



School of Computing &
Intelligent Systems
Faculty of Computing and Engineering

PG Dip/MSc Computing and Intelligent Systems

Full-time: 2090PM-EN/2088PM-EN
Part-time: 2249PM-EN/2245PM-EN

PG Dip/MSc Computing and Creative Technologies

Full-time: 6212PM-EN/6216PM-EN
Part-time: 6213PM-EN/E6217PM-EN

PG Dip/MSc Computing for Financial Services

Full-time: 5761PM-EN/5762PM-EN
Part-time: 5764PM-EN/5765PM-EN

STUDENT HANDBOOK

<http://scis.ulster.ac.uk/>

Academic Year 2009-10

Course Director: Dr. Tom Lunney

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B1 PROGRAMME SPECIFICATION

UNIVERSITY OF ULSTER

COURSE TITLE:

Postgraduate Diploma/Master of Science Computing and Intelligent Systems

1 AWARDING INSTITUTION/BODY:

University of Ulster

2 TEACHING INSTITUTION:

University of Ulster

3 LOCATION:

Magee Campus

4 ACCREDITED BY:

University of Ulster

5 FINAL AWARD:

Postgraduate Diploma

Master of Science

6 MODE OF ATTENDANCE:

Full-time

Part-time

7 SPECIALISMS:

Computing

8 COURSE/UCAS CODE:

Computing and Intelligent Systems

Full-time: 2090PM-EN/2088PM-EN; Part-time: 2249PM-EN/2245PM-EN

9 DATE REVISED: 2007/2008

10 EDUCATIONAL AIMS OF THE COURSE:

The course aims to provide postgraduate education and training in the concepts and methods of computing and intelligent systems and their applications to the needs of the commercial, industrial and business communities.

It aims to impart the high-level skills necessary for graduates to pursue a career in computing and intelligent systems or a related area.

It aims to provide a platform for graduates to embark on further research studies, or a leadership role in the specification, design and implementation of large-scale computer systems.

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
- Draft benchmarking standards for taught Masters in Computing (supported by QAA) at <http://www.comp.leeds.ac.uk/roger/cphc/Masters/BM.pdf>
- Current research or other advanced scholarship carried out by academic staff
- Requirements of the British Computer Society
- 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:

11K KNOWLEDGE AND UNDERSTANDING OF SUBJECT

- K1** demonstrate knowledge and sound understanding of the fundamental concepts, principles, theories and practices underlying computing in the domain of knowledge based systems.
- K2** recognise and analyse criteria and specifications appropriate to specific problems and plan strategies for their implementation.
- K3** employ effectively practices and tools for the specification, design, implementation and critical evaluation of intelligent computing applications.
- K4** analyse the extent to which an intelligent system meets the criteria defined for its current deployment and future evolution.
- K5** communicate effectively ideas, proposals and designs to a range of audiences, using rational and reasoned arguments either orally, written or electronically. (Masters project only)
- K6** understand the professional, legal, moral and ethical issues involved in the exploitation of computer technology. (Masters project only)

Teaching and Learning Methods: Lectures, tutorials, seminars and practical sessions.

Assessment Methods: Coursework, written unseen examinations.

11I INTELLECTUAL QUALITIES

- I1** specify, design and construct intelligent systems.

- I2** evaluate such systems with respect to general quality and possible trade-offs within the parameters of the problem.
- I3** assess the implications, risks and safety aspects of applying an intelligent solution to a selected application domain.
- I4** generate and evaluate tests which investigate the functionality of intelligent based systems. (Masters project only)

Teaching and Learning Methods: Lectures, tutor directed tutorials, supervised practical sessions and self-directed learning.

Assessment Methods: Coursework related to case studies and projects, written unseen examinations, workbooks, project reports and dissertation.

11P PROFESSIONAL/PRACTICAL SKILLS

- P1** select and use appropriate hardware and software, recognising its logical and physical properties.
- P2** comprehend the complete engineering process involved in the effective deployment of computers to solve practical problems.
- P3** deploy effectively computer based tools towards the construction and documentation of intelligent systems applications.
- P4** write reports, using complex arguments, for various audiences including research, technical or commercial domains. (Masters project only)

Teaching and Learning Methods: Lectures, tutor directed tutorials, problem based seminars and practical sessions, project preparation and implementation.

Assessment Methods: Problem based coursework, project interim reports and research paper presentation.

11T TRANSFERABLE SKILLS

- T1** learn in both familiar and unfamiliar situations making effective use of information-retrieval skills and of learning resources.
- T2** communicate effectively using various media and with a variety of audiences.
- T3** make effective use of general Information Technology facilities.
- T4** demonstrate self-direction and originality in tackling and solving problems, and act autonomously in planning and implementing tasks to a professional level.

T5 appreciate the need for continuing professional development in recognition of the requirement for Life Long Learning. (Masters project only)

Teaching and Learning Methods: Lectures, tutor directed tutorials, seminars and practical sessions, project preparation and implementation.

Assessment Methods: Assessments, project presentations, interim reports and research paper presentation.

PgDip - Computing and Intelligent Systems

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

MODULE TITLE	LEVEL	CODE	OUTCOMES																			
			K1	K2	K3	K4	K5	K6	I1	I2	I3	I4	P1	P2	P3	P4	T1	T2	T3	T4	T5	
Database Technologies	7	COM718	√	√	√					√				√	√						√	
Computational Intelligence	7	COM907	√	√		√				√	√	√		√	√			√				
Research Methods	7	COM848	√	√		√						√		√	√	√		√	√	√	√	
Artificial Intelligence / Knowledge Based Systems	7	COM908	√	√	√					√	√				√				√	√		
Network Management	7	COM721	√	√	√						√			√	√						√	
Mobile & Pervasive Computing	7	COM844	√		√					√				√		√					√	
Cognitive Computing	7	COM847	√		√					√		√		√	√					√	√	
Intelligent Embedded Systems	7	COM912	√	√	√					√	√	√		√	√	√				√		

MSc - Computing and Intelligent Systems

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

MODULE TITLE	LEVEL	CODE	OUTCOMES																			
			K1	K2	K3	K4	K5	K6	I1	I2	I3	I4	P1	P2	P3	P4	T1	T2	T3	T4	T5	
Database Technologies	7	COM718	√	√	√					√				√	√						√	
Computational Intelligence	7	COM907	√	√		√				√	√	√		√	√			√				
Research Methods	7	COM848	√	√		√						√		√	√	√		√	√	√	√	
Artificial Intelligence / Knowledge Based Systems	7	COM908	√	√	√					√	√				√				√	√		
Network Management	7	COM721	√	√	√						√			√	√						√	
Mobile & Pervasive Computing	7	COM844	√		√					√				√		√					√	
Cognitive Computing	7	COM847	√		√					√		√		√	√					√	√	
Intelligent Embedded Systems	7	COM912	√	√	√					√	√	√		√	√	√				√		
Masters Project (Research)	7	COM865	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

12 STRUCTURE AND REQUIREMENTS FOR THE AWARD

The Postgraduate Diploma programme consists of eight taught modules. The Masters degree consists of the eight modules of the Postgraduate Diploma in addition to a substantial piece of independent research. The modular organisation of the PgDip/MSc course means that it can be taken in either full or part-time mode of study. In full-time mode, study for the Masters is completed in one academic year. In part-time mode the study for the Masters takes at least two academic years. Fulltime students will normally take 4 of the taught modules in each of the first two semesters, and seek to complete the Master's Project during the following summer. The internal coherence of the programme implies that the first block of four taught modules taken should be successfully completed before embarking on the second block of four taught modules. Students progression to the Masters project is subject to having successfully passed all eight modules with the pass mark being 50% for each module. Each of the taught modules attracts 15 credit points, with the Masters Project attracting 60 credit points. Candidates for the Master's are required to obtain 180 credit points at level 7 for the award of MSc Computing and Intelligent Systems. Candidates who do not wish to or are unable, for any reason, to complete the Masters Project can exit from the Program with a Postgraduate Diploma, having successfully completed all 8 taught modules to gain 120 credit points at Level 7.

Module Title	Credit Level	Credit Points	Module Status	Awards
Database Technologies	7	15	Compulsory	
Computational Intelligence	7	15	Compulsory	
Research Methods	7	15	Compulsory	
Artificial Intelligence/Knowledge Based Systems	7	15	Compulsory	
Network Management	7	15	Compulsory	
Mobile and Pervasive Computing	7	15	Compulsory	
Cognitive Systems	7	15	Compulsory	
Intelligent Embedded Systems	7	15	Compulsory	
Masters Project (Research)	7	60	Compulsory	MSc (180 points)

13 SUPPORT FOR STUDENTS AND THEIR LEARNING

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

- Induction, introducing curriculum, course structure, organisation and study and interpersonal skills
- Student Handbook and Module Guide
- Computer Laboratories with a comprehensive range of software

- Extensive Library and other Learning Resources
- Student e-mail accounts and full access to the Internet
- University and School Intranet with a wide range of learning support material including WebCT and PDS
- Course Specific texts, learning packs and resource tools
- Personal contact with Course Director
- Learning materials provided by Module Co-ordinators
- Each student is allocated an Advisor of Studies
- School Administrative Staff
- Group study rooms available
- Full spectrum of support and guidance services offered by Student Support, Sport and Recreation, Students' Union and Careers Service

14 CRITERIA FOR ADMISSION

Applicants must hold a degree or equivalent in Computing/Engineering or a related discipline or demonstrate their ability to undertake the course through the accreditation of prior experiential learning. An interview may form part of the admissions process.

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

Mechanisms for review and evaluation of teaching, learning, assessment, the curriculum and outcome standards:

- External benchmark standards from the UK Quality Assurance Agency (QAA) and the British Computer Society Guidelines on Course Accreditation
- Views of students as expressed through staff/student consultation
- 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

Classification of Final Result for Masters Degrees

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

Pass with Distinction 70%

Pass 50%

The Board of Examiners shall recommend the award of a Pass with Distinction to a candidate who achieves an overall average of 70% or more, with a mark of at least 70% being achieved in the Masters Project module.

Classification of Final Result for Postgraduate Diploma

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

Pass with Distinction 70%

Pass 50%

The Board of Examiners shall recommend the award of a Pass with Distinction to a candidate who achieves an overall mark of at least 70%.

Candidates registered on linked postgraduate courses shall receive only one award at the highest level during a period of continuous registration.

Candidates admitted with advanced standing shall be assessed in accordance with the course regulations using the evidence from the accredited prior learning.

External Examiners

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. The full role and responsibilities are set out in the University's Handbook for External Examiners. External Examiners are given training on appointment.

17 INDICATORS OF QUALITY RELATING TO TEACHING AND LEARNING

Selected indicators of quality relating to Teaching and Learning include:

- Research Assessment Exercise HEFCE rating of 4.(2001)

- Faculty of Computing and Engineering hosts the LTSN Centre for Computing and has been proactive in the development of new teaching and learning environments and techniques.
- The Faculty also hosts the Centre for Software Process Technologies with a brief to vitalise the software industry in Northern Ireland by engaging in '...applied research with commercial software development organisations to improve the efficiency, effectiveness and quality of their processes and products.'
- Several members of the course team belong to the Research Institute in Computing Science
- 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."
 Report at: <http://www.qaa.ac.uk/reviews/reports/instReports.asp?instID=H-0185>

B1 PROGRAMME SPECIFICATION

UNIVERSITY OF ULSTER

COURSE TITLE:

Postgraduate Diploma/Master of Science Computing and Creative Technologies

1 AWARDING INSTITUTION/BODY:

University of Ulster

2 TEACHING INSTITUTION:

University of Ulster

3 LOCATION:

Magee Campus

4 ACCREDITED BY:

University of Ulster

5 FINAL AWARD:

Postgraduate Diploma
Master of Science

6 MODE OF ATTENDANCE:

Full-time
Part-time

7 SPECIALISMS:

Computing

8 COURSE/UCAS CODE:

Computing and Creative Technologies
Full-time:6212PM-EN/6216PM-EN; Part-time:6213PM-EN/E6217PM-EN

9 DATE REVISED: 2007/2008

10 EDUCATIONAL AIMS OF THE COURSE:

The course aims to provide postgraduate education and training in the concepts and methods of computing and design and their applications to the needs of the commercial, industrial and business communities.

