple credit risk models

Reading list

Students will be provided with a comprehensive list of core reference texts for the module. Below are the key recommended texts:

E.J. Elton and M.J. Gruber. (2006). *Modern Portfolio Theory and Investment Analysis*. Wiley.

J.C. Hull. (2006*). Options, Futures and Other Derivatives*. Prentice Hall.

U.F. Wiersema (2008). *Brownian Motion Calculus*. Wiley.

RESEARCH PROJECT MANAGEMENT SKILLS

SMM522

Module leader	Dr Zaki Khorasanee	
Sessions	4 x 3 hour sessions plus self directed study	
Module assessment	Coursework	100%

Educational aims

The aim of this module is to familiarise students with active research areas relevant to the actuarial profession and the process of writing a business report. After attending the introductory seminars, students will be required to submit a business research report of 1,500-2,000 words on a topic that has been approved by the module leader.

The course aims to make it possible for participants to:

- understand methods used to generate ideas for relevant projects
- understand recent research developments in the actuarial field
- develop an understanding of commonly used sources of data/literature available and correct methods of referencing these sources
- learn how to communicate research ideas effectively
- appreciate the links between academic theory and practical relevance.

Learning outcomes

On successful completion of the course the participants will:

- have an overview of topical research areas in actuarial science
- understand how to formulate and test research questions
- know how find relevant data sources and literature
- be able to prepare a business research report of a professional standard
- have a sound grasp of a particular research topic.

Syllabus

Research process

A business research report should enable a non-specialist reader to acquire a sound basic knowledge of the topic covered. The process starts with selecting a suitable topic, followed by understanding the related literature, collecting any data required and, lastly, writing a well-structured, well-presented report with appropriate references to the literature.

Data/information sources

Students will be given an overview of sources they can access, including financial databases, academic journals and trade publications. The correct referencing and attribution of sources will be discussed.

Actuarial research areas

Staff from the Faculty of Actuarial Science and Insurance will present introductions to their areas of expertise and will highlight related topical research areas.

Communication skills

There will be sessions enabling students to work on their written and oral communication skills. There will be particular focus on the elements of writing a professionally presented business research report.

Reading list

A list of websites and journals from where source information can be found will be provided in the introductory seminar to the module.

BUSINESS RESEARCH PROJECT

SMM527

Module leader	A project supervisor will be allocated
Sessions	This is an individual project which students will develop in their own time with support from their project supervisor.
Module assessment	Coursework 100% Delivery of the final project, indicative length: 10,000 words

Educational aims

- To train students to undertake individual research and provide them with an opportunity to specialise in a contemporary business or finance topic related to their future career aspirations
- To integrate and apply concepts from different aspects of their MSc.

Learning outcomes

On completing the project students will be able to:

- Identify specific business or finance related issues which would be useful to research and shape an achievable research question around them.
- Develop a research question and plan and carry out a research programme to address the question.
- Understand the theories and recent research relating to the project topic.
- Understand how to apply research methodologies to practical business and commercial issues.
- Show confidence in overcoming problems raised in the course of a practical research project and
- Accept the challenge of carrying out a piece of research with elements of originality.

Project requirements

The choice of project is **your** responsibility. It is most important that you choose an area you are happy to work in, and in which you are confident of your abilities.

Students are encouraged to start thinking about project ideas at the beginning of their studies. By the end of the first term you will have gained sufficient knowledge to start to

develop ideas that can be discussed with faculty. We expect you to identify the basic idea or research question, though this is likely to be modified after discussion with academic staff.

Make effective use of the RPMS module. This module can be used to help to formulate your ideas and design an appropriate methodology. It can also help you develop a specific project topic – the greater clarity you have about the topic of your project the more successful it is likely to be.

The types of project allowed are:

What you can do	What you can't do
• Business report on a contemporary issue • Business plan • Statistical test of literature driven hypothesis • Empirical feasibility of a financial strategy • Development of a new product/ service / finance strategy • Market survey • Case study on a specific issue within a particular company/ organisation • Numerical project that describes and implements one or more numerical methods for pricing, hedging or reserving for derivatives or portfolios.	• Pure literature surveys • Some evidence that the writer has learnt a new subject, a sort of extra elective • A synthesis of other writing or a piece of journalism • A mere compendium of facts and statistics • Projects totally unrelated to relevant academic discipline and literature.

