



STUDENT HANDBOOK

BSc (HONS) Financial Engineering

PROGRAMME: 2134

SCHOOL OF COMPUTING & INFORMATION ENGINEERING

FACULTY OF COMPUTING & ENGINEERING

COLERAINE CAMPUS

UNIVERSITY OF ULSTER

COURSE DIRECTOR: DR MICHAELA BLACK

SEPTEMBER 2011 ENTRY

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Dear Student

I am very pleased to welcome you as a student to the University of Ulster and in particular to the School of Computing & Information Engineering on the Coleraine campus.

This handbook provides the information you need about your course. You will need to refer to this handbook throughout the year.

1. Introduction

Financial Engineering

Northern Ireland has been identified as having exceptionally strong credentials in financial services technology including infrastructure, applications support and software development. In its promotional material for inward investment on financial services, *InvestNI* promotes the fact that “*sophisticated software development for major financial institutions in London, New York, Frankfurt and Tokyo is being undertaken in the region. This sector continues to grow, offering scope for firms seeking to access mainframe skills or to develop increasingly specialist software for example in the area of algorithmic trading.*” The financial services industry in Northern Ireland is already well established. *InvestNI* report that “*the financial services industry in Northern Ireland employs over 20,000 people in more than 1,200 firms. It has a rapidly developing cluster of leaders covering investment banking, administration, retail and insurance services.* Given *InvestNI*'s role in attracting foreign direct investment from the leading international financial institutions to establish new business and employment opportunities within the Northern Ireland economy, we have actively engaged with them in developing a course that provides graduates with the skills in financial analysis, asset management and software development that are required by the leading financial services groups.

1.1 Structure and Overview of the Course

The *School of Computing and Information Engineering* and the *Department of Business, Retail & Financial Services* are both based at the Coleraine campus. They have a long and successful track record of collaboration to present courses at both undergraduate and postgraduate levels. The course resides within the Faculty of Computing & Engineering. The course will be managed and directed by the School of Computing and Information Engineering with collaboration from the Department of Business, Retail & Financial Services within the Ulster Business School (UBS).

Computing at Coleraine

The Subject's overall aim is:

To strive to achieve excellence in learning, teaching, research and technology transfer for the benefit of individuals, employers and the wider community in Northern Ireland and elsewhere.

The Subject was selected for a Discipline Audit Trail (DAT) during the QAA Institutional Audit in 2010. The academic standards and the quality of the learning opportunities available to students were confirmed as appropriate.

The professional body for the Subject is the British Computer Society (BCS), which accredited/exempted programmes in November 2008.

The Higher Education Academy National Subject Centre for Information and Computer Sciences, is based on the Jordanstown campus of the University. This provides a rich source of resources, special events on topics such as assessment, group working and the teaching of programming.

The Subject is supported by Visiting Professors who contribute to the delivery of seminars and bring their particular expertise into the curricula. Visiting experts are invited from other institutions, industry and professional organisations to contribute to the teaching (e.g. on professional development modules). Additionally the Subject is advised by a Computing Industrial Liaison Panel which meets several times a year providing two-way communication between the Subject and industry. A representative of the umbrella organisation for the NI Software industry, Momentum, also sits on this panel. Evidence of the importance placed on the comments of this Panel includes the introduction of C++ into the curriculum and an increased attention given to the development of the students' general communication and other softer skills.

Following the decision to concentrate on advanced Masters programmes in line with the QAA Qualifications Framework, the Subject has enhanced and introduced a wider portfolio of such programmes reflecting the particular identity and strengths of each campus. This includes an MSc in Telecommunications and Internet Systems at Coleraine.

Ulster Business School

The Ulster Business School consists of nine academic units. These are the Departments of Accounting; Management; Business, Retail and Financial Services; Hospitality and Tourism Management; International Business; Marketing, Entrepreneurship and Strategy (incorporating the Northern Ireland Centre for Entrepreneurship - NICENT); the Business Institute; the Research Graduate Centre; and the Research Institute.

The Department of Business, Retail and Financial Services comprises 22 academic staff, including 3 professors in the areas of Applied Financial Economics, Business Finance, and Finance & Investment. The new appointment made in 2007 to the latter position is especially relevant for the development and ongoing direction of this course.

The Department offers a range of courses at undergraduate and postgraduate levels, combining the core areas of business studies with a number of specialist subjects. Specialist subjects include retailing and financial services. UBS has a strong

international student base with a large cohort of students from other European countries (ERASMUS programme) and from our partner institutions in China.

In 2006-07 substantial changes to the Department's suite of undergraduate programmes were introduced in order to meet the changing needs of the local and international marketplace. These changes included the revalidation of the highly successful BSc Hons Business Finance and Investment programme and the approval for a new BSc Hons Business degree. In addition, the range of modular programmes was expanded to include for the first time a number of 'in-house' minor combinations (Accounting, Marketing and Retail Studies) with business. The changes to the provision will mean that students are presented with a much greater choice and degree of flexibility in their study than before.

The Department is strongly engaged with local and international business, and links with local and international business help to inform course development. The Department is involved in a range of industry liaison activities and collaborative activities that help to promote knowledge transfer with the local regional economy.

The Department has strong research expertise in various areas including retailing and financial services, small business and entrepreneurship, internationalization and e-business; research activities are supported by PhD programmes in these areas.

The overall aim of the course is to provide students with an opportunity to develop practical up-to-date knowledge and skills in the design, construction, and use of computing systems for the financial sector. In doing so the course will meet the needs of students with an interest in a career in the financial sector and/or the development of the major financial analysis and trading software tools that are at the core of the modern financial services industry. The course will also meet the needs of the financial industry, locally, nationally and internationally, and, in particular, the needs of the expanding financial services sector within Northern Ireland and the agencies, such as *InvestNI*, working to attract foreign direct investment from the leading international financial institutions to establish new business and employment opportunities within the Northern Ireland economy.

The programme provides a focussed study in the areas of software development, mathematics and modelling and finance and securities to a level that prepares students for immediate employment in the financial engineering industry. Possibilities exist for the future development of postgraduate courses in the area to provide additional choice for graduates on the Coleraine campus, within UU or beyond.

In particular, the course seeks to:

- provide a rigorous study of the theory and principles underlying modern financial engineering applications
- develop a high degree of expertise in the application, integration and critical evaluation of a range of financial engineering tools and facilities
- develop an ability to use, compare and critically evaluate a range of techniques, theories and methods as used in the development of financial engineering computing applications
- instil an understanding of the individual, social, organisational and economic implications of the application of financial engineering
- develop an ability to carry out a programme of work with minimal supervision
- develop an ability to communicate effectively
- promote the knowledge and skills required by the financial engineering industry

- stimulate an interest in financial engineering as an academic discipline, with a view to encouraging progression to postgraduate research
- provide appropriate experience of working in industry through a work placement
- provide students with an opportunity to obtain an in-depth knowledge and understanding of financial engineering

1.3 Course Team

The following tables highlight the relevant academic and support staff.

Table 1: Course Team

Name	Post	Special Duties (if applicable)
Prof. Richard Millar	Dean of Faculty of Computing & Engineering	
Mr Martin McKinney	Senior Lecturer Head of the School of Computing & Information Engineering	
Prof. Barry Quinn	Professor of Retail Marketing Head of Department of Business, Retail & Financial Services	
Dr Graeme Acheson	Lecturer	
Dr Michaela Black	Senior Lecturer	Course Director, Faculty PDP Coordinator, Year 1 Coordinator
Dr Norman Creaney	Lecturer	Placement Coordinator, Year 2 Coordinator
Prof. Philip Hamill	Professor of Finance & Investment	
Dr Zhonglin He	Lecturer	
Dr Moira McAlister	Lecturer	
Mrs Claire McCann	Lecturer	
Prof. Sally McClean	Professor of Mathematics	
Prof. David Bustard	Professor of Computing Science Project Coordinator, Year 4 Coordinator	
Dr Michael McNeill	Senior Lecturer	Timetabling Coordinator
Dr Adrian Moore	Lecturer	
Dr Philip Morrow	Senior Lecturer	Head of Computing & Engineering Research Graduate School
Prof. Gerard Parr	Professor of Telecommunications	

Prof. Bryan Scotney	Professor of Informatics, Director of Computer Science Research Institute	
Mr Roger Snowdon	Lecturer	
Dr Chris Stretch	Lecturer	
Dr Karl Stringer	Lecturer	Examinations Coordinator, Year 3 Coordinator
Dr Marek Szularz	Lecturer	

Table 2: Support Team

Name	Post	Special Duties (if applicable)
Tony McLaughlin	Technical Planning & Development Manager	
Janet Alison	Technical Services Engineer (Software)	Blackboard Manager
Nigel Creighton	Technical Services Engineer (Hardware)	
Steven Walmsley	Technician	
Pauleen Marshall	School Secretary	
Jane Fraser	School Secretary	

2. Student Support

2.1 Induction

All students registered on the Degree Programme will participate in an induction programme as outlined below.