It aims to impart the high-level skills necessary for graduates to pursue a career in multimedia design or a related area.

It aims to provide a platform for graduates to embark on further research studies, or a leadership role in the specification, design and implementation of large-scale multimedia applications.

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
- Draft benchmarking standards for taught Masters in Computing (supported by QAA) at <http://www.comp.leeds.ac.uk/roger/cphc/Masters/BM.pdf>
- Current research or other advanced scholarship carried out by academic staff
- Requirements of the British Computer Society
- 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:

11K KNOWLEDGE AND UNDERSTANDING OF SUBJECT

- K1** demonstrate knowledge and sound understanding of the fundamental concepts, principles, theories and practices underlying computing in the domain of multimedia design
- K2** recognise and analyse criteria and specifications appropriate to specific problems and plan strategies for their implementation.
- K3** employ effectively practices and tools for the specification, design, implementation and critical evaluation of multimedia applications.
- K4** analyse the extent to which a multimedia -based system meets the criteria defined for its current deployment and future evolution.
- K5** communicate effectively ideas, proposals and designs to a range of audiences, using rational and reasoned arguments either orally, written or electronically. (Masters project only)
- K6** understand the professional, legal, moral and ethical issues involved in the exploitation of computer technology. (Masters project only)

Teaching and Learning Methods: Lectures, tutorials, seminars and practical sessions.

Assessment Methods: Coursework, written unseen examinations.

11I INTELLECTUAL QUALITIES

- I1** specify, design and construct multi-media type systems.

- I2** evaluate such systems with respect to general quality and possible trade-offs within the parameters of the problem.
- I3** assess the implications, risks and safety aspects of applying a multimedia based solution to a selected application domain.
- I4** reason critically in the area of multimedia based systems. (Masters project only)

Teaching and Learning Methods: Lectures, tutor directed tutorials, supervised practical sessions and self-directed learning.

Assessment Methods: Coursework related to case studies and projects, written unseen examinations, workbooks, project reports and dissertation.

11P PROFESSIONAL/PRACTICAL SKILLS

- P1** select and use appropriate hardware and software, recognising its logical and physical properties.
- P2** comprehend the complete engineering process involved in the effective deployment of computers to solve practical problems.
- P3** deploy effectively computer based tools towards the construction and documentation of multimedia applications.
- P4** write reports, using complex arguments, for various audiences. (Masters project only)

Teaching and Learning Methods: Lectures, tutor directed tutorials, problem based seminars and practical sessions, project preparation and implementation.

Assessment Methods: Problem based coursework, project interim reports and research paper presentation.

11T TRANSFERABLE SKILLS

- T1** learn in both familiar and unfamiliar situations making effective use of information-retrieval skills and of learning resources.
- T2** communicate effectively using various media and with a variety of audiences.
- T3** make effective use of general Information Technology facilities.
- T4** demonstrate self-direction and originality in tackling and solving problems, and act autonomously in planning and implementing tasks to a professional level.

T5 demonstrate self-direction and originality in tackling and solving problems, and act autonomously in planning and implementing tasks to a professional level.(Masters project only)

Teaching and Learning Methods: Lectures, tutor directed tutorials, seminars and practical sessions, project preparation and implementation.

Assessment Methods: Assessments, project presentations, interim reports and research paper presentation.

PgDip - Computing and Creative Technologies

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

MODULE TITLE	LEVEL	CODE	OUTCOMES																			
			K1	K2	K3	K4	K5	K6	I1	I2	I3	I4	P1	P2	P3	P4	T1	T2	T3	T4	T5	
Database Technologies	7	COM718	√	√	√					√				√	√						√	
Design Theory and Method	7	DES801	√	√							√	√		√				√			√	
Advanced Human Computer Interaction	7	COM719	√		√	√								√		√		√	√	√		
3D Computer Graphics Application	7	DES805	√	√	√	√								√				√	√		√	
Mobile & Pervasive Computing	7	COM844	√		√					√				√		√					√	
Design Entrepreneurship Awareness	7	DES809	√		√					√		√		√	√			√	√	√		
Object-Oriented Information Systems	7	COM905	√		√	√					√							√			√	
Design Entrepreneurship Applied	7	DES810	√	√	√							√				√		√	√	√	√	√

MSc - Computing and Creative Technologies

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

MODULE TITLE	LEVEL	CODE	OUTCOMES																			
			K1	K2	K3	K4	K5	K6	I1	I2	I3	I4	P1	P2	P3	P4	T1	T2	T3	T4	T5	
Database Technologies	7	COM718	√	√	√					√				√	√						√	
Design Theory and Method	7	DES801	√	√							√	√		√				√			√	
Advanced Human Computer Interaction	7	COM719	√		√	√								√		√		√	√	√		
3D Computer Graphics Application	7	DES805	√	√	√	√								√				√	√		√	
Mobile & Pervasive Computing	7	COM844	√		√					√				√		√					√	
Design Entrepreneurship Awareness	7	DES809	√		√					√		√		√	√			√	√	√		
Object-Oriented Information Systems	7	COM905	√		√	√					√							√			√	
Design Entrepreneurship Applied	7	DES810	√	√	√							√				√		√	√	√	√	√
Masters Project (Professional)	7	COM722	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

12 STRUCTURE AND REQUIREMENTS FOR THE AWARD

The Postgraduate Diploma programme consists of eight taught modules. The Masters degree consists of the eight modules of the Postgraduate Diploma in addition to a substantial piece of independent research. The modular organisation of the PgDip/MSc course means that it can be taken in either full or part-time mode of study. In full-time mode, study for the Masters is completed in one academic year. In part-time mode the study for the Masters takes at least two academic years. Fulltime students will normally take 4 of the taught modules in each of the first two semesters, and seek to complete the Master's Project during the following summer. The internal coherence of the programme implies that the first block of four taught modules taken should be successfully completed before embarking on the second block of four taught modules. Students progression to the Masters project is subject to having successfully passed all eight modules with the pass mark being 50% for each module. Each of the taught modules attracts 15 credit points, with the Master's Project attracting 60 credit points. Candidates for the Master's are required to obtain 180 credit points at level 7 for the award of MSc Computing and Creative technologies. Candidates who do not wish to or are unable, for any reason, to complete the Master's Project can exit from the Program with a Postgraduate Diploma, having successfully completed all 8 taught modules to gain 120 credit points at Level 7.

Module Title	Credit Level	Credit Points	Module Status	Awards
Database Technologies	7	15	Compulsory	
Design Theory and Method	7	15	Compulsory	
Advanced Human Computer Interaction	7	15	Compulsory	
3D Computer Graphics Application	7	15	Compulsory	
Mobile and Pervasive Computing	7	15	Compulsory	
Design Entrepreneurship Awareness	7	15	Compulsory	
Object-Oriented Information Systems	7	15	Compulsory	
Design Entrepreneurship Applied	7	15	Compulsory	
Masters Project (Professional)	7	60	Compulsory	MSc (180 points)

13 SUPPORT FOR STUDENTS AND THEIR LEARNING

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

- Induction, introducing curriculum, course structure, organisation and study and interpersonal skills
- Student Handbook and Module Guide
- Computer Laboratories with a comprehensive range of software

- Extensive Library and other Learning Resources
- Student e-mail accounts and full access to the Internet
- University and School Intranet with a wide range of learning support material including WebCT and PDS
- Course Specific texts, learning packs and resource tools
- Personal contact with Course Director
- Learning materials provided by Module Co-ordinators
- Each student is allocated an Advisor of Studies
- School Administrative Staff
- Group study rooms available
- Full spectrum of support and guidance services offered by Student Support, Sport and Recreation, Students' Union and Careers Service

14 CRITERIA FOR ADMISSION

Applicants must hold a degree or equivalent in Computing/Design or a related discipline or demonstrate their ability to undertake the course through the accreditation of prior experiential learning. An interview may form part of the admissions process.

Specific requirements for admission are:

- have gained a degree that includes a significant component of computing and design

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

Mechanisms for review and evaluation of teaching, learning, assessment, the curriculum and outcome standards:

- External benchmark standards from the UK Quality Assurance Agency (QAA) and the British Computer Society Guidelines on Course Accreditation
- Views of students as expressed through staff/student consultation
- 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

Classification of Final Result for Masters Degrees

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

Pass with Distinction 70%

Pass 50%

The Board of Examiners shall recommend the award of a Pass with Distinction to a candidate who achieves an overall average of 70% or more, with a mark of at least 70% being achieved in the Masters Project module.

Classification of Final Result for Postgraduate Diploma

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

Pass with Distinction 70%

Pass 50%

The Board of Examiners shall recommend the award of a Pass with Distinction to a candidate who achieves an overall mark of at least 70%.

Candidates registered on linked postgraduate courses shall receive only one award at the highest level during a period of continuous registration.

Candidates admitted with advanced standing shall be assessed in accordance with the course regulations using the evidence from the accredited prior learning.

External Examiners

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. The full role and responsibilities are set out in the University's Handbook for External Examiners. External Examiners are given training on appointment.

17 INDICATORS OF QUALITY RELATING TO TEACHING AND LEARNING

Selected indicators of quality relating to Teaching and Learning include:

- Research Assessment Exercise HEFCE rating of 4 (2001)

- Faculty of Computing and Engineering hosts the LTSN Centre for Computing and has been proactive in the development of new teaching and learning environments and techniques.
- The Faculty also hosts the Centre for Software Process Technologies with a brief to vitalise the software industry in Northern Ireland by engaging in '...applied research with commercial software development organisations to improve the efficiency, effectiveness and quality of their processes and products.'
- Several members of the course team belong to the Research Institute in Computing Science
- 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."
 Report at: <http://www.qaa.ac.uk/reviews/reports/instReports.asp?instID=H-0185>

B1 PROGRAMME SPECIFICATION

UNIVERSITY OF ULSTER

COURSE TITLE:

Postgraduate Diploma/Master of Science Computing for Financial Services

1 AWARDING INSTITUTION/BODY:

University of Ulster

2 TEACHING INSTITUTION:

University of Ulster

3 LOCATION:

Magee Campus

4 ACCREDITED BY:

University of Ulster

5 FINAL AWARD:

Postgraduate Diploma
Master of Science

6 MODE OF ATTENDANCE:

Full-time
Part-time

7 SPECIALISMS:

Computing

8 COURSE/UCAS CODE:

Full-time:5761PM-EN/5762PM-EN; Part-time:5764PM-EN/5765PM-EN

9 DATE REVISED: 2007/2008

10 EDUCATIONAL AIMS OF THE COURSE:

The course aims to provide postgraduate education and training in the concepts and methods of computing and information systems and their application to the needs of the commercial, business, and particularly the Financial Services sector.

It aims to impart the high-level skills necessary for graduates to pursue a career in software engineering, specifically for financial and business systems.

It aims to provide a platform and a vehicle to prepare graduates for a leadership role in the specification, design, and implementation of large-scale computer applications within Financial Services sector industries.

