Form 16 Heriot-Watt University – Undergraduate Course Structure Template (RAY)

Version 3.0 (2007/2008)

1. Course Code	2. Course Title	3. School	4. Type	5. Awards
F771-FIM	**Financial Mathematics –Transition September 2008 – June 2009**	Mathematical & Computer Sciences	BSc	BSc Honours, BSc Ordinary, DipHE, CertHE

6. Course Accredited by	6. UCAS Code	7. QAA Subject Benchmarking Group(s)	8. Date of Production/Revision
	GGC3	Mathematics	8 July 2008

9. Stage Composition	10. Arrangement of Modules: (Themes and Subject Streams)			11. Awards, Credits & Levels
	Mandatory Modules	**Optional Modules**	**Elective Modules**	

Stage 1	8 modules 8 mandatory	**Semester 1** Calculus A (F17CA) Introduction to Statistical Science A (F77SA) Algebra A (F17CC) Introductory Economics (F77EC)	**Semester 2** Calculus B (F17CB) Introduction to Statistical Science B (F77SB) Professional Development Planning (F77PD) Finance and Financial Reporting (F77FF)	**Semester 1**	**Semester 2**	**Semester 1**	**Semester 2**	**Certificate of Higher Education** 120 credits (8 modules to be completed)
Stage 2	8 modules 7 mandatory and 1 optional module	Probability and Statistics A (F78PA) Actuarial and Financial Mathematics A (F78AA) Multivariable Calculus and Real Analysis A (F18CD) Linear Algebra (F18CF)	Probability and Statistics B (F78PB) Actuarial and Financial Mathematics B (F78AB) Multivariable Calculus and Real Analysis B (F18CE)		Finance and Fin. Reporting (F77FF) or Numerical Analysis A (F18NA)			**Diploma of Higher Education** 240 credits, incl. 90 at Level 8 (16 modules to be completed)

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Stage 3	8 modules 5 mandatory 3 optional	Stochastic Processes (F79SP) Statistical Models A (Project Module) (F79MA) Portfolio Theory and Asset Models (F79PA)	Statistical Models B (Project Module) (F79MB) Derivative Markets and Discrete-time Finance (F79DF)	**One of:** Introductory Economics (F77EC) Vector Analysis (F19MV) Intermediate Economics 1 (C28IE)	**Two of:** Bayesian Inference and Computational Methods (F79BI) Ordinary Differential Equations (F19MO) Intermediate Economics 2 (C28IF) Numerical Analysis B (F19NB) Finance Theory and Markets 2 (C38FN)			**Ordinary or General Degree** 360 credits, incl. 60 at Level 9 (24 modules to be completed)

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	Mandatory Modules	**Optional Modules**	**Elective Modules**	

Stage 4	8 modules 3 mandatory, 5 optional **Note:** Optional modules must be chosen so that at least 6 modules out of 8 are at SCQF level 10.	Financial Risk Management (F70FR) Continuous-time Finance (F70CF)	Derivative Markets and Discrete-time Finance (F79DF) Advanced Derivative Pricing (F70DP)	**Two of:** Optimisation (F10MM) Functional Analysis (F10MF) Vector Analysis (F19MV) Numerical Analysis C (F10NC) Statistical Computing (F70SC) Security Markets 1 (C39SM) Intermediate Economics 1 (C28IE) Corporate Finance 1 (C39CF) Financial Reporting (C38FR)	**Two of:** Risk Theory (F70RT) Partial Differential Equations (F10MP) Further Stochastic Processes (F70SP) Numerical Analysis D (F10ND) Ord. Diff. Equations (F19MO) Security Markets 2 (C39SN) Int Economics 2 (C28IF) Corporate Finance 2 (C39CG) Taxation (Tax Law) (C39TA) Numerical Analysis B (F19NB) Time Series (F70TS)			**Honours Degree** Requires 480 SCQF credits including a minimum of 180 at Level 9 and 10 and at least 90 at Level 10 (32 modules to be completed))

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	GGC3	Mathematics	20 February 2008

Stage Notes

Stage One: Students must study 8 mandatory modules.

Stage Two: Students must study 8 mandatory modules.

Stage Three: Students must study 5 mandatory modules, together with three approved option modules.

Stage Four: Students must study 3 mandatory modules, together with 5 approved option modules which must be chosen so that the course of study includes at least 90 credits at SCQF Level 10.