Week	Topic	
0	Welcome & overview	Michaela Black, Year 1 Co-ordinator (at registration, Tuesday 20th Sept)
0	Lab and E-Mail Induction	Janet Allison and Tony McLaughlin (after registration, 20 th Sept)
1	Blackboard Induction	Janet Allison
1	Basic Induction	1 st year: What is a University? (Michaela Black) 2 nd year (placement focus): Dave Bustard and Norman Creaney 4 th year (project and career focus) Dave Bustard, Sean Gallagher (Date & Time TBC)
2	Coursework, Plagiarism & Referencing	Small Group Tutorials, (Date & Time TBC)
3	Meet your Advisor (in groups, then individually as necessary)	Meetings to (i) confirm details in student files; (ii) explain EC1 forms; (iii) discuss attendance so far.
4	How to Study: organisation and basic time management	Small Group Tutorials, (Date & Time TBC)
5	PDP	Overview, and ongoing in later weeks, Organiser: Michaela Black (lab based)
6	<i>Consolidation week</i>	Events as required
7	<i>Coursework week</i>	
8	Preparing for Examinations	Small Group Tutorials, (Date & Time TBC)
9	<i>Coursework week</i>	
10	<i>Coursework week</i>	
11	Meet your Advisor (in groups,	Reflection on first semester and CV

	then individually as necessary)	preparation through PDS
12	Revision week	Events as required
	2nd semester Q&A Session with year ahead	Organiser: Michaela Black

Table 3: Induction Programme

Additional tutorials for first year students through Software Development module COM135:

- Science Shop Introduction
- Programming skills for PDP
- Library Induction Online
- Student Support Interactive session
- Group Work

Organiser: Michaela Black

2.2 Adviser of Studies

On enrolment to the course the Course Director will allocate all students an Adviser of Studies. Students will meet their Advisor of Studies on the day of registration. The Advisers of Studies will agree with their students the frequency and format of meetings which will normally take place at least once during each semester. Advisers of Studies have a responsibility to guide their students in matters affecting their choice of optional modules, curriculum content, assessment, progress, and study and examination skills. Advisers of Studies are responsible for reporting on their students' progress in accordance with the procedures approved by the Course/Subject Committee and Faculty Board. Advisers of Studies are also encouraged to act in a general advisory capacity and to assist their students, particularly those in their first year, in meeting the requirements of a University environment. Where necessary, they should seek, or advise their students to seek, guidance and assistance from the range of support provided by Student Support, the Students' Union, Information Services, Chaplaincy etc.

2.3 Student Engagement

In year 1 (level 4) students are divided into teams and these teams are asked to engage in challenging competitive tasks for points in a fun, non-threatening environment. The teams select their own name or moniker for identification purposes and they are awarded points on the basis of a range of activities such as attendance, asking relevant questions in class, having work submitted on-time, and general performance and engagement (individual or group). The points accumulated determine the team's position in a league table and the league table is updated and displayed weekly. There are also additional award categories for performance e.g. most improved team, largest individual member contribution etc.



Figure 1: Engagement Games Prizes

2.4 University Centralised Support

The University's centralised *Department of Student Support* is available to help students achieve the maximum benefit from their University life. Students encounter personal challenges in learning and in living within the university environment. Their purpose of the Department of Student Support is to assist students, not only in relation to academic achievement, but also in their social and personal development, and to help them plan their future careers. There are a number of key areas of that are of particular use to students and these include Accommodation Services, Health Services, Nursery Care, Students Union and Student Development (which includes Counselling & Guidance and Careers). Details are available at: <http://www.studentsupport.ulster.ac.uk/>

2.5 Learning Resource Centre

Student learning facilities are also provided for via a modern £3.5 million [Learning Resource Centre](#) (LRC) which opened in 2008. Situated at the heart of the campus the LRC offers study and learning facilities via 230 networked computers and a further 450 personal study spaces. Mirroring the rest of the campus the LRC is fully Wi-Fi enabled for laptop users. Computer access, printing and photocopying facilities are available at the open access IT suite 24 hours a day.

2.6 Student Software Resources

The School maintains a web page providing links to a number of free-to-download software packages that will help you re-create the lab environment on your own PC. A selection of the software available is presented in the table below.

Java	Applications	Internet	Antivirus	Utilities
-Eclipse -IntelliJ -JDK	-LPA Win-Prolog -Clementine/PASW -Notepad++ -Rational Rose -db4objects - Excel-Addins ORMM	-Firefox -Adobe SVG Viewer -mifiles -DevPHP -SSH Secure Shell 3.2.9.2	-Stinger	-IZARC -TreeSize Free

Table 4: Student Software CD

Links to the software packages can be found on the School website at

<http://www.compeng.ulster.ac.uk/cie/softwareforstudents>

Students will also get membership to MSDN: Microsoft Developer Network

<http://msdn.microsoft.com/en-gb/default.aspx>

3. Course Structure

In keeping with the more distinguishing features of the undergraduate courses offered by the School of Computing & Information Engineering (Coleraine), particular emphasis has been given to the following:

1. **Development of Software Systems:** The School has always placed a strong emphasis on the skills associated with the development of high quality software systems. In the current submission significant emphasis is placed on the development of these skills within the context of finance.
2. **Delayed Module Choice:** It has been a strategic decision to provide a common pre-Placement programme. This ensures that all students from a particular programme have studied a common set of modules prior to Placement. This efficient operation of years 1 and 2 allows the School to promote an increased number of final year optional modules than would otherwise be the case.
3. **Extensive use of Blackboard:** All undergraduate modules on this course are (at least) Blackboard dependent.

The structure of the course is summarised below in Figure 2.

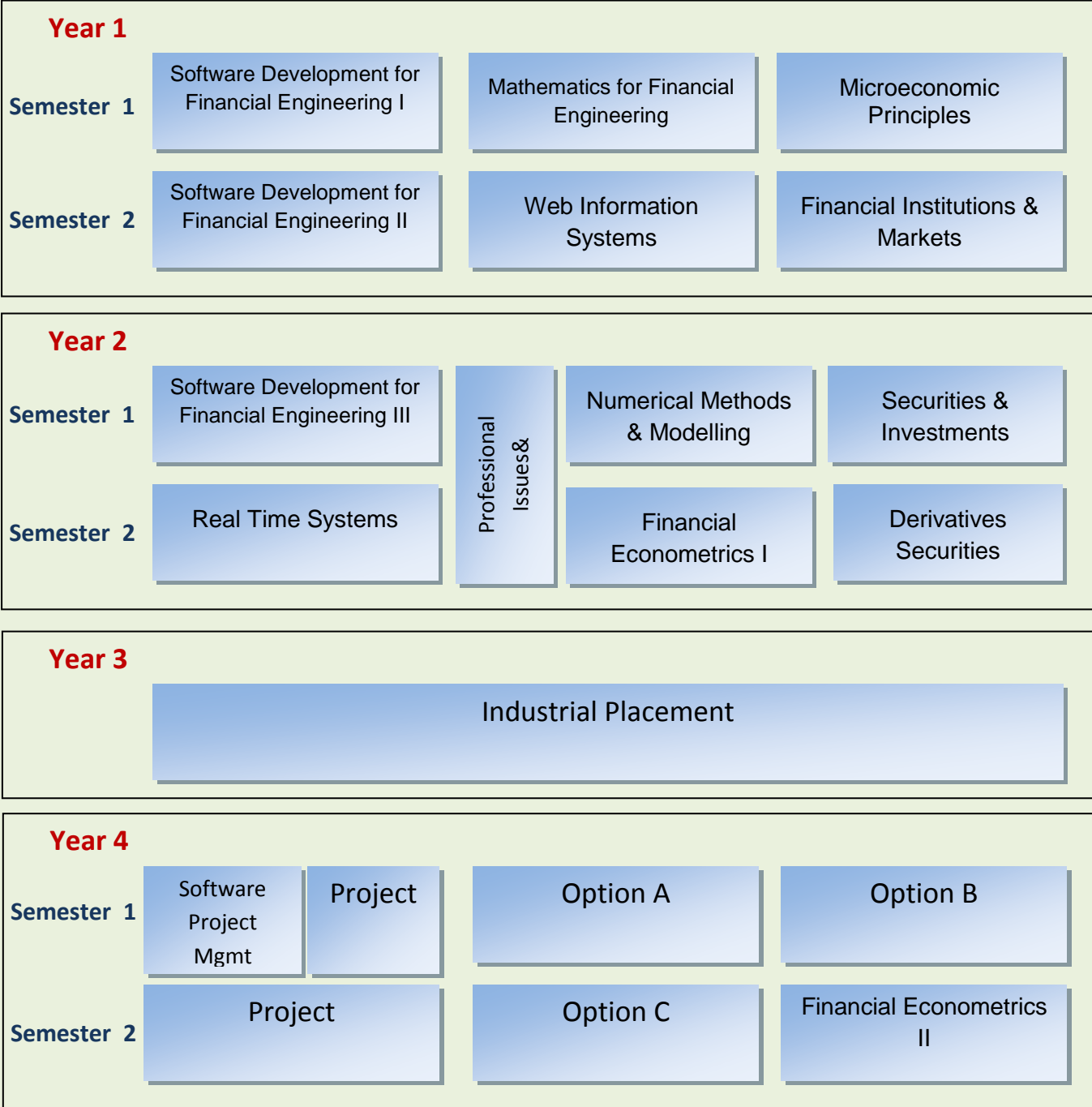


Figure 2: Course Structure

The various Level 6 Option Modules will be fluid in terms of content and semester of delivery. The diagram above illustrates the structure of the current proposal. Option modules will be driven by the needs of the industry coupled with relevant staff research interests. At present the Level 6 Option Modules are as follows:

- Operational Research Methods
- Machine Learning & Data Mining
- Networks & Web Security
- Advanced Database
- Fund Management and Performance Analysis

In the pre-placement phase, the course is structured in three strands that are interlinked through applications and assessments. These three interrelated strands are: software development; mathematical analysis and modelling; and finance and securities.