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
- Draft benchmarking standards for taught Masters in Computing (supported by QAA) at <http://www.comp.leeds.ac.uk/roger/cphc/Masters/BM.pdf>
- Current research or other advanced scholarship carried out by academic staff
- Requirements of the British Computer Society
- 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:

11K KNOWLEDGE AND UNDERSTANDING OF SUBJECT

- K1** demonstrate knowledge and sound understanding of the fundamental concepts, principles, theories and practices underlying computing as it is used within IT applications supporting the Financial Services.
- K2** recognise and analyse criteria and specifications appropriate to specific problems and plan strategies for their implementation.
- K3** employ effectively practices and tools for the specification, design, implementation and critical evaluation of computer applications.
- K4** analyse the extent to which a computer-based system meets the criteria defined for its current deployment and future evolution.
- K5** communicate effectively ideas, proposals and designs to a range of audiences, using rational and reasoned arguments either orally, written or electronically. (Masters Project only)
- K6** understand the professional, legal, moral and ethical issues involved in the exploitation of computer technology. (Masters project only)

Teaching and Learning Methods: Lectures, tutorials, seminars and practical sessions.

Assessment Methods: Coursework, written unseen examinations.

11I INTELLECTUAL QUALITIES

- I1** specify, design and construct computer-based systems.

- I2** evaluate such systems with respect to general quality and possible trade-offs within the parameters of the problem.
- I3** assess the implications, risks and safety aspects of applying a computing based solution to a selected application domain.
- I4** reason critically in the area of financial services systems. (Masters project only)

Teaching and Learning Methods: Lectures, tutor directed tutorials, supervised practical sessions and self-directed learning employing study packs and research based materials.

Assessment Methods: Coursework related to case studies and projects, written unseen examinations, workbooks, project reports and dissertation.

11P PROFESSIONAL/PRACTICAL SKILLS

- P1** select and use appropriate hardware and software, recognising its logical and physical properties.
- P2** comprehend the complete engineering process involved in the effective deployment of computers to solve practical problems.
- P3** deploy effectively computer based tools towards the construction and documentation of computer applications.
- P4** write reports, using complex arguments, for various audiences including management, technical or users. (Masters project only)

Teaching and Learning Methods: Lectures, tutor directed tutorials, problem based seminars and practical sessions, project preparation and implementation.

Assessment Methods: Problem based coursework, project reports and Professional Masters Project Report.

11T TRANSFERABLE SKILLS

- T1** learn in both familiar and unfamiliar situations making effective use of information-retrieval skills and of learning resources.
- T2** communicate effectively using various media and with a variety of audiences.
- T3** make effective use of general Information Technology facilities.
- T4** act ethically as a researcher and IT professional.

T5 demonstrate self-direction and originality in tackling and solving problems, and act autonomously in planning and implementing tasks to a professional level. (Masters project only)

Teaching and Learning Methods: Lectures, tutor directed tutorials, seminars and practical sessions, project preparation and implementation.

Assessment Methods: Assessments, project presentations, reports and Professional Master's Project Report.

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PgDip - Computing for Financial Services

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

MODULE TITLE	LEVEL	CODE	OUTCOMES																			
			K1	K2	K3	K4	K5	K6	I1	I2	I3	I4	P1	P2	P3	P4	T1	T2	T3	T4	T5	
Financial Services Information Systems	7	COM717	√	√							√						√	√	√	√		
Database Technologies	7	COM718	√	√	√					√				√	√						√	
Advanced Human Computer Interaction	7	COM719	√		√	√					√			√		√		√	√	√		
Artificial Intelligence / Knowledge Based Systems	7	COM908	√	√	√					√	√				√				√	√		
Mobile & Pervasive Computing	7	COM844	√		√					√				√		√						√
Network Management	7	COM721	√	√	√							√		√	√							√
Object-Oriented Information Systems	7	COM905	√		√	√					√			√				√				√
Interoperability & Legacy Systems	7	COM720	√		√	√				√	√			√	√							√

MSc - Computing for Financial Services

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

MODULE TITLE	LEVEL	CODE	OUTCOMES																			
			K1	K2	K3	K4	K5	K6	I1	I2	I3	I4	P1	P2	P3	P4	T1	T2	T3	T4	T5	
Financial Services Information Systems	7	COM717	√	√							√						√	√	√	√		
Database Technologies	7	COM718	√	√	√					√				√	√							√
Advanced Human Computer Interaction	7	COM719	√		√	√					√			√		√		√	√	√		
Artificial Intelligence / Knowledge Based Systems	7	COM908	√	√	√					√	√				√				√	√		
Mobile & Pervasive Computing	7	COM844	√		√					√				√		√						√
Network Management	7	COM721	√	√	√							√		√	√							√
Object-Oriented Information Systems	7	COM905	√		√	√					√			√				√				√
Interoperability & Legacy Systems	7	COM720	√		√	√				√	√			√	√							√
Masters Project (Professional)	7	COM722	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

12 STRUCTURE AND REQUIREMENTS FOR THE AWARD

The Postgraduate Diploma programme consists of eight taught modules. The Masters degree consists of the eight modules of the Postgraduate Diploma in addition to a substantial piece of independent research. The modular organisation of the PgDip/MSc course means that it can be taken in either full or part-time mode of study. In full-time mode, study for the Masters is completed in one academic year. In part-time mode the study for the Masters takes at least two academic years. Fulltime students will normally take 4 of the taught modules in each of the first two semesters, and seek to complete the Master's Project during the following summer. The internal coherence of the programme implies that the first block of four taught modules taken should be successfully completed before embarking on the second block of four taught modules. Students progression to the Masters project is subject to having successfully passed all eight modules with the pass mark being 50% for each module. Each of the taught modules attracts 15 credit points, with the Master's Project attracting 60 credit points. Candidates for the Master's are required to obtain 180 credit points at level 7 for the award of MSc Computing for Financial Services. Candidates who do not wish to or are unable, for any reason, to complete the Master's Project can exit from the Program with a Postgraduate Diploma, having successfully completed all 8 taught modules to gain 120 credit points at Level 7.

Module Title	Credit Level	Credit Points	Module Status	Awards
Financial Services Information Systems	7	15	Compulsory	
Database Technologies	7	15	Compulsory	
Advanced Human Computer Interaction	7	15	Compulsory	
Artificial Intelligence / Knowledge Based Systems	7	15	Compulsory	
Mobile and Pervasive Computing	7	15	Compulsory	
Network Management	7	15	Compulsory	
Object-Oriented Information Systems	7	15	Compulsory	
Interoperability and Legacy Systems	7	15	Compulsory	
Masters Project (Professional)	7	60	Compulsory	MSc (180 points)

13 SUPPORT FOR STUDENTS AND THEIR LEARNING

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

- Induction, introducing curriculum, course structure, organisation and study and interpersonal skills
- Student Handbook and Module Guide
- Computer Laboratories with a comprehensive range of software

- Extensive Library and other Learning Resources
- Student e-mail accounts and full access to the Internet
- University and School Intranet with a wide range of learning support material including WebCT and PDS
- Course Specific texts, learning packs and resource tools
- Personal contact with Course Director
- Learning materials provided by Module Co-ordinators
- Each student is allocated an Advisor of Studies
- School Administrative Staff
- Group study rooms available
- Full spectrum of support and guidance services offered by Student Support, Sport and Recreation, Students' Union and Careers Service

14 CRITERIA FOR ADMISSION

Applicants must hold a degree or equivalent in Computing/Business or a related discipline or demonstrate their ability to undertake the course through the accreditation of prior experiential learning. An interview may form part of the admissions process.

Specific requirements for admission are:

have gained a degree that includes a significant component of computing.

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

Mechanisms for review and evaluation of teaching, learning, assessment, the curriculum and outcome standards:

- External benchmark standards from the UK Quality Assurance Agency (QAA) and the British Computer Society Guidelines on Course Accreditation
- Views of students as expressed through staff/student consultation
- 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

Classification of Final Result for Master's Degrees

The following shall be the minimum percentages acceptable in determining the overall gradings of candidates.

Pass with Distinction	70%
Pass	50%

The Board of Examiners shall recommend the award of a Pass with Distinction to a candidate who achieves an overall average of 70% or more, with a mark of at least 70% being achieved in the Master's Project module.

Classification of Final Result for Postgraduate Diploma

The following shall be the minimum percentages normally acceptable in determining the overall grading of candidates.

Pass with Commendation	70%
Pass	50%

The Board of Examiners shall recommend the award of a Pass with Distinction to a candidate who achieves an overall mark of at least 70%.

Candidates registered on linked postgraduate courses shall receive only one award at the highest level during a period of continuous registration.

Candidates admitted with advanced standing shall be assessed in accordance with the course regulations using the evidence from the accredited prior learning.

External Examiners

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. The full role and responsibilities are set out in the University's Handbook for External Examiners. External Examiners are given training on appointment.

17 INDICATORS OF QUALITY RELATING TO TEACHING AND LEARNING

Selected indicators of quality relating to Teaching and Learning include:
- Research Assessment Exercise HEFCE rating of 4.(2001)

- Faculty of Computing and Engineering hosts the LTSN Centre for Computing and has been proactive in the development of new teaching and learning environments and techniques.
- The Faculty also hosts the Centre for Software Process Technologies with a brief to vitalise the software industry in Northern Ireland by engaging in '...applied research with commercial software development organisations to improve the efficiency, effectiveness and quality of their processes and products.'
- Several members of the course team belong to the Research Institute in Computing Science
- 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."
 Report at: <http://www.qaa.ac.uk/reviews/reports/instReports.asp?instID=H-0185>

B.3 COURSE REGULATIONS

UNIVERSITY OF ULSTER

1 TITLE	CODE
Postgraduate Diploma/Master of Science in: Computing and Intelligent Systems [FT:2090PM-EN; PT:2249PM-EN / FT:2088PM-EN; PT: 2245PM-EN]	
Computing and Creative Technologies [FT: 6212PM-EN; PT: 6213PM-EN / FT: 6216PM-EN; PT: E6217PM-EN]	
Computing for Financial Services [FT:5761PM-EN; PT:5764PM-EN / FT:5762PM-EN; PT:5765PM-EN]	

2 MODE OF ATTENDANCE

Full-time and Part-time (Evening)

3 DURATION

FULL-TIME: Normally 2/3 semesters of study
PART-TIME: Normally 4/6 semesters of study

4 LOCATION

Magee

5 FACULTY

Faculty of Computing and Engineering.

6 ADMISSION REQUIREMENTS

Applicants must:

- (a) have gained
 - (i) an Honours or non-Honours degree from a University of the United Kingdom or the Republic of Ireland, from the Council for National Academic Awards, the National Council for Educational Awards, the Higher Education and Training Awards Council, or from an institution of another country which is recognised as being of an equivalent standard; or

- (ii) an equivalent standard in a Postgraduate Certificate, Graduate Diploma, Graduate Certificate or an approved alternative qualification; and

for Computing and Intelligent Systems, the degree qualifications must be in Computing, Engineering or a related discipline;

for Computing and Creative Technologies, the degree qualifications must be in Computing, Design or a related discipline with a significant computing/design content;

for Computing for Financial Services, the degree qualifications must be in a Business, Scientific or related discipline, with a significant computing content.

For each programme an interview may form part of the selection process.

and

- (b) provide evidence of competence in written and spoken English (GCSE grade C or equivalent); IELTS grade 6.0 for non-native English speakers.

or as an alternative to (a) (i) or (a) (ii) and/or (b):

- (c) In exceptional circumstances, where an individual has substantial and significant experiential learning, a portfolio of written evidence demonstrating the meeting of graduate qualities (including subject-specific outcomes, as determined by the Course Committee) may be considered as an alternative entrance route. Evidence used to demonstrate graduate qualities may not be used for exemption against modules within the programme.