Progression Requirements

(a) Progression through the course requires a *minimum* of number of credit points:

Stage 1 to Stage 2: 120
Stage 2 to Stage 3: 240
Stage 3 to Stage 4: 360

(b) Progression through the course requires a *minimum of Grade D* at the first attempt is required in the following modules:

Stage 1: all modules
Stage 2: all modules
Stage 3: all modules

At all stages, the Progression Board may, however, allow a student to proceed with one, or two, E's in non-continuing subjects

Award Requirements

The class of honours is determined by the average of the final marks obtained in **all** modules taken in Stages 3 and 4 that are rated **SCQF level 9 or 10.**

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	GGC3	Mathematics	25 February 2008

10. Educational Aims of the Course

On completion of the course, students will be able to:
The course aims to provide an education in a wide range of subject areas associated with financial markets, particularly in probability, statistics, finance and derivatives. The course focuses on a quantitative approach and includes material in pure and applied mathematics and would not only be a firm basis for employment but also for postgraduate study.

The principle objectives are to:

- Provide an intensive and high-quality education in an undergraduate context.
- Enable students to develop a detailed knowledge and critical understanding of financial mathematics and the underlying theory of probability.
- Enable students to apply the knowledge they acquire to the solution of practical problems.
- Enable students to communicate and work effectively, autonomously, with initiative and responsibly.

11. The Course provides opportunities for learners to achieve the following outcomes:

Subject Mastery

Understanding, Knowledge and Cognitive Skills

On completion, the students will be able to demonstrate:

- A detailed knowledge and critical understanding of the theory and practice of pricing and hedging of financial instruments and their risk management.
- A detailed knowledge and critical understanding of statistical techniques important in the analysis of financial data.
- A detailed knowledge and critical understanding of probability and stochastic processes as applied to financial markets.
- Awareness and understanding of current issues in financial mathematics.
- Awareness of the structure and regulation of financial markets and of economics.

Scholarship, Enquiry and Research

On completion of the course, students will be able to:

- demonstrate that they have developed and can apply skills in critical analysis and evaluation of a wide range of theories, concepts, and techniques which arise in the study and practice of financial mathematics
- demonstrate statistical skills of critically evaluating and modelling data, and reporting findings
- demonstrate that they have developed problem solving skills
- identify and analyse issues, at a professional level .

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Personal Abilities

Industrial, Commercial and Professional Practice

On completion of the course, students will be in a strong position to move on to a professional environment, with sound knowledge and awareness of the nature of that environment and the demands it will make. They will also have the necessary background and experience to enable them to be ready and able to communicate on technical and general matters with peers and senior colleagues.

Autonomy, Accountability and Working with Others

On completion of the course students will be able to:

- Plan and organise own learning through self management and time management
- Assess issues associated with working as part of a team
- Communicate effectively at all levels and using a range of media

Communication, Numeracy and ICT

On completion of the course, students will be able to:

- Demonstrate high levels of numeracy as required by modern financial institutions
- Adopt a mature and professional attitude to the solution of technical problems.
- Demonstrate extensive IT skills and use of computer packages such as R, MATLAB, and Excel for solving of financial mathematics problems
- Make presentations on specialised topics and communicate well with peers and other colleagues

12. Approaches to Teaching and Learning:

Course learning outcomes derive from the requirements for financial mathematics expertise in modern financial institutions Teaching on the course is student-focussed, with students encouraged to take responsibility for their own learning and development. Teaching approaches and techniques include traditional lectures and tutorial sessions, and innovative computer demonstrations and computer lab sessions. In addition, students learn through structured group work, collaborative student presentations, and independent technical project work.

13. Assessment Policies:

The assessment policy for the course incorporates a range of assessment types. Continuous assessment during some modules and summative assessment at the conclusion of modules both contribute to the overall assessment and are used to formally measure achievement in specified learning outcomes. Understanding, knowledge and subject-specific skills are assessed by coursework assignments and written examinations. Formative assessment is used, especially in Stage 1 and Stage 2, to provide feedback and to inform student learning.

Stage 1 and 2 modules are assessed by end-of-term examinations and/or appropriate coursework (computer projects or assignments). Most Stage 3 and 4 modules are synoptically linked and are assessed at the end of the year. In addition, appropriate formative assessment (e.g. assignments, computer projects or other coursework) is used throughout Stages 3 and 4. Two Stage 3 modules (Statistical Models A and B) are assessed by research-informed project work (70%), which is carried out over two terms, and by an exam (30%), which covers related preparatory material.

Approaches to assessment are continually reviewed. Further details about methods of assessment are provided in the appropriate module descriptors.