3.1 Course Themes

Software Development

Development of software systems, with a focus on the major financial analysis and trading software tools that are at the core of the modern financial services industry, is a core element of the course. Strong emphasis is placed on the skills associated with the development of high quality software systems, and through the three linked modules on *Software Development for Financial Engineering* students on this course will cover software development to the same depth as students taking BSc Computing. Development and provision of large-scale applications are highly relevant, and these issues are addressed at an early stage of the course in the *Web Information Systems* module. Software development experience is further extended to the financial engineering environment through the *Real-Time Systems* module which addresses the design and development of computer systems that must respond to financial market events and require real-time behaviour.

Mathematical Analysis and Modelling

The techniques and models underpinning financial engineering are mathematical in nature, and this strand of the course provides the mathematical, statistical and computational tools required to understand the principles and applications of financial instruments and systems. Through the modules on *Mathematics for Financial Engineering*, *Numerical Methods & Modelling*, and *Financial Econometrics I*, the essential elements of differential and integral calculus, methods of approximation, simulation, system performance and analysis, financial system modelling and statistical analysis (including time-series analysis) will be addressed. A key component of this strand will be the use of Industry standard software tools such as *Matlab* to construct and analyse computational models of financial instruments and systems.

Finance and Securities

The third strand of the course provides an understanding of financial markets and instruments. Core economic principles are addressed in year 1 through the *Microeconomic Principles* module, followed by a practical examination of the workings of financial markets and institutions in the module on *Financial Institutions and Markets*. Here, the connection between theoretical concepts and their real-world applications is explored, along with the significance of financial markets, institutions and instruments in the successful operation of the economy, the role of regulation, and drivers for change in the financial services industry. The module on *Securities Analysis* builds on topics developed in the *Mathematical Analysis and Modelling* strand to provide an understanding of investment products and how they are constructed, the valuation of financial assets, and operational aspects of trade processing. This aspect is extended in the *Derivatives Securities* module to develop

analytical skills and practical understanding of issuing, trading and settlement of securities and derivative instruments.

3.2 Module Summaries

The six modules in Year 1 and the seven modules in Year 2 of the programme are compulsory. Following Placement, all final year students are required take a Project (30 credit points) and a further compulsory 10-point module (Software Project Management). One other compulsory 20-point module (Financial Econometrics II) has been identified in semester two of final year. Students select two further modules in semester one and one other module in semester two to make up the requisite credits for the award.

Broadly speaking the first two years of the course are geared towards ensuring that students are well prepared and have the underpinning knowledge and skills for relevant Placements.

Reflecting the desired structure of the course, Year 1 is preparatory. It consists of:

- Two modules aimed at developing software development skills (Software Development for Financial Engineering I and Software Development for Financial Engineering II);
- Two modules that develop knowledge and understanding of financial institutions, financial markets, and the main asset classes and where they are traded (Microeconomic Principles and Financial Institutions & Markets); and
- A module devoted to underpinning mathematics and modelling (Mathematics for Financial Engineering)
- Modern information systems (Web Information Systems)

Year 2 builds on this and students will be exposed to

- Two modules aimed at further developing and refining their software development skills (Software Development for Financial Engineering III and Real Time Systems);
- Two modules devoted to developing further mathematical modelling skills within the financial environment (Numerical Methods & Modelling and Financial Econometrics I);
- Two modules on financial instruments - Securities & Investments and Derivatives Securities
- A core module on Professional Issues & Enterprise

Year 3 will be spent either on a relevant Year 3 Industrial Placement: Diploma in Professional Practice (DPP) or Intercalary Year: Diploma in International Academic Studies (DIAS).

Following placement, final year (Year 4, level 6) students return to the University to complete their studies. In this year they will be required to:

- Complete the core modules in *Project Management* and the individual *Project* enable students to draw together previously acquired and newly attained knowledge and skills, along with the professional experience gained from placement, to produce a computer-based solution to a realistic problem in the financial engineering domain.

- Earlier work on financial modelling and real-time data analysis is extended in the core module on *Financial Econometrics II*, as this is a topic that is central to the understanding, operation and analysis of financial engineering systems.

Further specific optional final year modules have been incorporated in the course because of their particular relevance to financial engineering; some examples of these are:

Advanced Database

Databases form a key component in modern financial systems. A financial engineer could be expected to both interface with such systems in developing applications and tools, and also to have sufficient technical background to interact with database specialists working on the infrastructure of financial institutions. The final year Advanced Database module covers the Oracle database, which is the most widely used system in the financial arena, and builds on principles that are established in the second year module on Real-time Systems so that students gain experience of how real-time financial data streams are handled within a financial trading system.

Machine Learning & Data Mining

Data Mining is used increasingly in the financial sector to provide automated induction of models for assessing risk and predicting future performance. The final year Machine Learning & Data Mining module provides a thorough grounding in the subject and, through the use of an industry standard Data Mining package, equips the student with the skills necessary to carry out a substantial data mining exercise.

Operational Research Methods

A key aspect of financial engineering is the development of an understanding of investment and trading strategies and their consequent payoffs. Operational research methods provide the techniques through which systems are modelled and associated behavioural strategies and payoffs can be analysed and assessed. Relevant model formulations, algorithms, simulation techniques and applications will be studied that enable the student to develop a critical approach to analysis and evaluation of financial instruments.

Ethical Issues and Ethical Approval

Issues of ethics on the course are addressed through a number of modules and also through induction where the issues of privacy, professional issues and security were discussed. Further coverage was provided through the core (compulsory) year 2 module: *Professional Issues and Enterprise* and the final year module in *Machine Learning and Data Mining* module. The University requires that any research that makes use of human subjects obtain ethical approval in advance. This includes techniques as simple as using a group of students to evaluate a piece of software. Students undertaking final year projects are required to discuss the issue of Ethical approval with their supervisor and to complete an ethical approval form as necessary. For projects that just require the use of questionnaires, using non-vulnerable adult subjects such as fellow students, a simplified process is available under Blackboard. Ethical approval is also required for all modules processes addressed within the *Project* module.

3.3 Entrepreneurship Training

It is important that students have an awareness of entrepreneurship and are capable of assessing the viability of any innovative project or new venture or the development of an existing one. Students need to be aware of the problems and issues associated with establishing and managing the development of a new or existing venture.

Entrepreneurship has always been a strong component of the courses offered with the Faculty of Computing and Engineering. While Entrepreneurship is delivered explicitly as part of some modules in some courses, in others it is implicit as is the case with this course.

General entrepreneurial concepts are covered primarily through the Year 2 (level 5) module Professional Issues and Enterprise (COM411). Guest speakers will include representatives of the financial engineering industry. There will also be additional contributions in terms of content/learning outcomes from the Web Information Systems module and from the level 6 modules (Software Project Management and Project). The final year Project module also encourages students to demonstrate innovative thinking and creativity in the development of a software product.

Table 5 identifies where the NICENT Entrepreneurship Learning Outcomes are matched on a one-to-one basis, as closely as possible, with learning outcomes in the various modules in the course.