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 the programme provided that

- (a) they shall 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 in respect of a Master's award and at least 50% of the credit value of the award in respect of a Postgraduate Diploma award
- (b) no exemption shall be permitted from the Research Project

8 ATTENDANCE REQUIREMENTS

- 8.1 Students are expected to attend all classes associated with the programme and be punctual and regular in attendance.
- 8.2 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.
- 8.3 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.

9 RULES GOVERNING STUDENT CHOICE

- 9.1 Modules are offered as indicated in the table at section 18. Revisions may be made in accordance with the University's quality assurance procedures. Module availability may vary.

10 EXAMINATION AND ASSESSMENT

- 10.1 The performance of candidates shall be assessed by the Board of Examiners in accordance with the Regulations Governing Examinations in Programmes of Study.
- 10.2 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.
- 10.3 Within each module candidates shall be assessed by coursework; examination; a combination of coursework and examination in accordance with the attached table.
- 10.4 Candidates must achieve an overall module mark of 50% with a minimum mark of 45% in each element of the module.

11 SUBMISSION OF COURSEWORK

- 11.1 Coursework must be submitted by the dates specified by the Course Committee.
- 11.2 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, accompanied in the case of

illness by a medical certificate. This application shall be made to the Course Director.

- 11.3 Coursework submitted without consent after the deadline shall not normally be accepted.
- 11.4 Candidates completing a dissertation must submit an unbound version of their dissertation by specified submission deadline for assessment and two final bound copies to the course director by specified date. The dissertation shall be presented in accordance with the Guidelines for the Presentation of Dissertations for Master's Degree programmes. The bound copies shall become the property of the University.
- 11.5 Access to dissertations shall not normally be restricted. Access may be restricted, in exceptional circumstances, for a period of up to two years in the first instance, and for a total period of not more than five years. Such restriction shall be approved in accordance with the procedures described in the Guidelines for the Preparation of Dissertations for Master's Degree programmes. Access to the abstract of the work shall not be restricted.

12 PROGRESS

- 12.1 Progress from semester 1 to semester 2 is automatic.
- 12.2 For part-time programmes: Subject to 13 and 14 hereof, candidates are required to pass all modules in each year of study in order to proceed to the next.

13 PASS

13.1 Minimum Mark

The minimum percentage which must be obtained by a candidate in each assessment element (coursework or examination) in order to be considered for passing the module is 45%.

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 14.2 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 50% or the repeat mark, whichever is the lower for the purpose of calculating the module result.

14.2 In each year, the consequences of failure shall normally be as follows:

Failure in module(s) with an overall value up to and including 60 credit points	Repeat <i>once only</i> of specified examination(s) and/or coursework in the failed module(s) (examinations August).
Failure in module(s) with an overall value of more than 60 credit points and less than 90 credit points	Repeat <i>once only</i> of specified examination(s) and/or coursework in the failed module(s) in the next academic year (examinations January/May) with or without attendance.
Failure in module(s) with an overall value of 90 credit points or more	Repeat <i>once only</i> of specified examination(s) and/or coursework in the failed module(s) in the next academic year with or without attendance, OR withdraw from the programme.

14.3 Candidates who fail the dissertation may be permitted to resubmit the dissertation on one occasion only by a specified date in the following year (within a period not exceeding eight months from the date of the examination board's decision).

15 CLASSIFICATION OF FINAL RESULT

15.1 All modules contribute to the final award. The table at section 18 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 for Master's Degrees

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

Pass with Distinction 70%

Pass 50%

The Board of Examiners shall recommend the award of a Pass with Distinction to a candidate who achieves an overall average of 70% or more, with a mark of at least 70% being achieved in the dissertation. *NOTE THAT: A DISTINCTION MARK MUST BE ACHIEVED IN THE DISSERTATION;*

Provided that they have not been exempted for modules amounting to more than 60 credit points, candidates who fail the dissertation and have passed the taught modules may be assessed for the award of a Postgraduate Diploma in accordance with 15.3.

15.3 Classification of Final Result for Postgraduate Diploma

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

Pass with Distinction	70%
Pass	50%

The Board of Examiners shall recommend the award of a Pass with Distinction to a candidate who achieves an overall mark of at least 70%.

15.4 Candidates registered on linked postgraduate programmes shall receive only one award at the highest level during a period of continuous registration.

15.5 Candidates admitted with advanced standing shall be assessed in accordance with the programme regulations using the evidence from the accredited prior learning.

16 ILLNESS AND OTHER EXTENUATING CIRCUMSTANCES

16.1 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 or whose results are substantially affected by illness or other sufficient cause:

- (a) permit the candidate to complete, take, or repeat the examination or coursework or both at an approved subsequent date **or**
- (b) deem the candidate to have passed and recommend an Aegrotat Master's Degree OR Aegrotat Postgraduate Diploma.

16.2 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.

18 TABLES

Postgraduate Diploma in Computing & Intelligent Systems

Year ft(pt)	Semester ft(pt)	Level	Module Title	Code	Credit Value	Status Compulsory (c) Optional (o)	Assessment Methods		Contribution to the overall mark of the Final Award
							% Coursework	% Examination	
1 (1)	1(1)	7	Database Technologies	COM718	15	C	50	50	12.5%
1 (1)	1(1)	7	Computational Intelligence	COM907	15	C	50	50	12.5%
1(2)	1(1)	7	Research Methods	COM848	15	C	100	0	12.5%
1(2)	1(1)	7	Artificial Intelligence / KBS	COM908	15	C	50	50	12.5%
1 (1)	2(1)	7	Network Management	COM721	15	C	50	50	12.5%
1(1)	2(1)	7	Mobile and Pervasive computing	COM844	15	C	100	0	12.5%
1(2)	2(1)	7	Cognitive Systems	COM847	15	C	100	0	12.5%
1(2)	2(1)	7	Intelligent Embedded Systems	COM912	15	C	100	0	12.5%

Masters Degree in Computing & Intelligent Systems

Year ft(pt)	Semester ft(pt)	Level	Module Title	Code	Credit Value	Status Compulsory (c) Optional (o)	Assessment Methods		Contribution to the overall mark of the Final Award
							% Coursework	% Examination	
1 (1)	1(1)	7	Database Technologies	COM718	15	C	50	50	8.3%
1 (1)	1(1)	7	Computational Intelligence	COM907	15	C	50	50	8.3%
1(2)	1(1)	7	Research Methods	COM848	15	C	100	0	8.3%
1(2)	1(1)	7	Artificial Intelligence / KBS	COM908	15	C	50	50	8.3%
1 (1)	2(2)	7	Network Management	COM721	15	C	50	50	8.3%
1(1)	2(2)	7	Mobile and Pervasive Computing	COM844	15	C	100	0	8.3%
1(2)	2(2)	7	Cognitive Systems	COM847	15	C	100	0	8.3%
1(2)	2(2)	7	Intelligent Embedded Systems	COM912	15	C	100	0	8.3%
1(3)	3(1,2)	7	Master Project (Research)*	COM865	60	C	100	0	33.3%

* Indicates module which must be passed at 70% for award of Distinction

Postgraduate Diploma in Computing & Creative Technologies

Year ft(pt)	Semester ft(pt)	Level	Module Title	Code	Credit Value	Status Compulsory (c) Optional (o)	Assessment Methods		Contribution to the overall mark of the Final Award
							% Coursework	% Examination	
1 (1)	1(1)	7	Database Technologies	COM718	15	C	50	50	12.5%
1 (1)	1(1)	7	Design Theory and Method	DES801	15	C	100	0	12.5%
1(2)	1(1)	7	Advanced Human Computer Interaction	COM719	15	C	50	50	12.5%
1(2)	1(1)	7	3D Computer Graphics Application	DES805	15	C	100	0	12.5%
1 (1)	2(1)	7	Mobile and Pervasive computing	COM844	15	C	100	0	12.5%
1(1)	2(1)	7	Design Entrepreneurship Awareness	DES809	15	C	100	0	12.5%
1(2)	2(1)	7	Object-Oriented Information Systems	COM905	15	C	50	50	12.5%
1(2)	2(1)	7	Design Entrepreneurship Applied	DES810	15	C	100	0	12.5%

Masters Degree in Computing & Creative Technologies

Year ft(pt)	Semester ft(pt)	Level	Module Title	Code	Credit Value	Status Compulsory (c) Optional (o)	Assessment Methods		Contribution to the overall mark of the Final Award
							% Coursework	% Examination	
1 (1)	1(1)	7	Database Technologies	COM718	15	C	50	50	8.3%
1 (1)	1(1)	7	Design Theory and Method	DES801	15	C	100	0	8.3%
1(2)	1(1)	7	Advanced Human Computer Interaction	COM719	15	C	50	50	8.3%
1(2)	1(1)	7	3D Computer Graphics Application	DES805	15	C	100	0	8.3%
1 (1)	2(2)	7	Mobile and Pervasive Computing	COM844	15	C	100	0	8.3%
1(1)	2(2)	7	Design Entrepreneurship Awareness	DES809	15	C	100	0	8.3%
1(2)	2(2)	7	Object-Oriented Information Systems	COM905	15	C	50	50	8.3%
1(2)	2(2)	7	Design Entrepreneurship Applied	DES810	15	C	100	0	8.3%
1(3)	3(1,2)	7	Master Project (Professional)*	COM722	60	C	100	0	33.3%

* Indicates module which must be passed at 70% for award of Distinction

Postgraduate Diploma in Computing for Financial Services

Year ft(pt)	Semester ft(pt)	Level	Module Title	Code	Credit Value	Status Compulsory (c) Optional (o)	Assessment Methods		Contribution to the overall mark of the Final Award
							% Coursework	% Examination	
1 (1)	1(1)	7	Financial Services Information Systems	COM717	15	C	50	50	12.5%
1 (1)	1(1)	7	Database Technologies	COM718	15	C	50	50	12.5%
1(2)	1(1)	7	Advanced Human Computer Interaction	COM719	15	C	50	50	12.5%
1(2)	1(1)	7	Artificial Intelligence / KBS	COM908	15	C	50	50	12.5%
1 (1)	2(1)	7	Mobile and Pervasive Computing	COM844	15	C	100	0	12.5%
1(1)	2(1)	7	Network Management	COM721	15	C	50	50	12.5%
1(2)	2(1)	7	Object-Oriented Information Systems	COM905	15	C	50	50	12.5%
1(2)	2(1)	7	Interoperability and Legacy Systems	COM720	15	C	50	50	12.5%

Masters Degree in Computing for Financial Services

Year ft(pt)	Semester ft(pt)	Level	Module Title	Code	Credit Value	Status Compulsory (c) Optional (o)	Assessment Methods		Contribution to the overall mark of the Final Award
							% Coursework	% Examination	
1 (1)	1(1)	7	Financial Services Information Systems	COM717	15	C	50	50	8.3%
1 (1)	1(1)	7	Database Technologies	COM718	15	C	50	50	8.3%
1(2)	1(1)	7	Advanced Human Computer Interaction	COM719	15	C	50	50	8.3%
1(2)	1(1)	7	Artificial Intelligence / KBS	COM908	15	C	50	50	8.3%
1 (1)	2(2)	7	Mobile and Pervasive Computing	COM844	15	C	100	0	8.3%
1(1)	2(2)	7	Network Management	COM721	15	C	50	50	8.3%
1(2)	2(2)	7	Object-Oriented Information Systems	COM905	15	C	50	50	8.3%
1(2)	2(2)	7	Interoperability and Legacy Systems	COM720	15	C	50	50	8.3%
1(3)	3(1,2)	7	Masters Project(Professional)*	COM722	15	C	100	0	33.3%