Reading list

Student research and reading list will be defined by the subject matter of the project.

Term Three Electives Information

Cass Business School provides an extensive range of elective modules for the different MSc programmes. A special elective handbook, regarding your term three selection of modules, will be distributed in the second term and will provide further information.

Electives which have previously been provided by MSc Actuarial Management include:

- Enterprise Risk Management
- Introduction to Model Office Building in Life Insurance
- Longevity Risk in Pensions Products
- Modelling and Data Analysis
- Stochastic Asset Models
- Topics in Quantitative Risk Management
- Introduction to Copula Modelling

Apart from these electives, students will also be able to choose from pre-selected modules offered by other MSc programmes. In the past these have included, among others:

- Pension Finance
- Hedge Funds
- Mergers and Acquisitions
- Reinsurance

Please note the School reserves the right to withdraw an elective if demand is insufficient and to add new electives if they are available. Space restrictions and timetable availability may also apply.

Section 4 – Regulations

4.1 Degree Requirements

Described below are the rules governing the award of a master degree in Actuarial Management. For further information, the City University's complete set of "Ordinances and Regulations", including the Assessment Regulations (Regulation 19) are published on the University's website

Periods of registration

The periods allowed for completion of the qualifications are:

- Four years for a masters degree, full or part-time
- Two years for a postgraduate diploma, full or part-time

Regulations for the award of the Postgraduate Diploma

To qualify for the Postgraduate Diploma, a candidate must achieve the following:

- Obtain a minimum of 120 credits in total from the Stage One modules (see assessment matrix for module credit weightings)
- Successful completion of the compulsory Stage One modules (i.e. SMM028 and SMM029) to achieve 50 credits.
- Successful completion of a minimum of a further 70 credits from the Stage One elective modules
    - This must contain at least two modules from SMM030, SMM031, SMM033, SMM034, SMM035, SMM036 and SMM037 (i.e. the modules corresponding to the ST subjects of the Institute and Faculty of Actuaries)

Award of Merit and Distinction of Postgraduate Diploma

The overall degree mark is calculated as the credit-weighted average of the marks on the compulsory modules and remaining highest-marked modules such that the student achieves 120 credits. Modules on which prior exemptions are held are excluded from the weighting.

The award of merit for the Postgraduate Diploma is based on:

- An average mark between 65% - 69.9% inclusive and no modules failed at first attempt;
- Or an overall degree mark of 70% or more and one module failed at first attempt

The award of Distinction for the Postgraduate Diploma is based on:

- An overall degree mark of at least 70% with no modules failed at first attempt.

Compensatory award of Graduate Diploma

The pass mark for each module is 50% to achieve the attached credits for the *Postgraduate Diploma*.

However, should this not be achieved in all required modules, then a lower pass mark of 40% is required to achieve the attached credits for the lesser award of the *Graduate Diploma in Actuarial Management*. The rules concerning compulsory subjects, prior exemptions and minimum required credits are the same for both awards.

However, it should be noted that whilst students awarded the Graduate Diploma only will be eligible for any professional exemptions obtained during the course (see below), they will not be eligible for the award of the MSc in Actuarial Management.

Regulations for the award of the MSc

To qualify for the award of an MSc in Actuarial Management, students must complete the Postgraduate Diploma in Actuarial Management and obtain a further 60 credits at Stage Two of the course.

Thus, successful completion of the MSc requires a **minimum of 180 credits**. However, it should be noted that additional credits achieved at Stage One in excess of the 120 credits required to obtain the Postgraduate Diploma will not count towards this target.

To achieve the 60 credits required at Stage Two, students must complete:

(i) the compulsory Stage Two module (i.e. Research Project Management Skills), giving a total of 10 credits; and

(ii) either

a) **five** of the Stage Two elective modules, each worth 10 credits; or

b) **one** of the Stage Two elective modules, worth 10 credits, and the Business Research Project (SMM527), worth 40 credits.

4.2 Award of Distinction and Merit

To calculate the overall degree mark, all module marks are combined using the weightings in the assessment matrix table.

The award of distinction for the masters is based on:

- An overall degree mark of at least 70% with no modules failed at first attempt.