NICENT Learning Outcome	NICENT Learning Outcome in Module			
	Module Title	Code	Yr	Sem
Knowledge and Understanding				
<i>Learning Outcome 1</i> Define what entrepreneurship is, consider how everyone has the potential to be entrepreneurial, and to explore the constituents of the entrepreneurial process	Professional Issues & Enterprise	COM 411	2	1
<i>Learning Outcome 2</i> Identify steps required to research the potential for an innovative idea for the development of an existing enterprise	Professional Issues & Enterprise	COM 411	2	1
<i>Learning Outcome 3</i> Examine the key resources required to exploit an innovative idea or opportunity to develop an existing business	Professional Issues & Enterprise	COM 411	2	1
<i>Learning Outcome 4</i> Identify the key steps required for exploiting an innovative idea or opportunity to develop an existing business	Professional Issues & Enterprise	COM 411	2	1
<i>Learning Outcome 5</i> Recognise the central role of creativity and	Professional Issues & Enterprise	COM 411	2	1

innovation in entrepreneurship				
<i>Learning Outcome 6</i> Appreciate the significance within entrepreneurial process of calculated risk taking	Professional Issues & Enterprise	COM 411	2	1
Professional/Practical Skills				
<i>Learning Outcome 7</i> Organise and utilise the components of the planning process in the development of an innovative project or the exploitation of a new opportunity to develop an existing business, launch a new venture, or initiate a social enterprise	Professional Issues & Enterprise	COM 411	2	1
	Web Information Systems	COM 104	1	2
<i>Learning Outcome 8</i> Communicate and sell innovative ideas effectively	Professional Issues & Enterprise	COM 411	2	1
	Web Information Systems	COM 104	1	2
NICENT Learning Outcome	NICENT Learning Outcome in Module			
	Module Title	Code	Yr	Sem
Transferable/Key Skills				
<i>Learning Outcome 9</i> Recognise the value and potential of innovative and entrepreneurial thinking for effective problem solving and change management	Professional Issues & Enterprise	COM 411	2	1
	Software Project Management	COM 501	4	1
	Project	COM 570	4	1&2
<i>Learning Outcome 10</i> Recognise the core role of creativity and innovation in managing the entrepreneurial process effectively	Professional Issues & Enterprise	COM 411	2	1
	Software Project Management	COM 501	4	1
	Project	COM 570	4	1&2

Table 5: Mapping of the NICENT Entrepreneurship Learning Outcomes within the BSc Hons Financial Engineering with DPP/DIAS

3.4 Placement & Placement Preparation

Students spend Year 3 in relevant and supervised employment referred to as industrial placement. The first two years of the BSc Programme are designed to provide the students with the knowledge and expertise they will need to extract maximum benefit from the placement experience.

Placement preparation begins with a module on *Professional Issues and Enterprise*, in Year 2, as highlighted above. Professionals from the finance industry will participate in the delivery of this module through guest lectures and seminars. Finance industry professionals will also participate in other aspects of the course: for example, live demonstrations of actual financial trading systems in operation, and access to industry standard financial modelling tools, can be provided.

Students then spend Year 3 in relevant supervised employment on an industrial *Placement*. Successful completion of placement is required for progression to final year while a performance level of 50% is recognised by the award of the Diploma in Professional Practice (DPP). The first two years of the course are designed to provide the fundamental knowledge and expertise that students will need to begin placement in the financial sector, including the financial software development industry. The industrial placement provides students with the opportunity to apply the skills they have already acquired to real tasks and projects in professional employment, and through this to enhance their personal development and subsequent employability. The Placement process for the course is organised, managed and assessed in accordance with the Faculty of Computing & Engineering's Code of Practice. Placement Officers are charged to ensure the day-to-day management and organisation of all aspects of the Placement activity and full details of the process and associated support mechanisms are made available on the University's MLE (Blackboard) and OPUS system.

There is specific dedicated support and information available for students considering the DAS route. Students will be appropriately counselled on the requirements and implications of selecting this alternative.

The BSc Programme has a member of academic staff known as the Placement Tutor who is responsible for:

- Establishing and maintaining good relations with placement providers;
- Finding new placements as required;
- Preparing students for the placement experience;
- Administering the process whereby students are placed;
- Collating the assessment returns at the end of the placement year;
- Making recommendation regarding each student's overall performance and progress.
- The Programme Placement Tutor is a member of a Faculty of Engineering Placement Group chaired by a Faculty Placement Co-ordinator. This group seeks to ensure close collaboration in the work of various Programme placement tutors.

3.5 Career Opportunities

All graduates from this Programme will have a high degree of skill in the development of quality software. The “core” of the Programme, essentially the first two years of study plus the final year project, will have prepared them for careers in software production in a variety of positions, including software houses, data processing and industrial computing. The Programme will also have prepared them to work at the hardware/software interface, and will provide the potential for hardware design. Further study routes are also possible through MRes, MPhil and PhD Programmes for those wishing to conduct detailed research into specific aspects of Information Technology. Careers advice is formally provided by the Careers Service. See <http://www.ulst.ac.uk/careers/> for more information.

In its “*ICT Future Skills Action Plan*”, published in June 2008, *InvestNI* forecasts a growth of 2.4% per year over the period 2006-2021 in the overall ICT industry in Northern Ireland. Within this action plan, the most significant growth area within the ICT sector in Northern Ireland is identified to be the software industry. Within this area lies the development of the major financial analysis and trading software tools that are at the core of the modern financial services industry. Within its Corporate Plan 2008-2011, *InvestNI* has announced a shift in sectoral focus, with a commitment to “*drive a shift towards high-value economic activity by attracting FDI in target industries, notably financial services, software and ICT, ...*”. Within this Plan, both Financial Services and Software are identified as “medium term” in terms of time to outcome, which is consistent with the provision of a new stream of graduates through this Financial Engineering course to meet the needs of an expanding and sustainable industry.

3.6 Teaching, Learning and Assessment Strategies

Teaching on all years of this degree takes the form of a suitable mix of lectures, laboratory sessions and/or tutorials in accordance with the approved module specifications.

The School of Computing & Information Engineering has fully embraced the concept of e-Learning and has considerable experience in its use. At module level, there is 100% engagement within the School with the University’s MLE (Blackboard) and all of the School’s modules are described as being (at least) “web-dependent”.

The Course Committee meets in advance of each semester and makes arrangements for an agreed schedule of assessments for the semester. In agreeing and approving the schedule the committee ensures that the students’ workload is distributed fairly evenly across each semester.

Where students are assessed by group work, they will be made aware at the outset of the module how individual contribution to group work will be assessed and marked. While precise details will vary from assessment to assessment, typically group work assessments include both a group mark and an individual component mark.

Assessment on this degree takes the form of a suitable mix of activities including group work, presentations, programming exercises, log books, individual lab exercises and sessional examinations. As with the delivery of modules, the assessment is appropriate to the learning outcomes of the module.

All student work is moderated in compliance with the (module’s) sponsoring Faculty’s Code of Practices (Computing & Engineering or Ulster Business School as

appropriate). These include matters relating to the moderation of both coursework and examinations at each level (including External Examiner involvement in the process).

The final year project will (as appropriate) be supervised by one or more academic members of the Course Committee. Staff may be drawn from either the School of Computing & Information Engineering or the Department of Business, Retail and Financial Services). The final year project is double marked

3.7 Personal Development Planning

Personal Development Planning (PDP) is a structured process to support students to become more effective, independent and autonomous learners, and to plan for career development. Employers are increasingly expecting graduate recruits not only to have a good degree but also a well-rounded CV. The use of PDP perceived by employers as evidence of someone who is both capable and competent at their work and also able to keep abreast of new trends and developments.

The Professional and Career Enhancement (PACE) System is a web application accessible from any computer, on campus or at home. It supports students' Personal Development Planning, enabling them to reflect upon, record and evaluate their personal, academic and career experiences.

PDP is introduced as part of the student's Induction programme. Studies Advisors will encourage and support the students in their use of PACE System to access personal and key module skills; personal adaptation to university study and life; identify and address weak areas. The two Year 1 modules - Software Development for Financial Engineering 1 & 2 – will provide students with an opportunity to reflect on their key skills and to make plans to overcome any deficiencies. Students will be able to implement and reflect and analyse the success of their chosen technique.

The groundwork established in Year 1 is then built on in Year 2 in Placement preparation sessions where practical application of the principles comes into play. Again, the PACE System is utilised to assist with the production of CVs etc., enabled by direct integration with the Faculty's online placement support system, OPUS. Students also use the PACE System's journaling feature to reflect on work-based problems and to make their responses available for review.

In final year, students are strongly encouraged to avail of the services of the Career Development Centre for further development of interview skills, job selection and career planning. PDP is given appropriate prominence at all stages of the degree.

As part of a student's on-going personal development a variety of extra-curriculum opportunities will become available to them while studying on the course. All students are strongly encourage to participate in as many of these as possible. Typical examples of these development opportunities are:

- Microsoft Imagine Cup: <http://www.microsoft.com/ireland/imaginecup/>
- Class Representatives:
http://www.uusu.org/content/52625/class_representation_/
- Tutoring in Schools: <http://www.ulster.ac.uk/teachlearn/access/tis/>
- Student Union Membership & University Clubs: <http://www.uusu.org/>
- Entrepreneurial Competitions

- Stock Exchange Challenge Event
- Member of School Social Events Organisational Team
- Team Roles in Groups
- Invited Guest Speakers Talks



Figure 3: 2010 Coleraine Student Teams Competing at Microsoft Imagine Cup Final, Dublin

3.8 Prizes and Awards

The University offers annually a number of prizes and awards for competition among students. These are awarded by the Board Of Examiners to the most successful students on their programmes. On this Programme, the following prizes can be competed for.

<i>Title of Prize</i>	<i>Criteria for selection</i>	<i>Students eligible</i>
McCrea Leebody Science Awards (normally no more than 3 awards each year)	Performance in Year 1 studies	All Year 1 students across all campuses
Alumni Fund Awards for Academic Excellence	Highest overall average mark across the modules undertaken for Year 1 or equivalent	All university-based undergraduate degree students in the Faculty who have completed Year 1
British Computer Society Medal and Prize	Most outstanding student in the final Honours year	All final year students across all campuses
Kainos Prize	Final year project which uses technology in the most innovative way	Final year students on the Coleraine campus

Table 6: Prizes and Awards

3.9 The Programme Timetable

The Programme timetable will be distributed at enrolment or induction and can also be viewed on the Programme Notice board.