* Indicates module which must be passed at 70% for award of Distinction

COURSE STRUCTURE DIAGRAMS

PgDip/MSc Computing and Intelligent Systems

Full-time

Semester 1	Semester 2	Semester 3
Database Technologies (Credit Value=15; Level=7; Status=Compulsory; Pre-requisites=none; Current)	Network Management (Credit Value=15; Level=7; Status=Compulsory; Pre-requisites=none; Current)	Masters Project (Research) (Credit Value=60; Level=7; Status=Compulsory; Pre-requisites=all semester 1 and semester 2 modules; Current)
Computational Intelligence (Credit Value=15; Level=7; Status=Compulsory; Pre-requisites=none; Current)	Mobile and Pervasive Computing (Credit Value=15; Level=7; Status=Compulsory; Pre-requisites=none; Current)	
Research Methods (Credit Value=15; Level=7; Status=Compulsory; Pre-requisites=none; Current)	Cognitive Computing (Credit Value=15; Level=7; Status=Compulsory; Pre-requisites=none; Revised)	
Artificial Intelligence/Knowledge Based Systems (Credit Value=15; Level=7; Status=Compulsory; Pre-requisites=none; Current)	Intelligent Embedded Systems (Credit Value=15; Level=7; Status=Compulsory; Pre-requisites=none; Current)	

Part-time

Year 1	
Semester 1	Semester 2
Database Technologies (Credit Value=15; Level=7; Status=Compulsory; Pre-requisites=none; Current)	Network Management (Credit Value=15; Level=7; Status=Compulsory; Pre-requisites=none; Current)
Computational Intelligence (Credit Value=15; Level=7; Status=Compulsory; Pre-requisites=none; Current)	Mobile and Pervasive Computing (Credit Value=15; Level=7; Status=Compulsory; Pre-requisites=none; Current)

Year 2	
Semester 1	Semester 2
Research Methods (Credit Value=15; Level=7; Status=Compulsory; Pre-requisites=none; Current)	Cognitive Computing (Credit Value=15; Level=7; Status=Compulsory; Pre-requisites=none; Current)
Artificial Intelligence/Knowledge Based Systems (Credit Value=15; Level=7; Status=Compulsory; Pre-requisites=none; Current)	Intelligent Embedded Systems (Credit Value=15; Level=7; Status=Compulsory; Pre-requisites=none; Current)

Year 3(Semester 1 & 2)
Masters Project (Research) (Credit Value=60; Level=7; Status=Compulsory; Pre-requisites=all Year1 and Year2 modules; Current)

PgDip/MSc Computing and Creative Technologies

Full-time

Semester 1	Semester 2	Semester 3
<p style="text-align: center;">Database Technologies</p> <p>(Credit Value=15; Level=7; Status=Compulsory; Pre-requisites=none; Current)</p>	<p style="text-align: center;">Mobile and Pervasive Computing</p> <p>(Credit Value=15; Level=7; Status=Compulsory; Pre-requisites=none; Current)</p>	<p style="text-align: center;">Masters Project (Professional)</p> <p>(Credit Value=60; Level=7; Status=Compulsory; Pre-requisites=all semester 1 and semester 2 modules; New)</p>
<p style="text-align: center;">Design Theory and Method</p> <p>(Credit Value=15; Level=7; Status=Compulsory; Co-requisites=3D Computer Graphics Application; Current)</p>	<p style="text-align: center;">Design Entrepreneurship Awareness</p> <p>(Credit Value=15; Level=7; Status=Compulsory; Co-requisites= Design Entrepreneurship Applied; New)</p>	
<p style="text-align: center;">Advanced Human Computer interaction</p> <p>(Credit Value=15; Level=7; Status=Compulsory; Pre-requisites=none; Revised)</p>	<p style="text-align: center;">Object-Oriented Information Systems</p> <p>(Credit Value=15; Level=7; Status=Compulsory; Pre-requisites=none; Current)</p>	
<p style="text-align: center;">3D Computer Graphics Application</p> <p>(Credit Value=15; Level=7; Status=Compulsory; Co-requisites=Design Theory and Method; Current)</p>	<p style="text-align: center;">Design Entrepreneurship Applied</p> <p>(Credit Value=15; Level=7; Status=Compulsory; Pre-requisites=Design Theory and Method, 3D Computer Graphics Application; Co-requisites= Design Entrepreneurship Awareness; New)</p>	

Part-time

Year 1	
Semester 1	Semester 2
<p style="text-align: center;">Database Technologies</p> <p>(Credit Value=15; Level=7; Status=Compulsory; Pre-requisites=none; Current)</p>	<p style="text-align: center;">Mobile and Pervasive Computing</p> <p>(Credit Value=15; Level=7; Status=Compulsory; Pre-requisites=none; Current)</p>
<p style="text-align: center;">Design Theory and Method</p> <p>(Credit Value=15; Level=7; Status=Compulsory; Co-requisites=3D Computer Graphics Application; Current)</p>	<p style="text-align: center;">Design Entrepreneurship Awareness</p> <p>(Credit Value=15; Level=7; Status=Compulsory; Co-requisites= Design Entrepreneurship Applied; New)</p>
Year 2	
Semester 1	Semester 2
<p style="text-align: center;">Advanced Human Computer interaction</p> <p>(Credit Value=15; Level=7; Status=Compulsory; Pre-requisites=none; Revised)</p>	<p style="text-align: center;">Object-Oriented Information Systems</p> <p>(Credit Value=15; Level=7; Status=Compulsory; Pre-requisites=none; Current)</p>
<p style="text-align: center;">3D Computer Graphics Application</p> <p>(Credit Value=15; Level=7; Status=Compulsory; Co-requisites=Design Theory and Method; Current)</p>	<p style="text-align: center;">Design Entrepreneurship Applied</p> <p>(Credit Value=15; Level=7; Status=Compulsory; Pre-requisites=Design Theory and Method, 3D Computer Graphics Application; Co-requisites= Design Entrepreneurship Awareness; New)</p>
Year 3(Semester 1 & 2)	
<p style="text-align: center;">Masters Project (Professional)</p> <p>(Credit Value=60; Level=7; Status=Compulsory; Pre-requisites=all Year1 and Year2 modules; New)</p>	

PgDip/MSc Computing for Financial Services

Full-time

Semester 1	Semester 2	Semester 3
<p style="text-align: center;">Financial Services Information Systems</p> <p>(Credit Value=15; Level=7; Status=Compulsory; Pre-requisites=none; Current)</p>	<p style="text-align: center;">Mobile and Pervasive Computing</p> <p>(Credit Value=15; Level=7; Status=Compulsory; Pre-requisites=none; Current)</p>	<p>Masters Project (Professional) (Credit Value=60; Level=7; Status=Compulsory; Pre-requisites=all semester 1 and semester 2 modules; New)</p>
<p style="text-align: center;">Database Technologies</p> <p>(Credit Value=15; Level=7; Status=Compulsory; Pre-requisites=none; Current)</p>	<p style="text-align: center;">Network Management</p> <p>(Credit Value=15; Level=7; Status=Compulsory; Pre-requisites=none; Current)</p>	
<p style="text-align: center;">Advanced Human Computer Interaction</p> <p>(Credit Value=15; Level=7; Status=Compulsory; Pre-requisites=none; Revised)</p>	<p style="text-align: center;">Object-Oriented Information Systems</p> <p>(Credit Value=15; Level=7; Status=Compulsory; Pre-requisites=none; Current)</p>	
<p style="text-align: center;">Artificial Intelligence/Knowledge Based Systems</p> <p>(Credit Value=15; Level=7; Status=Compulsory; Pre-requisites=none; Current)</p>	<p style="text-align: center;">Interoperability and Legacy Systems</p> <p>(Credit Value=15; Level=7; Status=Compulsory; Pre-requisites=Database Technologies; Current)</p>	

Part-time

Year 1	
Semester 1	Semester 2
<p style="text-align: center;">Financial Services Information Systems</p> <p>(Credit Value=15; Level=7; Status=Compulsory; Pre-requisites=none; Current)</p>	<p style="text-align: center;">Mobile and Pervasive Computing</p> <p>(Credit Value=15; Level=7; Status=Compulsory; Pre-requisites=none; Current)</p>
<p style="text-align: center;">Database Technologies</p> <p>(Credit Value=15; Level=7; Status=Compulsory; Pre-requisites=none; Current)</p>	<p style="text-align: center;">Network Management</p> <p>(Credit Value=15; Level=7; Status=Compulsory; Pre-requisites=none; Current)</p>
Year 2	
Semester 1	Semester 2
<p style="text-align: center;">Advanced Human Computer Interaction</p> <p>(Credit Value=15; Level=7; Status=Compulsory; Pre-requisites=none; Revised)</p>	<p style="text-align: center;">Object-Oriented Information Systems</p> <p>(Credit Value=15; Level=7; Status=Compulsory; Pre-requisites=none; Current)</p>
<p style="text-align: center;">Artificial Intelligence/Knowledge Based Systems</p> <p>(Credit Value=15; Level=7; Status=Compulsory; Pre-requisites=none; Current)</p>	<p style="text-align: center;">Interoperability and Legacy Systems</p> <p>(Credit Value=15; Level=7; Status=Compulsory; Pre-requisites=Database Technologies; Current)</p>
Year 3(Semester 1 & 2)	
<p>Masters Project (Professional) (Credit Value=60; Level=7; Status=Compulsory; Pre-requisites =all Year1 and Year2 modules)</p>	

SECTION B5
MODULE DESCRIPTIONS
POSTGRADUATE PROVISION

CONTENTS

School of Computing and Intelligent Systems

Modules at Level M

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Cognitive Computing
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Object-oriented Information Systems
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Intelligent Embedded Systems
Advanced Human Computer Interaction
Financial Services Information Systems
Database Technologies
Interoperability and Legacy Systems
Network Management
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Masters Project (Professional)

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Design Theory and Method
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Mobile and Pervasive Computing

The emergence of small and inexpensive processors coupled with the development of wireless networks, and the development of the Mobile Web provides new opportunities for the deployment of information via mobile devices such as smart-phones, PDAs and embedded microprocessors. The convergence of technologies and devices whose primary characteristics are that they are mobile, wireless, small and powerful, promises to enable new systems to provide information 'anywhere-anytime'. In these next-generation systems, the users' information essentially follows them around (i.e. is pervasive).

This fundamental shift in the delivery and management of information generates significant potential for the creation and commercial exploitation of new applications, which could realise enormous benefits in industry and commerce, and arguably impact beneficially on all spheres of human activity. However, the reliable provision of information 'on-demand' anytime, anywhere also generates a whole new generation of problems. These challenges, developments, problems and the emerging solutions are the core subject of this module. The aim of this module is to expose postgraduate students to current developments in converging computing technologies which create both the opportunity and the desire for pervasiveness.

Having completed this module the student will have a strong understanding of the opportunities and challenges afforded by the emerging discipline of Pervasive computing. Practical experience will have been gained in applications development in this genre and the student will also have gained a solid theoretical underpinning in the relevant technologies. The student will also be very aware of the key role played by the application in the survival of any technology, along with a good appreciation of the difficulty of predicting which systems and technologies will prosper and evolve, and which will disappear.

Cognitive Systems

Cognitive Systems is designed to develop the students' appreciation of how theories, principles, mechanisms and models from Cognitive Science, Neuroscience and natural autonomous systems can apply to Computer Science. This module gives a modern and innovative approach to the fundamental concepts and basic design principles of Cognitive Systems. There is also a focus on how Cognitive Systems can be used for numerous real world applications.