The award of merit for the masters is based on:

- An overall degree mark between 65% - 69.9% inclusive and no modules failed at first attempt
- Or an overall degree mark of 70% or more and at most one module failed at first attempt

4.3 Assessment Calculations

The rules governing calculation of module and overall degree marks are as follows;

- There are no minimum mark requirements for separate assessment components (unless specifically stated). However, it is compulsory to complete all components and no module mark can be awarded until these are completed.
- A module mark is calculated by aggregating marks for all assessment components as stated in the module outline (see Section 3).
- Where modules are assessed by both exam and coursework, these are weighted to calculate the module mark. Please see the assessment matrix in Section 2 for the relative weightings.
- Where there are several pieces of coursework, the coursework results are calculated according to the relevant weightings to be advised by the module leader.
- To calculate the overall degree mark, module marks are combined using weightings in line with the relative credit value of each module.

4.4 Coursework

All coursework and invigilated tests are compulsory and count towards the final degree. In some modules, presentations or invigilated tests may replace written coursework assignments.

Some subjects may be assessed by coursework only. Precise details concerning examined and non-examined modules are provided in the module outlines.

Please note that coursework is required to be submitted for assessment by the specified deadline date. Late coursework will receive imposed penalties. Late coursework will immediately receive a deduction of five marks on the first day of lateness, with one further mark deducted for each day of lateness, for a maximum of five days. After this point coursework will not be accepted and a mark of zero will be awarded.

All coursework should be submitted electronically via the virtual learning environment, Moodle. **It is essential that you keep a copy of all coursework submitted**.

All sources used should be cited using the Harvard referencing system. Further information about this can be found on the Cass website:

http://www.cass.city.ac.uk/intranet/student/learning-resource-centre/citing-references

Coursework will be returned to students as quickly as possible with the aim of students receiving feedback within three weeks of submission

4.5 Failure and the Re-sitting of Modules

- Any module with an aggregate mark of less than 50% is deemed to have been failed and must be re-sat.

- To re-sit a failed module, a candidate must re-sit all assessment components for which a mark of less than 50% was obtained.

- Candidates may re-sit a module only once.

- A candidate who successfully completes a re-sit will be awarded the credits for the module. The mark awarded for any re-taken component will be capped at 50%. The mark awarded for other components will be the original mark. The subsequent module mark will then be used in calculating the overall degree average.

- A candidate who does not pass a required re-sit by the date specified by the Assessment Board will not progress on the programme and the Assessment Board will normally make a recommendation that they withdraw.

4.6 Grade Related Criteria

Class	%	Literary		Knowledge	Independent thought, uses of sources and research materials	Presentation	Professional
Distinction	85-100	A	Outstanding	Comprehensive and informative knowledge of subject area, may include new knowledge derived from which the marker and wider community may learn; addresses the learning outcomes/ assessment criteria in full	Where relevant, evidence of independent reading, thinking and analysis and strong critical ability	Well-constructed	Distinction
	80-84		Excellent				
	75-79		Very good	Sophisticated or strong - shows knowledge of complex issues or a broad range of issues and addresses the learning outcomes/ assessment criteria well.	Where relevant, show evidence of wide and comprehensive reading and critical ability	Clearly written	
	70-74						
Merit	65-69	B	Good	Sound knowledge of a broad range of issues or detailed knowledge of a smaller number of issues; makes a good attempt to address the learning outcomes/ assessment criteria, realising all to some extent and some well	Evidence of thorough research of the topic(s) but some answers may not be complete or arguments sufficiently explored. Some critical ability will be evident.	Well-structured and logically written	Merit
Pass	50-64	C	Satisfactory	Adequate knowledge of important issues – some level of response to all learning outcomes/ assessment criteria but may not include important elements or information that is fully accurate.	Where relevant, development of ideas is limited but attempts will be made to analyse materials critically	Expression and structure may lack clarity	Pass
Fail (0%-49%)	41-49	D	Poor	Unsatisfactory work - inadequate knowledge of the important issues and doesn't succeed in grasping key issues, therefore learning outcomes/ assessment criteria will not be realised	No real development of ideas and critical analysis will be very limited.	Presentation is confused or incoherent	Fail (0%-49%)
	20-40	E	Very poor	Knowledge is lacking either through omission, the inclusion of large amounts of irrelevant information or evidence of significant misunderstanding - totally inadequate attempt to address the learning outcomes/ assessment criteria	No critical ability will be displayed	Confused, incoherent or unstructured presentation	

Section 5 – Additional Information

5.1 MSc Course Office

The MSc course office is here to support both staff and students and each MSc course has its own dedicated Course Officer who you will get to know over the course of your time here at Cass. The Course Office team will provide you with course related information, material and your grades, advice relating to other areas of City University and support throughout the duration of your studies.