3.10 University Calendar 2011-2012

Introductory period

Monday 19 September 2011 - Friday 23 September 2011

Autumn Semester

Monday 26 September 2011 – Friday 27 January 2012 (15 weeks)

Christmas vacation

Monday 19 December 2011 – Friday 6 January 2012

Examinations begin

Monday 9 January 2012

Spring Semester

Monday 30 January 2012 – Friday 1 June 2012 (16 weeks)

Easter vacation

Monday 2 April 2012 – Friday 13 April 2012

Revision week

Tuesday 8 May 2012 – Friday 11 May 2012

Examinations begin

Monday 14 May 2012

Summer Semester

Monday 23 July 2012 – Friday 14 September 2012 (8 weeks)

Examinations begin

Monday 3 September 2012

Supplementary Examinations

Wednesday 15 August 2012 – Thursday 23 August 2012

4. Programme Management

4.1 Course Director – Dr Michaela Black

Day-to-day administration of each Programme is the responsibility of the Course Director. All major decisions in the running of the Programme are taken at Course Committee meetings.

4.2 Year Coordinators

Year Coordinators are responsible for the pastoral care of their assigned year and the overseeing of major activities in that year. Common responsibilities will include monitoring attendance, identifying class representatives, and addressing issues that arise, either through student-staff meetings or in day-to-day operations.

Year 1: Dr Michaela Black

Year 2: Dr Norman Creaney

Year 3: Dr Karl Stringer

Year 4: Prof. David Bustard

4.3 Course Committee

The Course Committee is essentially a committee formed by those members of academic staff who have teaching responsibilities on the Programme as well as the nominated Studies Advisors.

The Course Committee reports to the Faculty's Learning and Teaching Committee, which in turn reports to the Faculty of Engineering Board. This is the normal route for all of the Faculty's Course Committee meeting minutes.

Student progression (i.e. assessing the performances of students and determining whether or not they should be allowed to proceed to the next stage of the Programme) is the responsibility of the Board of Examiners. The Board of Examiners is essentially the Course Committee plus an External Examiner. The External Examiner is an academic member of staff from another university whose main brief is to oversee standards etc. on the Programme.

The Programme Committee meets on a regular basis – normally at least once per semester, although other special meetings may be arranged should a need be identified.

4.4 Student/Staff Consultative Committee

Part of the Course Committee meetings is devoted exclusively to the consideration of general student problems associated with the Programme. This is the Staff-Student Consultative Committee and two/three elected students from each year of the Programme are invited to participate as Class Representatives. These elected representatives are invited to express the views of their peers in relation to the organisation and delivery of the Programme. In the past, issues addressed have included:

- ✓ Resourcing;
- ✓ Comments on the delivery assessment of each module;
- ✓ Workloads;
- ✓ General Feedback
- ✓ Other general programme-related matters

The Staff-Student Consultative Committee is a formal forum for students to express their opinions. The Faculty's policy is to encourage the early identification of problems and to bring these to the attention of staff as soon as possible.

5. Programme Specification

COURSE TITLE(S): BSc Hons Financial Engineering

PLEASE NOTE:

This specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he or she takes full advantage of the learning opportunities provided. More detailed information on the specific learning outcomes, content and the teaching, learning and assessment methods of each module can be found at www.compeng.ulster.ac.uk/cie/cie_undergraduate.php

1	AWARD INSTITUTION/BODY:	UNIVERSITY OF ULSTER
2	TEACHING INSTITUTION:	UNIVERSITY OF ULSTER
3	LOCATION:	COLERAINE
4	ACCREDITED BY:	
5	FINAL AWARD:	Bachelor of Science (BSc)
6	MODE OF ATTENDANCE:	FULL-TIME
7	SPECIALISMS:	Computing Science, Financial Services
8	COURSE/UCAS CODE:	Banner Code :6276 UCAS Code: GG61 C BSc/FEng
9	DATE WRITTEN/REVISED:	January 2009

10 EDUCATIONAL AIMS OF THE COURSE

The overall aim of the programme is to provide a focussed study in the areas of software development, mathematics and modelling and finance and securities to a level that prepares students for immediate employment in the financial engineering industry. Possibilities exist for the future development of postgraduate courses in the area to provide additional choice for graduates on the Coleraine campus, within UU or beyond.

In particular, the course seeks to:

- provide a rigorous study of the theory and principles underlying modern financial engineering applications
- develop a high degree of expertise in the application, integration and critical evaluation of a range of financial engineering tools and facilities
- develop an ability to use, compare and critically evaluate a range of techniques, theories and methods as used in the development of financial engineering computing applications
- instil an understanding of the individual, social, organisational and economic implications of the application of financial engineering
- develop an ability to carry out a programme of work with minimal supervision
- develop an ability to communicate effectively
- promote the knowledge and skills required by the financial engineering industry
- stimulate an interest in financial engineering as an academic discipline, with a view to encouraging progression to postgraduate research
- provide appropriate experience of working in industry through a work placement
- provide students with an opportunity to obtain an in-depth knowledge and understanding of financial engineering

11 MAIN LEARNING OUTCOMES

The following reference points were used to inform the development of the programme and its learning outcomes:

- the University's Vision and core strategic aims, teaching and learning strategy and policies
- current research or other advanced scholarship carried out by academic staff
- subject benchmark statement (Computing – March 2007) available at:
<http://www.qaa.ac.uk/academicinfrastructure/benchmark/statements/computing07.pdf>
- requirements of professional (BCS) bodies
- national and University qualifications and credit frameworks

The course provides opportunities for students to achieve and demonstrate the following learning.

Successful students will be able to:

11 K KNOWLEDGE AND UNDERSTANDING OF SUBJECT

- K1** Demonstrate knowledge and understanding of the key concepts, principles, theories and practices that underpin financial engineering as an academic discipline and its relevance to a modern economy
- K2** Demonstrate knowledge and understanding of a range of tools, practices and methodologies used in the specification, design, implementation, testing and critical evaluation of computer software systems for use within the financial sector.
- K3** Demonstrate knowledge and understanding of the methods used in defining and assessing criteria for measuring the extent to which a financial engineering computer system is appropriate for its current deployment and future evolution taking into account factors such as limitations, constraints, fitness-for-purpose, quality and possible trade-offs
- K4** Demonstrate knowledge and understanding of financial institutions, financial markets, and the main asset classes and where they are traded
- K5** Demonstrate knowledge and understanding of the pricing of derivatives securities and payoffs from derivative trading strategies
- K6** Demonstrate knowledge and understanding of the mathematical, statistical and computational tools and techniques required to understand the principles and applications of financial instruments and systems.

Teaching and Learning Methods:

Teaching and learning will be a mixture of lectures, seminars and laboratory classes (practical classes). Much of the teaching materials will be provided in electronic form, with Blackboard providing a managed learning environment for the course. The student will develop from being heavily guided towards the relevant material to become more independent as they progress towards self-learning across the programme. All modules are (at least) Web Dependent. Electronic assessment will be used where practical and appropriate.

Assessment Methods:

Assessment will take the form of a mixture of closed-book examinations, submission of laboratory books, coursework assignments, class tests and oral presentations.

11 I INTELLECTUAL QUALITIES

- I1** Apply the key concepts, principles, theories and practices that underpin financial engineering as an academic discipline and its relevance to a modern economy
- I2** Select and apply a suitable range of tools, practices and methodologies for use in the specification, design, implementation, testing and critical evaluation of computer-based financial software systems
- I3** Develop and assess criteria for measuring the extent to which a financial engineering computer system is appropriate for its current deployment and future evolution
- I4** Analyse the role of the various financial markets in the financial services industry
- I5** Develop derivative trading strategies and be able to distinguish between using derivatives securities for hedging, speculation and arbitrage
- I6** Identify and apply the appropriate combination of mathematical, statistical and computational tools and techniques required in applications of financial instruments and systems.

Teaching and Learning Methods:

Teaching and learning will be a mixture of lectures, seminars and laboratory classes (practical classes). Much of the teaching materials will be provided in electronic form, with Blackboard providing a managed learning environment for the course. Electronic assessment will be used where practical and appropriate.

Assessment Methods:

Assessment will take the form of a mixture of closed-book examinations, laboratory books, coursework assignments, class tests and oral presentations.

11 P PROFESSIONAL/PRACTICAL SKILLS

- P1** Select and use relevant sources of information to identify potential computing solutions for financial engineering problems
- P2** Select and effectively deploy a range of tools for the modelling, construction, testing and documentation of computer-based financial engineering applications
- P3** Specify, design and construct computer-based systems for a range of financial application areas
- P4** Identify asset classes and appropriate trading locations.
- P5** Advise on the use of derivatives securities for hedging, speculation and arbitrage
- P6** Use an appropriate range of mathematical, statistical and computational tools and techniques required in applications of financial instruments and systems.