The aims of the module are to:

- i) investigate the basic concepts within cognitive science and how they can be used and applied to develop artificial cognitive computing to improve the capability of computers to learn, carry out tasks more autonomously and interact more fluently with users;
- ii) develop principles of cognitive science - philosophy, psychology, neuroscience and computer science;
- iii) establish relationships between cognitive science and Cognitive Systems;
- iv) demonstrate methods of applying cognitive science to computing technologies
- v) distinguish between traditional computing and cognitive computing;
- vi) provide basic skills in applying the principal techniques associated with using and building cognitive computing systems and how cognitive computing can be applied to solve or tackle many real-world problems drawing examples from applications which might involve human computer interaction, information systems management, intelligent systems and computational intelligence, intelligent interactive games and design, robotics, intelligent

agents, intelligent information processing systems, financial time-series prediction and intelligent autonomous corporate decision making.

This module provides the student with an appreciation of issues in Cognitive Science which apply to Cognitive Systems/Computing. It addresses key areas such as, learning, memory, knowledge representation, sensory fusion, motor control, self-organization and social cognition. The student will use the material to understand how these processes can inspire new algorithms and software and be applied in computing systems. The student will be made aware of the many beneficial applications that Cognitive Systems has in many modern day computing technologies.

Research Methods

Research methods employ systematic strategies to generate knowledge about human behaviour, experience and environments in which the thought and action process of the researcher are clearly specified so that they are logical understandable, confirmable and useful. With these sentiments in mind this module first provides an understanding of how knowledge is obtained and how rationalism and empiricism provide a basis for knowing. This leads to the role of the Scientific Method and how it underpins the traditional/conventional scientific research process. The module then focuses on the nature of research in the computing discipline and the development of a process model for research in this domain. It also inculcates an ethical approach to research and develops an appreciation of the role of professional bodies with regard to research activity.

The aims of the module are to:

- i) provide a theoretical foundation for embarking on research in the computing/engineering domain;
- ii) enable participants to develop skills at providing a context and rationale for their proposed research;
- iii) help students apply good research techniques using appropriately selected research methodologies;
- iv) develop discriminative skills to enable students to evaluate their own and other research in relation to their peers and across their particular research domain;
- v) empower students to contextualise, justify, present and disseminate their research in an appropriate, meaningful and easily comprehensible fashion.

This module first provides a theoretical foundation for students embarking on research in the domain of computing/engineering. It then introduces the different approaches to research and considers the criteria to be employed when selecting a research methodology. The different stages in the research process are demonstrated via exemplars and this provides students with the necessary skills to develop a set of deliverables (e.g. literature review, project proposal presentation of results) associated with carrying out research. Embedded in all these activities is the reinforcement of the need for adhering to recognised ethical standards and taking a professional approach to carrying out research.

Object Oriented Information Systems

This module involves the design and develop information systems using object-oriented techniques, tools and technologies; to appraise the writings of researchers and leaders in the object-oriented field; to demonstrate a thorough understanding of industry-standard approaches to information systems development; to synthesise

and evaluate advanced object-oriented and modelling concepts and techniques; to judge the root causes and recommend solutions to the maintenance problem; and, to reflect on obligations to society as software engineering professionals.

The move to object-oriented systems development has been accelerated by the success and spread of OO programming and the recognition that OO methods produce information systems that are more effective, efficient, flexible and stable; indeed, use of the object-oriented paradigm for commercial information systems development projects is now widespread. This module introduces the rationale for the use of an object-oriented approach and studies the concepts underpinning the approach. Various object modelling methods covering both the analysis and design stages are discussed. Methodological approaches for information system development projects are studied, including the development and reuse of software components. Students will build information systems using OO methods and the UML case tools.

Computational Intelligence

The module is designed to further develop the students' appreciation of the current research in computational intelligent techniques. The module provides an overview of existing computational intelligence techniques and highlights the current research in the development of hybrid approaches. The module develops an understanding of these techniques and concludes by introducing the student to the current research focus in bio-inspired systems and artificial life.

The aim of this module is to introduce postgraduate students to the research domain of Computational Intelligent systems and to provide both a theoretical and practical description of how such systems are designed and implemented. Having completed this module the student will have an understanding of the computational intelligence research area. The module addresses both existing techniques used individually and in hybrid forms. The module also introduces the current research topics within this domain.

Artificial Intelligence and Knowledge Based Systems

Artificial intelligence and knowledge-based systems (AI/KBS) can improve the use of knowledge in organizations, and have evolved to the point where they are of commercial significance. This module develops methodologies and organizational applications of artificial intelligence and knowledge-engineering, and will develop the student's ability to apply these to the design and implementation of knowledge-based systems. Practice is gained in solving AI problems, and in the production of expert systems.

The aims of the module are to:

- i) develop the student's abilities to critically analyze and explain the foundations, methodologies and applications of artificial intelligence and knowledge engineering;
- ii) introduce the concepts and design principles used in the construction of artificial intelligence and knowledge-based systems;
- iii) provide expertise in applying the principal techniques associated with using and building artificial intelligence and knowledge engineering systems.

This module gives the student an understanding of the foundations, methodologies and organizational applications of knowledge-engineering, and will develop their ability to apply these to the design and implementation of artificial intelligence/knowledge-based systems (AI/KBS). Practice is gained in solving AI problems, and in the production of expert systems.

Intelligent Embedded Systems

The module is designed to extend the students' understanding of embedded systems, and in particular enable the student to gain expertise in the design, development and implementation of intelligent techniques on an embedded systems platform. The module provides a review of recent advances in embedded systems, and highlights the specific design issues pertaining to the creation of intelligent techniques as embedded systems. The module concludes by introducing the student to current research into autonomously self-adapting intelligent systems and hybrid biological/artificial systems. The aim of this module is to introduce postgraduate students to the research domain of Intelligent Embedded Systems and to provide both a theoretical and practical description of how such systems are designed and implemented.

The module introduces postgraduate students to the research domain of Intelligent Embedded Systems and provides both theoretical and practical description of how such systems are designed and implemented. In particular, focus is placed on the design issues and considerations for implementing intelligent systems on resource-constrained and low-powered systems.

Advanced Human Computer Interaction

Design of Interactive Systems should be informed by theory and follow a systematic engineering approach. The development of HCI knowledge is determined by theory, experimental psychology, and reflection on design practice. This module offers students a thorough grounding in the cognitive and socio-psychological theories that underpins the design of interactive systems. Raising awareness of the issues inherent for transferring theoretical knowledge into the design process, this module will focus on advanced topics such as Social and Cognitive Psychology, Sociology and Cultural studies, Computing and Interface Design, Business Process research, Graphic and Product design, Technical communication and Linguistics, all of which are necessary for the reflection and creation user-compatible interfaces.

The aims of the module are to:

- i) provide an opportunity for students to study, in some depth and in an integrated way, significant issues in the field of Human-Computer Interaction;
- ii) help students develop, through practice, skills in the collation and analysis of secondary research materials, to encourage reflection on current HCI issues and enable development of critical analysis for interactive design;
- iii) encourage appropriate conduct and levels of professionalism in group-work, and to develop skills in the verbal and written communication of complex information;
- iv) provide the opportunity for students to develop an Interactive System, based on their practical and theoretical knowledge.

This module provides the student with a sound knowledge of the concepts that underpin the Human Computer Interaction field. Basic and advanced methods, models and tools are critically reviewed and applied to provide the student with a strong sense of user-compatible software and legislative requirements. Particular attention is awarded to emerging technological development within the Financial Services industry and the role of the knowledge worker as a computer user. The opportunity to construct a simple Interactive System is provided to offer practical design experience.

Financial Services Information Systems

Financial services is the largest industry (or category of industries) in the world, made up of companies specialising in banking, insurance, investment, actuarial and brokerages services. To keep abreast of fast-paced developments in this industry, Financial Service corporations are often the first to adopt new technological developments, and typically have a plethora of platforms and applications optimised to meet their competitive needs. In order to operate systems on various platforms, from individual desk-top to virtual distributed systems, these organisations need highly-skilled, competent computer specialists in all areas of system analysis, design, implementation and testing.

The aim of this module is to introduce students to the Financial Services industry as a potential working environment. The module will examine the various sectors within the industry, with particular emphasis awarded to the Financial Services Authority (FSA) for corporate status, regulations, legislation and career opportunities. The role which ICT has played in emerging Financial Service practices will be investigated. Throughout the module students will be developing skills to meet future industry requirements in terms of technical, social and management potential.

This module informs the student of the various sectors which contribute to the Financial Services industry. Information systems engineering methodology and project management skills are used to solve industrial problems in team-based role-play scenarios. The module aims to develop the information, social, management and communication skills of the student in preparation for future employment within the Financial Services industry.

Database Technologies

Database technologies represent a core component of information systems within financial institutions. Typically these enterprise level systems must support large numbers of geographically dispersed users across the organisation. This module focuses on the design and development of complex enterprise level database systems.

The aims of this module are to:

- i) provide students with a detailed understanding of the core principles which underpin relational database systems;
- ii) convey the importance of employing methodical and structured techniques in the design and implementation of database systems;
- iii) develop the necessary skills required in the design and development of database systems;
- iv) introduce students to a range of database design and development tools and technologies;
- v) introduce students to a range of advanced database systems utilized in enterprise level data management.

This module is devoted to the understanding of database systems, and the environments in which they operate. The pivotal role of database systems within financial institutions and legacy systems is emphasised. The module covers the fundamental principles and theory of database design. Furthermore, students gain

practical experience in designing and developing database systems using a range of techniques, tools and technologies.

Interoperability and Legacy Systems

Successful information systems must work within the environment of an organisation and must not only satisfy the current business requirements but provide a foundation from which future requirements can be met as the organisation evolves. By their very nature legacy systems are successful computer systems. Typically they have evolved with an organisation over a significant period of time and continue to offer substantial benefit. The migration of existing data and interoperability between new and existing systems represents a significant challenge within the financial services sector. This module provides students with the theoretical and practical skills required to migrate legacy systems and develop new systems that successfully interoperate with existing information systems.

The aims of this module are to:

- i. help students understand the evolution of and importance of legacy systems;
- ii. provide students with a detailed understanding and appreciation of technical challenges associated with the migration and interoperability of legacy systems;
- iii. evaluate and utilise various data migration strategies and techniques;
- iv. address security concerns associated with interfacing with legacy systems;
- v. investigate and evaluate the evolving data migration arena and use exemplars of the technologies that manifest this development.

The migration of existing data and interoperability between new and existing systems represents a significant technical challenge within the financial services sector. This module provides students with the theoretical and practical skills required to migrate legacy systems and develop new systems that successfully interoperate with existing information systems.

Network Management

The number of deployed networks, and people using them in the financial services, continues to grow. This module will introduce the concepts and principles of network management to guide the monitoring and deployment of modern, high quality reliable networks. In addition, students will be given the opportunity to learn how to configure network infrastructure equipment for complex financial based applications and how to integrate these within the network

The module aims to:

- i) develop an understanding of the theory and basic concepts of network management;
- ii) develop the ability to deploy and monitor complex network configurations
- iii) provide the student with the expertise to deploy network centric software applications.

This module will introduce the concepts and principles of network management to guide the deployment of modern, high quality reliable networks for the financial services. In addition, students will be given the opportunity to learn how to deploy and configure network equipment, deploy network based software applications and resolve network infrastructural problems. Students will have an in-depth knowledge

of basic skills in networking, and an appreciation for emerging themes that could impact networking in the future.

Masters Project (Research)

The research project represents a piece of work performed by the student under suitable staff supervision which draws both from the practical and creative nature of a design project and the traditional, scholarly exposition of an area of study. The content of the work must be original, and involves a critical appraisal of some area relating to computing. The chosen topic must be sufficiently open-ended to allow a student to demonstrate his or her ability to develop lines of thought or to explore alternative approaches.