Location

The course office is located on the 3rd floor of Cass Business School, 106 Bunhill Row, London EC1Y 8TZ.

Contact

You can contact the course office team either in person at the office, by email, telephone or via Moodle, our virtual learning environment.

The MSc Actuarial Management Course Officer is Jemma Leahy and can be contacted directly via telephone 020 7040 5245 or by email jemma.leahy.1@city.ac.uk.

Office opening hours

During term time the course office is open to students:

Monday	1300 – 1830
Tuesday	1300 – 2000
Wednesday	1300 – 1830
Thursday	1300 – 2000
Friday	1030 – 1530

Outside of term time the course office is open to students:

Monday to Thursday	1300 – 1700
Friday	1030 – 1530

5.2 Virtual Learning Environment (Moodle)

Moodle is the virtual learning environment used at City University and it provides a wide variety of information and interactive environments to students, including the following:

- Module material and supplementary learning documents, including areas for the submission of coursework and the release of coursework results
- Timetables, including teaching and examination
- Specialist Masters, MSc specific and module pages providing information relating to each area with supporting documents and forums
- Links to the Learning Resource Centre, Careers, Student Advice and Clubs and Societies

Students are responsible for checking their Moodle pages and their City email account regularly. This is how all information, including changes to teaching, is communicated. Course Officers manage the communications sent to students via Moodle and all administrative enquiries should be directed to them for assistance.

5.3 Personal Tutors

Postgraduate Taught students are assigned a personal tutor at the beginning of the year. This personal tutor will be available to provide general academic, professional and pastoral support and will also ensure students are aware of the additional and more specialised support mechanisms available within the University.

Students should have the opportunity to see their personal tutor at least once a term. However, it is the student's responsibility to contact their personal tutor to make an appointment.

The Course Office team is also here to assist should you need any support during the course of your studies.

5.4 Academic Staff Contact Details

In addition to their main teaching responsibilities academics also engage in research, administration and external work. As a result staff members may not be able to see you without an appointment.

If the matter is non-urgent please make an appointment or make use of the office hours many academics hold. If the matter is urgent please make this clear when contacting the member of staff to request an appointment.

Lecturers' contact details and office hours can be found on Moodle.

5.5 Exemptions from the Examinations of the Actuarial Profession

Students may be eligible for exemptions from the examinations of the Actuarial Profession. At present, students are able to gain exemptions in Subjects CA1, CA3, ST1, ST2, ST4, ST5, ST6, ST7 and ST8 (as well as Subjects CT2, CT4, CT5, CT6 and CT8).

There are now two methods in which students might earn exemptions:

- by “accreditation”, or
- on a “subject-by-subject basis”

Exemptions by accreditation

The MSc in Actuarial Management was accredited by the Actuarial Profession in November 2006. Cass Business School was the first institution to have both undergraduate and postgraduate actuarial courses accredited.

An “actuarial average” is calculated based on the following modules:

- The two compulsory modules at Stage One (i.e. CA1 – Part I and CA1 – Part II), and
- All ST elective modules attempted (i.e. ST1, ST2, ST4, ST5, ST6, ST7 and ST8)

Because the actuarial average will include all ST modules attempted, if you have completed all CT modules prior to starting the course, you are highly recommended to attempt only two ST modules during the course and complete the 120 credits required at Stage One by attempting SMM040 Model Documentation, Analysis and Reporting (CA2). The mark obtained in SMM040 will not be included in the actuarial average. However, if additional ST modules are attempted instead, these will be included and you run the risk of adversely affecting your actuarial average.

This actuarial average will be based on the mark scored in each relevant module (i.e. including **both the coursework and examination component**) and will be based on the higher of the mark obtained at the first attempt and the capped mark obtained after any required re-sit.