Teaching and Learning Methods:

Practical skills will be developed and nurtured primarily in the supervised laboratory classes. Typically the emphasis will move from quite heavily guided laboratory work towards work that requires a greater individual contribution. Professionalism and professional practices will be encouraged at all stages with a Year 2 (level 5) module identified as a key element in ensuring students are formally aware of the issues prior to Placement. Much of the resources will be provided in electronic form with Blackboard providing a managed learning environment for the course.

Assessment Methods:

Problem based coursework, use of laboratory resources, lab books, presentations, individual reports and contribution to group reports. Electronic assessment will be used where practical and appropriate.

11 T TRANSFERABLE SKILLS

- T1** Demonstrate effective information-retrieval skills
- T2** Demonstrate appropriate numeracy and literacy skills in understanding and presenting cases involving a quantitative and qualitative dimension
- T3** Make effective use of general IT facilities
- T4** Work as a member of a team recognising the various roles within a team and alternative ways of organising a team
- T5** Organise and manage their own learning and development in an efficient and effective manner
- T6** Make effective use of a range of learning resources to guide their learning
- T7** Appreciate and demonstrate the need for continuing professional development in recognition of the need for lifelong learning
- T8** Communicate effectively using various media and for a variety of audiences

Teaching and Learning Methods:

These skills will be progressively developed across the course primarily through the tutorials, seminars, practical sessions associated with each module. These will be supported by the activities associated with the Placement (including Placement preparation) and project work (including Project preparation and implementation).

Assessment Methods:

Reports, lab based assessment, use of software packages, groupwork, group projects, CV preparation, examination and coursework. Electronic assessment will be used where practical and appropriate.

11 PROGRAMME LEARNING OUTCOME MAP

Please Note: The matrix displays only the measurable programme outcomes and where these are developed and assessed within the modules offered in the programme.

YEAR 1

MODULE		OUTCOMES																									
TITLE	CODE	K1	K2	K3	K4	K5	K6	I1	I2	I3	I4	I5	I6	P1	P2	P3	P4	P5	P6	T1	T2	T3	T4	T5	T6	T7	T8
Software Development for Financial Engineering I	COM135	✓	✓	✓				✓	✓	✓				✓	✓	✓				✓		✓	✓	✓	✓		✓
Mathematics for Financial Engineering	COM159	✓					✓	✓					✓	✓					✓	✓	✓					✓	✓
Microeconomic Principles	ECO101	✓			✓			✓			✓			✓			✓			✓	✓					✓	✓
Software Development for Financial Engineering II	COM138	✓	✓	✓				✓	✓	✓				✓	✓	✓				✓		✓	✓	✓	✓		✓
Web Information Systems	COM104	✓	✓	✓				✓	✓	✓				✓	✓	✓				✓		✓	✓	✓			✓
Financial Institutions & Markets	ECO103	✓			✓			✓			✓			✓			✓			✓	✓					✓	✓

YEAR 2

MODULE		OUTCOMES																									
TITLE	CODE	K1	K2	K3	K4	K5	K6	I1	I2	I3	I4	I5	I6	P1	P2	P3	P4	P5	P6	T1	T2	T3	T4	T5	T6	T7	T8
Software Development for Financial Engineering III	COM316	✓	✓	✓				✓	✓	✓				✓	✓	✓				✓		✓	✓	✓	✓		✓
Numerical Methods & Modelling	MAT304	✓					✓	✓					✓	✓					✓	✓	✓				✓		✓
Securities & Investments	ACF301	✓			✓			✓			✓			✓			✓			✓	✓					✓	✓
Professional Issues & Enterprise	COM411	✓						✓						✓						✓				✓		✓	
Real Time Systems	COM329	✓	✓	✓				✓	✓	✓				✓	✓	✓				✓		✓	✓	✓	✓		✓
Financial Econometrics I	ACF304	✓					✓	✓					✓	✓					✓	✓	✓						✓
Derivatives Securities	ACF307	✓				✓		✓				✓		✓				✓		✓	✓					✓	✓

Final Year

MODULE		OUTCOMES																									
TITLE	CODE	K1	K2	K3	K4	K5	K6	I1	I2	I3	I4	I5	I6	P1	P2	P3	P4	P5	P6	T1	T2	T3	T4	T5	T6	T7	T8
Software Project Management	COM501	✓			✓	✓		✓			✓	✓		✓			✓	✓		✓	✓		✓		✓	✓	✓
Project	COM570	✓	✓			✓		✓	✓			✓		✓	✓			✓			✓	✓	✓	✓	✓	✓	✓
Operational Research Methods	COM551	✓					✓	✓					✓	✓					✓	✓	✓	✓		✓	✓		✓
Machine Learning & Data Mining	COM542	✓	✓	✓			✓	✓	✓	✓			✓	✓	✓	✓			✓	✓	✓	✓		✓	✓		✓
Networks & Web Security	COM zzz	✓	✓	✓				✓	✓	✓				✓	✓	✓				✓	✓			✓	✓		
Advanced Database	COM572	✓	✓	✓				✓	✓	✓				✓	✓	✓				✓		✓		✓			
Financial Econometrics II	ACFzzz	✓				✓	✓	✓				✓	✓	✓				✓	✓	✓	✓	✓					
Fund Management & Performance Analysis	ACF716	✓			✓	✓	✓	✓			✓	✓	✓	✓			✓	✓	✓	✓	✓					✓	✓

12 STRUCTURE AND REQUIREMENTS FOR THE AWARD

The course can be studied in full-time mode over a period of four academic years.

Each academic year of the course is arranged into 2 semesters - each semester is of 15 weeks duration. The learning is divided into study units called modules. All modules have been described at Levels 1, 2 or 3.

With the exception of the Placement module, all modules have a credit value of 10, 15, 20 or 30 credit points. The Placement module has a credit value of 60 credit points. The credit value of a module is in proportion to the effort required from the student with 1 credit point corresponding to 10 hours of student work effort. Hence (for example) a 20-point module corresponds to 200 hours of student work effort.

Student work effort for a module includes activities such as attending lectures, tutorials, seminars and practical classes; preparing for and performing coursework; preparing for and sitting examinations; independent and directed self-study and so on.

Progression from Semester 1 to Semester 2 is automatic.

To be eligible to proceed to the next stage of the programme, a student needs to pass all modules (120 credit points).

The names of the modules within the course, the levels at which they are studied, the credit ratings and awards that may be gained are shown in the following table:

Level 4 Modules

Module Title	Credit		Module Status	Awards
	Level	Points		
Software Development for Financial Engineering I	4	20	Compulsory	-
Mathematics for Financial Engineering	4	20	Compulsory	-
Microeconomic Principles	4	20	Compulsory	-
Software Development for Financial Engineering II	4	20	Compulsory	-
Web Information Systems	4	20	Compulsory	-
Financial Institutions & Markets	4	20	Compulsory	-

Level 5 Modules

Module Title	Credit		Module Status	Awards
	Level	Points		
Software Development for Financial Engineering III	5	15	Compulsory	-
Numerical Methods & Modelling	5	20	Compulsory	-
Securities & Investments	5	20	Compulsory	-
Professional Issues & Enterprise	5	10	Core	-
Financial Econometrics I	5	20	Compulsory	-
Real Time Systems	5	15	Compulsory	-
Derivatives Securities	5	20	Compulsory	-

Placement Module

Module Title	Credit		Module Status	Awards
	Level	Points		
Industrial Placement	5	60	Compulsory	DPP
Business Education Initiative	5	120		DIAS

Level 6 Modules

Module Title	Credit		Module Status	Awards
	Level	Points		
Software Project Management	6	10	Core	1/12 (Hons)
Project	6	30	Core	1/4 (Hons)
Operational Research Methods	6	20	Option	1/6 (Hons)
Machine Learning & Data Mining	6	20	Option	1/6 (Hons)
Digital Image Processing	6	20	Option	1/6 (Hons)
Networks & Web Security	6	20	Option	1/6 (Hons)
Advanced Database	6	20	Option	1/6 (Hons)
Financial Econometrics II	6	20	Compulsory	1/6 (Hons)
Fund Management & Performance Analysis	6	20	Option	1/6 (Hons)

NB:

- 1 All students must select a total of 3 Option modules (60 credits).
- 2 These should be balance across the 2 semesters i.e. 1 Option modules (20 credits) in Semester 1 and 2 Option modules in Semester 2.

13 SUPPORT FOR STUDENTS AND THEIR LEARNING

Students and their learning are supported in a number of ways. These include:

- A series of phased Induction sessions to provide timely advice on the key aspects of the course provision.
- A Faculty Student Handbook to provide a guide to life as a student within the Faculty of Computing & Information Engineering.
- A Course Student Handbook to provide all the necessary information about the course.
- Module Handbooks (electronic or otherwise) to describe the content of each module delivered in a particular year.
- A Course Director who has responsibility for ensuring the smooth day-to-day operation of the course.
- An Adviser of Studies is allocated to each student. Advisers of Studies are members of staff with the responsibility of assisting students in their personal and career development.
- Personal Development Planning
- A centralised Accommodation Service that helps new and existing students explore the range of accommodation options available.
- A centralised Careers Service is available to help students determine their future career and support their applications for employment.
- A centralised Information Services Department with responsibilities covering library, academic and administrative computing, digital communications, audio-visual services and reprographic services
- A centralised Student Support Department is available to students who have problems with non-academic aspects of student life.
- A Sport and Recreation Department
- An International Office
- A Students' Union
- A Chaplaincy

14 CRITERIA FOR ADMISSION

Applicants must satisfy the University's general entry requirements as set out in the prospectus or demonstrate their ability to undertake the course through the accreditation of prior experiential learning (APEL). The initial offer standard may vary from year to year.