The research project offers the student an opportunity to complete a scholarly yet realistic piece of work during which material developed throughout the course and extended through in-depth literature research can be related and applied to a problem drawn from the commercial or industrial world or a research area. The project tests the inventiveness, the critical capacities, and the in-depth knowledge and problem solving skills of the student.

On completion, it must be evident that the student has a lucid, well-informed, and in-depth understanding of the area of knowledge or practice from which the topic was drawn. The student must be able to demonstrate a critical appraisal of the chosen area of study. A professional attitude to the quality of work and the quality of the practical achievement will be looked for. The masters project represents a piece of work performed by the student under suitable staff supervision which draws both from the practical and creative nature of a problem solving project and the traditional, scholarly exposition of an area of study. The content of the work is original and it contains a critical appraisal of the subject area.

Masters Project (Professional)

The Masters Project (Professional) represents a piece of work performed by the student under suitable staff supervision which draws both from the practical and creative nature of a computer based Technology project and the traditional, scholarly exposition of an area of study. The content of the work must be original, and involves a critical appraisal of some area relating to computing within the domain of study.

The chosen topic must be sufficiently open-ended to allow a student to demonstrate his or her ability to develop lines of thought or to explore alternative approaches. The Masters Project (Professional) offers the student an opportunity to complete a realistic piece of work during which material developed throughout the course and extended through in-depth literature research can be related and applied to a IT-related problem drawn from the financial, design or commercial services sector. The project tests the inventiveness, the critical capacities, and the in-depth knowledge and technical skills of the student.

On completion, it must be evident that the student has a lucid, well-informed, and in-depth understanding of the area of knowledge or practice from which the topic was drawn. The student must be able to demonstrate a critical appraisal of the chosen area which, if not original, must be at the leading edge of existing IT applications within their area of research. A professional attitude to the quality of work and presentation will be required. The Masters Project (Professional) represents an integrated piece of work performed by the student under suitable staff supervision which draws both from the practical and creative nature of a computer-based project and the wider financial, design, or industrial IT setting.

Design Theory and Method

This module aims to equip the student to organise problem investigations and design tasks, and to focus, present and discuss information. Each student will move through a three stage design process: analysis, synthesis and evaluation.

Analysis: listing all design requirements needed to complete a set of logically related performance specifications.

Synthesis: finding possible solutions for each individual performance specification and building up complete design from these with least possible compromise.

Evaluation: evaluating the accuracy with which alternative designs fulfil performance requirements for operation, manufacture and marketing, before design is selected.

The objective of this module is to introduce the student to processes associated with design, the theories that underpin the innovation and creativity of the subject and the related methodologies. To expose the student to existing theories of design within new media practice and communication design fields.

3D Computer Graphics Application

This module covers all the various aspects of the design process, project management and practical production. While many of the skills imparted are general, the emphasis is on the design process within the broad field of 3-Dimensional design application.

The module aims to:

- i) encourage Innovation and exploration of interdisciplinary content through creativity and technology;
- ii) help prepare students, through practice for project management using the design process, for their Research Project.

The content for this module will evolve from year to year, addressing where possible the most recent technological advancements and 3D design application trends or identifying new opportunities. General parameter guidelines will be set, however scope for individual direction will exist. This module offers an insight to 3D design and its applications, through practical projects that are current to developmental trends. Students will gain a solid level of proficiency with technical application, for further exploration in their studies. The promotion of innovation and a creative dynamic will be core. Students will be expected to develop a sense of professional acumen, through appropriate decision-making, team working and effective project production. A research-based approach will be encouraged.

Design Entrepreneurship Awareness

The module enables both recent graduates and current practitioners of industrial design and multimedia to become aware of the supporting bodies in entrepreneurship whilst focusing on the individual in the marketing and dissemination of issues regarding very separate and diverse projects. The module aims to give the students a thorough understanding of the fundamental theories, concepts, methodologies and strategies behind entrepreneurship in a design context in order that they may be implemented in a critical and analytical manner.

Modules in business and entrepreneurship have been growing in importance over the last few years as the University has recognised that those more proactive self starters should be given the opportunity to apply and convert their University training in their chosen professional field. This module in entrepreneurship equips the student with the knowledge and awareness essential for a start to their career in the field of design communication.

Design Entrepreneurship Applied

This is the implementation of enterprise. It emphasizes the importance of commercial application and success within the design discipline, placing a business context for both personal and project development. It extends knowledge gained in Design Entrepreneurship Awareness, in the context of student led projects. The application of entrepreneurship fosters reflection on the business value of their work and requires a quantification of project requirements.

The essential aims of the module are to:

- I) focus entrepreneurship in a design project specific context.
- II) define innovative steps in project or professional development.
- III) provide the opportunity for students to quantify project requirements and attain a project focus towards the commercialization/ business development of their work.

This module emphasizes the importance of commercial application and success within the design discipline, placing a business context for both personal and project development. Students experience the processes required in bringing ideas to reality in the business world. It encourages an ambitious, yet professional approach to the development of self-directed projects by requiring the completion of formal written application documents to external bodies. It exercises interpersonal skills and project management through structured digital presentations.

CODE OF PRACTICE FOR MONITORING STUDENT ATTENDANCE

PROCEDURES FOR MONITORING STUDENT ATTENDANCE (MODULE OR OTHER NON-MODULE SPECIFIC EVENT)

1 Attendance will be monitored on all modules across all years of study (undergraduate and postgraduate). Schools may designate other non-module specific events (e.g. general tutorials, induction sessions, meetings with Advisors of Study) at which attendance may also be monitored.

2 Formal responsibility for attendance monitoring at module level and the maintenance of evidence lies with the Module Coordinator although additional School-level support may be provided. Module Coordinators will ensure that timely records of student attendance in an accessible format¹ are maintained.

3 At the start of each module², Module Coordinators will ensure that students are:

(a) reminded of their general attendance obligations³;

(b) advised of any additional module-specific attendance requirements;

(c) reminded of the resources available to them for informing them of non-attendance or other related issues;

(d) advised as to how attendance records for the module will be assembled. They will identify (for example):

- The range of classes at which attendance records will be taken (e.g. all lectures and lab classes; lab classes only; selected classes)
- The mechanism(s) employed (e.g. manual roll-call, use of technology such as Turning Point, WebCT engagement monitoring, combination of methods).

Members of staff assigned corresponding responsibilities for the other designated non-module specific events will provide corresponding information for their events.

4 All staff responsible for monitoring attendance will reflect regularly on the student attendance (and progress where appropriate) within their remit.

5 Module Level or other non-Module specific event.

Where a member of staff identifies a student's attendance profile as giving rise for concern (without reasonable explanation and in the absence of appropriate supporting documentation), they will invoke their School's process for investigation of student non-attendance.⁶ If this proves unsuccessful or the staff member is unhappy with the response received, (s)he will formally advise the student's Course/Subject Director of their concerns. The student's Course/Subject Director will arrange for the reasons for the student's absences to be investigated, meeting with the student if appropriate. Should a student's attendance continue to give rise for concern the student's Course/Subject Director will advise the Head of School who will formally communicate with the student inviting them to discuss the reason(s) for the recurring absences. Details of any meetings with a student at Head of School level will be recorded and placed on the student's file.

6 Failure to Submit Coursework

Where a student has failed to submit a piece of coursework (without reasonable explanation and in the absence of appropriate supporting documentation) the Module Coordinator will advise the

student; and his/her Adviser of Studies and Course/Subject Director that a mark of zero has been awarded for the work as per University Policy. Module Co-ordinators should use non-submission of coursework in conjunction with a student's module attendance profile to support invoking the School's process for investigation of student non-attendance or referring the student to their Course/Subject Director (as described under Point 5).

7 Staff will produce summary reports of attendance upon request from a Course/Subject Director and will also produce a final summary report on completion of the module.

PROCEDURES FOR MONITORING STUDENT ATTENDANCE (COURSE/PROGRAMME)

8 Attendance will be monitored on all courses/programmes across all years.

9 Formal responsibility for attendance monitoring at Course/Programme level lies with the Course/Subject Director, although additional School-level support may also be provided.

Monitoring at course/programme level will be on the basis of reviewing records of attendance for those modules and other non-module specific events and activities that lie within their area of responsibility. To fulfill this duty, Course/Subject Directors will make every effort to obtain attendance information from Module Coordinators for relevant modules that are hosted outside of the Faculty.

10 As part of the Induction Process, Course/Subject Directors will ensure that students are:

- (a)** reminded of their general attendance obligations (quoting the Student Charter, Course Regulations and other relevant sources);
- (b)** reminded of the resources available to them for informing staff of non-attendance or other related issues (e.g. NA1 forms, EC1 forms)
- (c)** advised that attendance will be monitored at all taught modules
- (d)** advised of any other non-module specific events (e.g. general tutorials, induction sessions, meetings with Advisors of Study) at which attendance will be monitored.

11 Course/Subject Directors will make arrangements for ensuring that student attendance across the taught modules and the other events and activities at which student attendance and engagement is required are regularly reflected upon.

12 Concern (Course/Programme Level)

When a student's attendance profile (including using other evidence such as non-submission of coursework as appropriate) across a Course/Programme gives rise for concern (without reasonable explanation and in the absence of appropriate supporting documentation) the Course/Subject Director will arrange for the reasons for the student's absences to be investigated, meeting with the student if appropriate. Should a student's attendance continue to give rise for concern the student's Course/Subject Director will advise the Head of School who will formally communicate with the student inviting them to discuss the reason(s) for the recurring absences. Details of any meetings with a student will be recorded and placed on the student's file.

13 Course/Subject Directors will produce summary reports of attendance upon request from their Head of School.

DATES OF ATTENDANCE/EXAMINATIONS/VACATIONS : 2009/10

Semester 1 (Autumn)	Monday 21 September 2009	Teaching begins
	Friday 11 December 2009	Teaching ends
	Monday 14 December 2009	Christmas Vacation begins
	Friday 25 December 2009 to Friday 1 January 2010	University Closed (Christmas)
	Friday 1 January 2010	Christmas Vacation ends
	Tuesday 5 January to Saturday 16 January 2010	Examination Period
	Friday 22 January 2010	Autumn Semester ends
	Friday 5 February 2010	Last date for meetings of Course/Subject Committees (Semester One Progress review)
Semester 2 (Spring)	Monday 25 January 2010	Teaching begins
	Wednesday 17 March 2010	University Closed (St Patrick's Day)
	Monday 29 March 2010	Easter Vacation begins
	Monday 5 April to Friday 9 2010	University Closed
	Friday 9 April 2010	Easter Vacation ends
	Monday 3 May 2010	University Closed (May Day)
	Tuesday 4 May to Friday 7 May 2010	Revision week (non-teaching)
	Monday 10 May to Saturday 22 May 2010 (with possible extension to 25 May if required for first sit examinations)	Examination period
	Friday 28 May 2010	Spring semester ends
	Thursday 10 June 2010	Last date for meetings of Boards of Examiners
Resit Period	Monday 28 June – Tuesday 6 July 2010	Summer Graduation Ceremonies
	Wednesday 11 August to Thursday 19 August 2010	Supplementary Examinations
Semester 3 (Summer)	Monday 23 August to Friday 27 August 2010	Meetings of Boards of Examiners
	Monday 19 July 2010	Teaching begins
	Monday 30 August to Friday 3 September 2010	Examination Period
	Friday 10 September 2010	Summer Semester ends
	Monday 13 September to Friday 17 September 2010	Meetings of Boards of Examiners