If this actuarial average is **60% or more**, then the student will usually be awarded exemptions from each subject of the syllabus of the Actuarial Profession corresponding to the modules included in the calculation of the average **provided that** the student has **passed all the modules included** (based on a module pass mark of 50%).

However, it should be noted that the Independent Examiner appointed by the Actuarial Profession reserves the right to adjust this threshold from year to year to ensure consistency.

Exemptions on a subject-by-subject basis

For students who do **not** satisfy the accreditation requirements (or for additional CT modules completed, which are not covered by the accreditation requirements) the Independent Examiner will consider awarding exemptions on a **subject-by-subject basis.**

In this case, for CT modules, the Independent Examiner will consider the examination mark only. However, for CA1 and ST modules, the module mark will be used. For Subject CA1, the mark used for exemption purposes will be the average of the module mark obtained in SMM028 Actuarial Risk Management – Part I and SMM029 Actuarial Risk Management – Part II. Partial exemptions are not available.

The role of the Independent Examiner is to decide whether the student's performance is sufficiently good to be awarded an exemption in that particular subject. For Subject CA1, the Independent Examiner is likely to require that, to qualify for a subject-by-subject exemption, both SMM028 and SMM029 have been passed (at the 50% pass mark).

The standard required to obtain exemptions will usually be considerably higher than that required simply to pass the corresponding module for university purposes. Typically, an exemption is awarded on a subject-by-subject basis if the mark achieved is 60% or above. **However, this does vary from subject to subject and from year to year, so should be taken as a guide only.**

Re-sits for exemption purposes

Re-sits for exemption purposes only are no longer allowed by the Actuarial Profession. However, as mentioned above, where a relevant module must be re-taken to complete the degree, the capped re-sit mark can be used in the calculation of actuarial average.

CA3 exemption arrangements

For students who choose to complete the MSc by means of the Business Research Project (and one Stage Two elective module) only, there is the opportunity to gain an exemption in Subject CA3: Communications of the Actuarial Profession (i.e. this exemption is not available either to students completing only the Postgraduate Diploma or to those who choose to complete the MSc by means of completing five Stage Two elective modules).

This module will be considered separately for a subject-by-subject exemption only and will not be included in the accreditation arrangement discussed above.

Rather than being based directly on the quality of the project, the exemption will be based on the ability to communicate the complex ideas within the project to an audience of both specialists and non-specialists as specified by the Actuarial Profession.

To this end, you will be required to prepare an additional Executive Summary of the project (with a maximum of 1,000 words) and to give a short PowerPoint presentation (of a maximum of 15 minutes) to a panel on the main features of the project (i.e. background, methodology and conclusions). These must be submitted at the same time as the project, and late submission may mean that you will not be considered for exemption.

Whilst your supervisor may provide some basic assistance here, their main role is to supervise the project from an academic perspective (and not to ensure that you are able to gain the professional exemption).

The RPMS module in Term Two will provide some basic tuition on both written and oral communication, and additional sessions will be arranged in Term Three to assist those wishing to be considered for the exemption.

It is your responsibility to ensure that you understand all of the assessment regulations (for both university and exemption purposes).

If you are unclear about any of the regulations (or any other matters in this handbook), please discuss the matter with the Course Director as soon as possible.

Programme Disclaimer

The information in this Specialist Masters Programme Handbook is correct at the time of going to press in August 2012. The University reserves the right to make amendments to:

a) The contents of the Programme Handbook and in particular to the timetable, location and methods of delivery or the content, syllabus and assessment of any of its programmes as set out in the programme and module specifications in this Handbook and/or on the University's website; and

b) its statutes, ordinances, regulations, policies, procedures and fee structures,

provided that such amendments are (i) as a result of student demand (or lack thereof), (ii) as a result of unforeseen events or circumstances beyond the University's control or (iii) are deemed reasonably necessary by the University.

In the event that amendments are made, the University shall take reasonable steps to notify you as soon as is reasonably possible.

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Cass Business School
In 2002, City University's Business School was renamed Sir John Cass Business School following a generous donation towards the development of its new building in Bunhill Row. The School's name is usually abbreviated to Cass Business School.

Sir John Cass's Foundation
Sir John Cass's Foundation has supported education in London since the 18th century and takes its name from its founder, Sir John Cass, who established a school in Aldgate in 1710. Born in the City of London in 1661, Sir John served as an MP for the City and was knighted in 1713.