Students will also be expected to have achieved a minimum of Grade B at A-Level Mathematics (or broad equivalent).

See prospectus entry.

15 EVALUATING AND IMPROVING THE QUALITY AND STANDARD OF TEACHING AND LEARNING

Quality and standards are evaluated and improved through consideration of:

- QAA benchmark for Honours Degrees in Computing
- IEEE Computing Curricula for Computer Science
- Views of students as expressed through staff/student consultation, and the University student questionnaire on teaching and other questionnaires
- Views of graduates in the National Student Survey
- Views of employers
- Views of external examiners
- Student performance data and career progression
- University processes for initial approval, periodic re-approval and annual monitoring.

In addition, there are University/Faculty/School strategies for teaching and learning.

16 REGULATION OF STANDARDS

Assessment rules

The pass mark for course, modules and individual assessments is 40%

Performance levels for degree classification are as follows:

1 st Class	An overall average of at least 70%
2 nd Class Upper Division	An overall average of at least 60% and less than 70%
2 nd Class Lower Division	An overall average of at least 50% and less than 60%
3 rd Class	An overall average of at least 40% and less than 50%

External Examiners

There is one External Examiner for the course.

External examiners are academic subject or professional experts appointed from outside the University. Their key functions are to contribute to the assurance of the standards of the award and the fair treatment of students. They are involved in the moderation and approval of assessments and the moderation of the marking undertaken by internal examiners.

17 INDICATORS OF QUALITY RELATING TO TEACHING AND LEARNING

Selected indicators of quality relating to Teaching and Learning include:

- 25% of teaching staff within the School of Computing & information Engineering are members of the British Computer Society
- Computing at Ulster was ranked 15th out of 81 UK Universities in 2008 Research Assessment Exercise
- A Discipline Audit Trail for Computing was examined as part of the 2005 QAA Institutional Audit with a number of positive comments. The following summary extract is appropriate:

“Computing programmes in the three Schools are defined appropriately and satisfy the requirements of professional accreditation where relevant. A review of assessed work confirmed that the standards achieved by students are appropriate to the titles of the awards and their location in FHEQ. The quality and extent of the DSED impressed the audit team, as did the articulation by staff of their commitment to the continual development and refinement of their courses and their attendance to issues such as student retention in very positive and supportive ways. Students felt that staff were very approachable and helpful, and this contributed significantly to a positive student learning experience. The quality of learning opportunities is suitable for the programmes of study leading to the named awards.”

18 TABLE OF MODULES

Modules at Level 4

BSc Hons Financial Engineering (DPP/DIAS)

Yr	Sem	Level	Module Title	Code	Credit Value	Status	Current, Revised or New	Assessment Methods (%)		Contribution to overall mark of the Final Award
								Exam	CW	
1	1	4	Software Development for Financial Engineering I	COM135	20	Compulsory	New	0	100	-
1	1	4	Mathematics for Financial Engineering	COM159	20	Compulsory	New	50	50	-
1	1	4	Microeconomic Principles	ECO101	20	Compulsory	New	60	40	-
1	2	4	Software Development for Financial Engineering II	COM138	20	Compulsory	New	50	50	-
1	2	4	Web Information Systems	COM104	20	Compulsory	Current	50	50	-
1	2	4	Financial Institutions & Markets	ECO103	20	Compulsory	Revised	60	40	-

Modules at Level 5

BSc Hons Financial Engineering (DPP/DIAS)

Yr	Sem	Level	Module Title	Code	Credit Value	Status	Current, Revised or New	Assessment Methods (%)		Contribution to overall mark of the Final Award
								Exam	CW	
2	1	5	Software Development for Financial Engineering III	COM316	15	Compulsory	New	50	50	-
2	1	5	Numerical Methods & Modelling	MAT304	20	Compulsory	New	50	50	-
2	1	5	Securities & Investments	ACF301	20	Compulsory	New	60	40	-
2	1&2	5	Professional Issues & Enterprise	COM411	10	Core	Current	0	100	-
2	2	5	Real Time Systems	COM329	15	Compulsory	New	50	50	-
2	2	5	Financial Econometrics I	ACF304	20	Compulsory prerequisite - <i>Mathematics for Financial Engineering</i>	Revised	50	50	-
2	2	5	Derivatives Securities	ACF307	20	Compulsory	New	60	40	-
3	4	5	Industrial Placement	COM367	60	Compulsory	Current	0	100	100% DPP
			Business Education Initiative	BEI300	120					100% DIAS

Modules at Level 6

BSc Hons Financial Engineering (DPP/DIAS)

Yr	Sem	Level	Module Title	Code	Credit Value	Status	Current, Revised or New	Assessment Methods (%)		Contribution to overall mark of the Final Award
								Exam	CW	
4	1	6	Software Project Management	COM501	10	Core	Current	50	50	1/12 BSc
4	1&2	6	Project	COM570	30	Core	Current	0	100	1/4 BSc
4	1	6	Operational Research Methods	COM551	20	Option	Current	75	25	1/6 BSc
4	1	6	Machine Learning & Data Mining	COM542	20	Option	Current	75	25	1/6 BSc
4	2	6	Networks & Web Security	COM505	20	Option	Current	75	25	1/6 BSc
4	2	6	Advanced Database	COM572	20	Option	Current	75	25	1/6 BSc
4	2	6	Financial Econometrics II	ACF514	20	Compulsory (prerequisite - <i>Financial Econometrics I</i>)	New	0	100	1/6 BSc
4	2	6	Fund Management & Performance Analysis	ACF716	20	Option (prerequisites - <i>Securities and Investments, Derivative Securities</i>)	New	60	40	1/6 BSc

6. Course Regulations

UNIVERSITY OF ULSTER

COURSE REGULATIONS

1	COURSE TITLE	COURSE CODE
	Bachelor of Science (with Honours) in Financial Engineering with DPP/DIAS	6276

2	MODE OF ATTENDANCE	Full-time
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3 DURATION

FULL-TIME SANDWICH: Normally 4 years (6 semesters of study and placement year)

Bachelor of Science (with Honours) in Financial Engineering with DPP/DIAS

4	LOCATION	Coleraine
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5	FACULTY	Computing & Engineering
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6 ADMISSION REQUIREMENTS

Applicants must:

- (a) satisfy the University's general entry requirements and have attained a pass in Mathematics at GCE 'A' level (grade B) or
- (b) provide evidence of their ability to undertake the programme through the accreditation of prior experiential learning.

NOTE

Regulations state that to satisfy minimum General Entry Requirements applicants must:

- (a) provide evidence of competence in written and spoken English (GCSE grade C or equivalent) and, where specified within individual course or subject entry requirements, in numeracy (GCSE Grade C or equivalent); and
- (b) have attained passes in five different subjects, of which two should be at GCE 'A' level, and three at GCSE level (grades A, B or C); or have attained passes in four different subjects, of which three should be at GCE 'A' level and one at GCSE level (grades A, B or C); or have alternative approved qualifications.

7 EXEMPTIONS

- 7.1 Studies pursued and examinations passed in respect of other qualifications awarded by the University or by another university or other educational institution, or evidence from the accreditation of prior experiential learning, may be accepted as exempting candidates from part of an approved programme provided that they register as students of the University for modules amounting to at least the final third of the credit value of the award at the highest level.

8 PLACEMENT/STUDY ABROAD

Year 3 of the Course is spent on placement: Diploma in Professional Practice (DPP), or study abroad: Diploma in International Academic Studies (DIAS).

For the award of Diploma in Professional Practice (DPP) or Diploma in International Academic Studies (DIAS), the period of full-time work experience or full-time study outside Northern Ireland respectively must last at least 25 weeks.

During the placement year students are expected to adhere to the normal attendance practices of their place of employment. An industrial supervisor from the employing company and an academic supervisor from the Faculty are assigned to each student. Assessment of placement is on the basis of 5 elements:

- | | |
|------------------------|-------|
| 1. Visits | (30%) |
| 2. Technical Report | (10%) |
| 3. Log Book | (10%) |
| 4. Final Report | (30%) |
| 5. Employer Assessment | (20%) |

During the study abroad, students spend an academic year studying at a university in the USA. At the host institution, students will:

- complete twenty-four business credits and six electives;
- undertake a period of voluntary or community work; and
- make three BEI Seminar Presentations per semester, to an audience of peers, academics and British Council staff.

Assessment will take the form of:

- | | |
|------------------------------|-------|
| 1. A Reflective e-Portfolio | (20%) |
| 2. A BEI Project Report | (35%) |
| 3. Grade Point Average (GPA) | (45%) |

The pass mark for the DPP or the DIAS is 50%. In addition, for the DIAS (only) the student must also score at least 35% in each of the 3 components in order to pass.