Postgraduate Induction – Useful Addresses

Web Portal for a range of information regarding University activity

<http://portal.ulster.ac.uk>

School of Computing Web site

<http://scis.ulster.ac.uk>

Academic Services for Students

<http://www.ulster.ac.uk/academicservices/student/>

Accommodation Services

<http://www.ulster.ac.uk/accommodation/>

Car Parking

<http://www.ulster.ac.uk/carparks/>

Campus Map – Magee

<http://www.ulster.ac.uk/information/location/mageesigns.html>

Careers Service

<http://careers.ulster.ac.uk/>

Student Support

<http://www.studentsupport.ulster.ac.uk/>

Complaints Procedure

<http://www.ulster.ac.uk/quality/qmau/complaints.html>

Community Liaison Information

www.ulster.ac.uk/communityliaison

Counselling Services

<http://www.ulster.ac.uk/studaffairs/welfareservices/counselling/index.htm>

Course/Module Database

<http://www.ulst.ac.uk/courses/modules/index.html>

Disability Support

<http://www2.ulster.ac.uk/staff/dept-ssds.html>

Faculty of Computing and Engineering

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

Finance - Tuition Fees

<http://www.ulster.ac.uk/finance/fees/>

Financial Support

<http://prospectus.ulster.ac.uk/geninfo/other-financial-support.html>

Health Services

<http://www.studentsupport.ulster.ac.uk/counselling/policies.html>

International Office

<http://www.ulster.ac.uk/international/>

IT services

<http://www.ulster.ac.uk/isd/itus/>

Library Services

<http://www.ulster.ac.uk/library/>

Nursery Care

<http://www2.ulster.ac.uk/staff/dept-sscc.html>

Plagiarism

<http://www.ulster.ac.uk/academicoffice/>

Sports Centre

<http://www.ulster.ac.uk/sportscentre/magee/>

Student Charter

<http://www.ulster.ac.uk/studentcharter/>

Student Handbook

<http://www.ulster.ac.uk/studenthandbook/>

Student Union

<http://www.uusu.org/main/>

Web Portal

<http://studentweb.ulster.ac.uk/>

University Staff

<http://www.ulster.ac.uk/staff/>

HEAD OF SCHOOL

Dr Liam Maguire Room MG242
School of Computing and Intelligent Systems
Tel: 028 7137 5417
E-Mail: lp.maguire@ulster.ac.uk

POSTGRADUATE COURSE DIRECTOR

Dr. Tom Lunney Room MG121D
School of Computing and Intelligent Systems
Tel: 028 7137 5388
E-Mail: tf.lunney@ulster.ac.uk

ADMINISTRATOR

Ms Michelle Stewart
Room MG230
School of Computing and Intelligent Systems
Tel: 028 7137 5409
E-Mail: m.stewart@ulster.ac.uk

SENIOR COMPUTING OFFICER

Mr Ted Leath
Room MG124
School of Computing and Intelligent Systems
Tel: 028 7137 5366
E-Mail: ta.leath@ulster.ac.uk

TEACHING ALLOCATION - PG Dip/MSc Computing and Intelligent Systems

Course Codes

Full-time: 2090PM-EN/2088PM-EN;

Part-time: 2249PM-EN/2245PM-EN

Semester 1 Lecturers

COM718 CRN=11879	Database Technologies a.belatreche@ulster.ac.uk	Dr Ammar Belatreche 75185
COM907 CRN=11958	Computational Intelligence nh.siddique@ulster.ac.uk	Dr NH Siddique 75340
COM848 CRN=11914	Research Methods g.prasad@ulster.ac.uk	Dr Girijesh Prasad 75645
COM908 CRN=11959	Artificial Intelligence/KBS pm.mckevitt@ulster.ac.uk	Prof Paul McKeivitt 75358

Semester 2 Lecturers

COM721 CRN=11882	Network Management ss.chakraborty@ulster.ac.uk	Dr Shyam Chakraborty 75126
COM844 CRN=11912	Mobile and Pervasive Computing dn.woods@ulster.ac.uk	Mr Derek Woods 75380
COM847 CRN=17064	Cognitive Systems dh.coyle@ulster.ac.uk	Dr Damian Coyle 75170
COM912 CRN=11962	Intelligent Embedded Systems jg.harkin@ulster.ac.uk	Dr Jim Harkin 75592

MSc

COM865 CRN=17065	Research Project tm.mcginnity@ulster.ac.uk	Prof. Martin McGinnity 75616
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(Note. Part-time students take the first two listed modules (for each semester) in year 1 and the remaining two modules (for each semester) in year 2.

(Note. COMxxx is the module code)

(Note. CRN means Course Reference Number for the module)

TEACHING ALLOCATION - PG Dip/MSc Computing & Creative Technologies

Course Codes

Full-time: 6212PM-EN/6216PM-EN;

Part-time:6213PM-EN/E6217PM-EN

Semester 1 Lecturers

COM718 CRN=11879	Database Technologies a.belatreche@ulster.ac.uk	Dr Ammar Belatreche 75185
DES801 CRN=12213	Design Theory and Method jg.bartley@ulster.ac.uk	Ms Johanna Bartley 75091
COM719 CRN=11880	Advanced Human Computer Interaction j.condell@ulster.ac.uk	Dr Joan Condell 75024
DES805 CRN=12216	3D Computing Graphics Application jdm.magee@ulster.ac.uk	Mr Justin Magee 75355

Semester 2 Lecturers

COM844 CRN=11912	Mobile and Pervasive Computing dn.woods@ulster.ac.uk	Mr Derek Woods 75380
DES809 CRN=12222	Design Entrepreneurship Awareness pr.hodge@ulster.ac.uk	Mr Robin Hodge 75572
COM905 CRN=11957	Object Orientated Info Systems zm.weng@ulster.ac.uk	Dr Zumao Weng 75358
DES810 CRN=12223	Design Entrepreneurship Applied jdm.magee@ulster.ac.uk	Mr Justin Magee 75355

MSc

COM722 CRN=11883	Master Project (Professional) lp.maguire@ulster.ac.uk	Prof Liam Maguire 75605
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(Note. Part-time students take the first two listed modules (for each semester) in year 1 and the remaining two modules (for each semester) in year 2.

(Note. COMxxx is the module code)

(Note. CRN means Course Reference Number for the module)

TEACHING ALLOCATION - PG Dip/MSc Computing For Financial Services

Course Codes

Full-time:5761PM-EN/5762PM-EN;

Part-time:5764PM-EN/5765PM-EN

Semester 1 Lecturers

COM717 CRN=11878	Financial Services Info Systems sm.moffett@ulster.ac.uk	Dr Sandra Moffett 75745
COM718 CRN=11879	Database Technologies a.belatreche@ulster.ac.uk	Dr Amar Belatreche 75185
COM719 CRN=11880	Advanced HCI j.condell@ulster.ac.uk	Dr Joan Condell 75024
COM908 CRM=11959	Artificial Intelligence/KBS pm.mckevitt@ulster.ac.uk	Prof Paul McKeivitt 75358

Semester 2 Lecturers

COM720 CRN=11881	Interoperability & Legacy Sys. a.mccaughey@ulster.ac.uk	Mr Aiden McCaughey 75131
COM721 CRN=11882	Network Management ss.chakraborty@ulster.ac.uk	Dr Shyam Chakraborty 75126
COM844 CRN=11912	Mobile and Pervasive Computing dn.woods@ulster.ac.uk	Mr Derek Woods 75380
COM905 CRN=11957	Object Orientated Info Systems zm.weng@ulster.ac.uk	Dr Zumao Weng 75358

MSc

COM722 CRN=11883	Masters Project (Professional) lm.maguire@ulster.ac.uk	Prof Liam Maguire 75605
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(Note. Part-time students take the first two listed modules(for each semester) in year 1 and the remaining two modules (for each semester) in year 2.

(Note. COMxxx is the module code)

(Note. CRN means Course Reference Number for the module)

Current timetables may be obtained from: <http://www.infm.ulst.ac.uk/~derek/ttsem1/>

**SCHOOL OF COMPUTING AND INTELLIGENT SYSTEMS
FACULTY OF COMPUTING AND ENGINEERING**

January 2009

Academic	Position	Room	Ext.	Email
Prof. Liam Maguire	Head of School	MS127	75605	lp.maguire@ulster.ac.uk
Prof. Martin McGinnity	Director of Intelligent Systems Research Centre	MS112	75616	tm.mcginny@ulster.ac.uk
Prof. Paul McKeivitt	Professor of Digital Multimedia	MS138	75433	p.mckeivitt@ulster.ac.uk
Prof. Ulrich Nehmzow	Professor of Cognitive Robotics	MS205	75059	u.nehmzow@ulster.ac.uk
Dr Laxmidhar Behera	Reader	MS107	75276	l.behera@ulster.ac.uk
Dr Shyam Chakraborty	Reader	MS135	75126	ss.chakraborty@ulster.ac.uk
Dr. Girijesh Prasad	Reader	MS137	75645	g.prasad@ulster.ac.uk
Dr. Kevin Curran	Senior Lecturer	MS130	75565	kj.curran@ulster.ac.uk
Dr Tom Lunney	Postgraduate Course Director (Senior Lecturer)	MG121D	75388	tf.lunney@ulster.ac.uk
Dr Heather Sayers	Undergraduate Courses' Co-ordinator (Senior Lecturer)	MG121C	75148	hm.sayers@ulster.ac.uk
Dr. Liam Mc Daid	Senior Lecturer	MS016	75452	lj.mcdaid@ulster.ac.uk
Mr Derek Woods	Senior Lecturer	MS134	75380	dn.woods@ulster.ac.uk
Dr Ammar Belatreche	Lecturer	MS104	75185	a.belatreche@ulster.ac.uk
Mr Michael Callaghan	Lecturer	MS132	75771	mj.callaghan@ulster.ac.uk
Dr. Sonya Coleman	Lecturer	MS133	75030	sa.coleman@ulster.ac.uk
Dr. Joan Condell	Lecturer	MS131	75024	j.condell@ulster.ac.uk
Dr Damien Coyle	Lecturer	MS103	75170	dh.coyle@ulster.ac.uk
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Mr John McGregor	Lecturer	MG237	75369	rj.mcgregor@ulster.ac.uk
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Dr Jose Santos	Lecturer	MG238	75034	ja.santos@ulster.ac.uk
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Dr. Zumao Weng	Lecturer	MG050	75358	zm.weng@ulster.ac.uk

Dr. Shane Wilson	Lecturer	MG038	75527	s.wilson@ulster.ac.uk
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Mr Anthony McCourt	Computer Training Officer	MG121B	75784	a.mccourt@ulster.ac.uk
Computing and Technical Support				
Mr Daniel Farren	Technician	MS030 / MF143	75008	db.farren@ulster.ac.uk
Mr Pat Kinsella	Computer Officer	MG132 / MS033	75617	pa.kinsella@ulster.ac.uk
Mr Ted Leath	Senior Computer Officer	MG124	75366	ta.leath@ulster.ac.uk
Mr Neil McDonnell	Technician	MS030 / MF143	75360	n.mcdonnell@ulster.ac.uk
Mr Paddy McDonough	Computer Officer	MS034	75322	p.mcdonough@ulster.ac.uk
Mr Bernard McGarry	Network Assistant	MG132	75644	bq.mcgarry@ulster.ac.uk
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Ms Emma McLaughlin	Secretary	MG048	75382	e.mclaughlin1@ulster.ac.uk
Miss Paula Sheerin	Secretary	MS111	75616	p.sheerin@ulster.ac.uk
Mrs Michelle Stewart	Secretary	MG048	75382	m.stewart@ulster.ac.uk

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