To be eligible for the award of DPP or DIAS the candidate must obtain a mark of at least 50% and complete the Course.

A candidate who achieves a mark of 70% or more, and completes the Course is eligible for the award of DPP with Commendation.

Candidates who do not obtain a mark of at least 50% but who obtain at least 40% will be deemed to have completed the placement satisfactorily but will be ineligible for the award of DPP.

Progression

In order to progress to the final year (Year 4, level 6) of the Course a candidate must obtain a pass mark of at least 40% for placement and complete any outstanding Year 2 (level 5) modules.

Exemption

Exemption from placement will be awarded only in the most exceptional circumstances. To be so exempted a candidate must satisfy the Board of Examiners that he/she has acquired work experience equivalent to placement.

A candidate must submit an application for exemption that includes a report (approximately 2,000 words) outlining the extent and level of the work experience already obtained, together with a report from his/her employer(s). A sub-committee consisting of the Course Director and the Placement Tutor will assess the application. They will then make a recommendation to the Board of Examiners. An interview with the candidate may form part of the assessment process.

A candidate who is exempted from placement will not be eligible for the award of DPP. Such candidates will be permitted to progress into the final year of the programme.

Special Circumstances

The Board of Examiners may in the case of candidates who are prevented by illness or other sufficient cause from taking the whole or part of the assessment, or whose results are substantially affected by illness or other sufficient cause, permit the candidate to take, complete or repeat the assessment at an approved subsequent date.

A student who is unable to obtain placement or who does not complete placement satisfactorily:

- (a) may be eligible to apply to transfer to an equivalent course without a placement element (admission to which would be at the discretion of the Course Committee of the equivalent course) or
- (b) may obtain a leave of absence to continue seeking a suitable placement

9 ATTENDANCE REQUIREMENTS

- 9.1 Students are expected to attend all classes associated with the programme and be punctual and regular in attendance.
- 9.2 A student who has not been in attendance for more than three days through illness or other cause must notify immediately the Course Director. The student shall state the reasons for the absence and whether it is likely to be prolonged. Where the absence is for a period of more than five working days, and is caused by illness which may affect their studies, the student shall provide appropriate medical certification in accordance with the General Regulations for Students.
- 9.3 Students who are absent without good cause for a substantial proportion of classes may be required to discontinue studies, in accordance with the General Regulations for Students.

10 RULES GOVERNING STUDENT CHOICE

- 10.1 Modules are offered as indicated in the table at section 19. Revisions may be made in accordance with the University's quality assurance procedures. Module availability may vary.

11 EXAMINATION AND ASSESSMENT

- 11.1 The performance of candidates shall be assessed by the Board of Examiners in accordance with the Regulations Governing Examinations in Programmes of Study.
- 11.2 Candidates shall be assessed in the modules for which they have enrolled in each year of study. At the discretion of the Board of Examiners candidates may be required to attend a viva voce examination.
- 11.3 Within each module candidates shall be assessed by coursework, examination and a combination of coursework and examination in accordance with the attached table.
- 11.4 The pass mark shall be 40% for each assessment element and for the module overall.
- 11.5 The pass mark for the placement/intercalary year is 50%; a mark of 40% is sufficient for progression to the next stage of the programme.

12 SUBMISSION OF COURSEWORK

- 12.1 Coursework shall be submitted by the dates specified by the Course Committee.
- 12.2 Students may seek prior consent from the Course Committee to submit coursework after the official deadline; such requests must be accompanied by a satisfactory explanation and in the case of illness by a medical certificate. This application shall be made to the Course Director.

12.3 Coursework submitted without consent after the deadline shall not normally be accepted.

13 PROGRESS

13.1 Subject to 14 and 15 hereof, candidates are required to pass all modules in each year of study in order to proceed to the next year. Progress from semester 1 to semester 2 is automatic.

14 CONSEQUENCES OF FAILURE

14.1 Candidates who fail to satisfy the Board of Examiners in assessment may be permitted at the discretion of the Board to re-present themselves as specified in 15.2 for one or more supplementary examination and repeat such coursework or other assessment requirements as shall be prescribed by the Board. Such candidates may be exempted at the discretion of the Board from the normal attendance requirements. Where candidates are required to repeat coursework or to take a supplementary examination the original mark in the failed coursework component or examination shall be replaced by a mark of 40% or the repeat mark whichever is the lower for the purpose of calculating the module result except in the DPP/DIAS year where the maximum mark allowed shall be 50%.

14.2 In each year other than the final year the consequences of failure shall normally be as follows:

<u>Failure at the First Attempt</u>	
Failure in modules with an overall value up to and including 60 credit points	Repeat specified examinations and/or coursework in the failed modules (examinations August)
Failure in modules with an overall value of between 60 and 80 credit points	Repeat specified examinations and/or coursework in the failed first semester module(s) (examinations January) and of specified examinations and/or coursework in the second semester modules (examinations May) with or without attendance OR withdraw from the programme
Failure in modules with an overall value of more than 80 credit points	Withdraw from the programme
Failure by candidates in Year 2 of sandwich programmes	Exceptionally second year students on sandwich programmes may be permitted to commence the placement period, pending a requirement to represent themselves for supplementary written examinations or to repeat coursework

<u>Failure at the Second Attempt</u>	
Failure in modules with an overall value up to and including 20 credit points	Provided that the module(s) are not prerequisite(s) which must be passed, proceed to next year and repeat once only specified examination(s) and/or coursework in the failed module(s) at the next examination period (January or May)
Failure in modules with an overall value up to and including 40 credit points (except as above)	Repeat once only specified examination(s) and/or coursework in the failed module(s) at the next examination period (January or May or August if semester already repeated) with or without attendance (progress to next year not permitted)
Failure in modules with an overall value of more than 40 credit points	Withdraw from the programme

Consequences of failure in placement year (DPP)

<u>Failure at the First Attempt</u>	
Failure in report	Resubmit report by a date specified by the Course Committee (Maximum mark not to exceed 50%)
Failure in placement	Repeat once only all or part of placement
<u>Failure at the Second Attempt</u>	
Failure in report	Repeat once only the report (Maximum mark not to exceed 50%)
Failure in placement	Withdraw from the programme

Consequences of failure in intercalary year (DIAS)

Failure at the First Attempt	Repeat <i>once only</i> the study period in whole or in part OR take specified examinations and/or coursework. (Maximum mark not to exceed 50%)
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Failure at the Second Attempt	Withdraw from the programme <u>OR</u> repeat <i>once only</i> specified examinations and/or coursework. (Maximum mark not to exceed 50%)
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14.3 Failure in the Final Year (Honours degree)

In the final year the consequences of failure shall normally be as follows:

Failure in modules with an overall value up to and including 40 credit points	Repeat once only specified examination(s) and/or coursework in the failed module(s) in consideration for Honours classification (examinations August)
Failure in modules with an overall value of more than 40 credit points	Withdraw from the programme

15 **CLASSIFICATION OF FINAL RESULT**

15.1 The table at section 19 indicates the contribution of each module to the final award. The weighting of each module's contribution to the overall mark shall be determined by its credit value.

15.2 Classification of Final Result (Honours degree)

The following percentages shall be used to determine candidates' overall gradings

Class I	At least 70%
Class II (division i) (Ili)	At least 60% and less than 70%
Class II (division ii) (Ilii)	At least 50% and less than 60%
Class III	At least 40% and less than 50%

In order to be considered for a particular class of Honours degree a candidate must have obtained marks in the appropriate range or above in at least 50% of the credit value of Level 6 modules, in addition to achieving an overall mark in the class.

15.3 Award of Diploma in Professional Practice (DPP) or Diploma in International Academic Studies (DIAS)

The following shall be the minimum percentages used in determining the overall grading of candidates in the Diploma.

Pass with Commendation	70%
Pass	50%

16 ILLNESS AND OTHER EXTENUATING CIRCUMSTANCES

16.1 In any year other than final year.

The Board of Examiners may in the case of candidates who are prevented by illness or other sufficient cause from taking or completing the whole or part of the assessment during the programme, or whose results are substantially affected by illness or other sufficient cause, permit the candidates to complete, take, or repeat the assessment in one or more modules at an approved subsequent date.

16.2 Final year (Honours Degree):

The Board of Examiners may in the case of candidates who are prevented by illness or other sufficient cause from taking or completing the whole or part of the final stage assessment or whose results are substantially affected by illness or other sufficient cause:

- (a) permit the candidate to complete, take, or repeat as candidates for the Honours degree, the assessment in one or more modules at an approved subsequent date **or**
- (b) deem the candidate to have passed and recommend the award of an Aegrotat Honours Degree.

16.3 Before an Aegrotat award is recommended a candidate must have indicated that he or she is willing to accept the award.

17 REVISIONS TO REGULATIONS

These regulations may be revised during the student's period of registration in accordance with the procedures approved by Senate.

PROGRAMME SPECIFIC RESOURCES

Individual module coordinators will advise on any key texts which must be purchased for each module.

Students are charged for printing. Print cards are available for purchase from a card dispenser in the School print room.