

Faculty: **Science, Technology and Creative Arts**

Title of Programme: **Modular Masters Programme in Computer Science**

Programme Code: **EIMAST**

Programme Specification

Start Date: September 2011

Date of Approval: 19 August 2011

Associate Dean (Academic Quality): PETROS KHOUDIAN



Signature

Programme Specification **Modular Masters Programme in Computer Science**

This programme specification (PS) is designed for prospective students, enrolled students, academic staff and potential employers. It provides a concise summary of the main features of the programme and the intended learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. More detailed information on the teaching, learning and assessment methods, learning outcomes and content for each module can be found in Definitive Module Documents (DMDs) and Module Guides.

Section 1

Awarding Institution/Body	University of Hertfordshire
Teaching Institution	University of Hertfordshire
University/partner campuses	College Lane
Programme accredited by	British Computer Society
Final Award	MSc
All Final Award titles	MSc Artificial Intelligence with Robotics MSc Distributed Systems and Networks MSc Software Engineering MSc Distributed Data Management MSc E-Learning Technology MSc Mobile Computing MSc Computer Science MSc Computer Networking Principles and Practice MSc Business Computing MSc Secure Computing Systems MSc Multimedia Technology
FHEQ level of award	Masters (M) – Level 7

A. Programme Rationale

The Programme is intended for three classes of Honours graduates: those who have a recent Honours degree in Computer Science (or equivalent), those who obtained an Honours degree in Computer Science (or equivalent) some years ago and those who have an Honours degree in a non-computer science (or equivalent) subject, but who have some level of computer literacy.

The strategy for dealing with students without a degree in computer science (or equivalent) is to rapidly bring them up to a sufficient standard over a narrow front so that they can study effectively a subset of the modules offered on the Programme. The skills chosen for rapid development are in the areas of problem analysis, system design and implementation and professional issues. Entrants who have benefited from relevant experiential learning may have a greater selection of modules for study.

The strategy for dealing with students with an Honours degree in Computer Science (or equivalent) obtained some years ago is to offer a tailored subset of the introductory modules designed for non-computing entrants to rectify dated knowledge.

Entrants with an Honours degree in Computer Science (or equivalent) will be eligible to take all taught modules offered by the Programme.

Entrants will be eligible to take one or more business-oriented modules, the nature and quantity depending on the chosen award title.

Within their chosen area students will pursue study at the forefront of the discipline informed by current research and technological developments. Graduates from the Programme will be equipped to pursue research to PhD level or to enter employment in technically advanced and unpredictable working environments requiring sound judgment and the exercise of personal responsibility and initiative.

B. Educational Aims of the Programme

The programme has been devised in accordance with the University's general educational aims of programmes of study as set out in UPR TL01.

Additionally this programme aims to provide students with opportunities to:

- build upon their existing degree-level knowledge and/or practical experience;
- undertake a substantial programme of individual investigative and practical work at postgraduate level;
- evaluate and further develop their skills in research, independent study and self-management and prepare themselves for lifelong learning;
- acquire the necessary skills to undertake further research or secure employment in their chosen career.

For the MSc Artificial Intelligence with Robotics, to provide students with opportunities to:

- acquire the theoretical knowledge and practical skills that are needed to contribute to the design and implementation of working systems in intelligent computing;
- extend their understanding of the scope and limitations of different computational paradigms, such as the way in which Symbolic AI or stochastic methods complement each other;
- gain an awareness of current research in artificial intelligence and robotics.

For the MSc Distributed Systems and Networks to provide students with opportunities to:

- gain an awareness of current research in the areas of distributed systems and networks;
- develop the ability to respond to rapid technological change in the area of distributed systems and networks;
- critically apply the theoretical aspects of distributed systems and networks to specific case studies as examples of networks or distributed systems.

For the MSc Software Engineering, to provide the students with the opportunity to:

- develop awareness of current research and practice in software engineering;
- extend theoretical knowledge and practical skills of models, methodologies, measures and tools that can be employed in the software engineering process;
- apply and critically evaluate a variety of software engineering practices.

For the MSc Distributed Data Management, to provide students with opportunities to:

- extend and critically evaluate the theoretical knowledge and practical skills that are needed to contribute to the design and implementation of working data intensive systems;
- extend and critically evaluate their knowledge of the scope and limitations of different data modelling paradigms and their definitions and implementations within and between enterprises;
- use and critically evaluate data models in advanced contexts such as defining distributed access to data and meta-data.

For the MSc Mobile Computing, to provide students with opportunities to:

- gain the ability to evaluate and apply emerging technologies for the creation of novel multi-user distributed applications;
- become familiar with the principles behind a range of mobile network technologies;

- apply and evaluate the canons of traditional software development such as usability engineering and requirements specification to mobile devices;
- explore the potential for innovative and imaginative applications in the mobile technology field;
- develop an appreciation of the “social” in mobile computing;
- extend knowledge of the major development platforms particularly suitable for mobile computing and evaluate their specific characteristics.

For the MSc Computer Science, to provide students with opportunities to:

- extend knowledge and understanding of and practical skills in, a range of advanced computer science topics.

For the MSc Computer Networking Principles and Practice, to provide students with opportunities to:

- extend theoretical knowledge in a range of networking technologies;
- extend technical expertise and practical skills in aspects of designing and managing real networks and to critically evaluate these;
- extend knowledge of and critically evaluate the principles that underpin current and future developments in the networking field.

For the MSc Secure Computing Systems, to provide students with opportunities to:

- gain familiarity with relevant research relating to system security;
- extend knowledge of and critically evaluate, techniques and tools employed in system security;
- extend awareness of the relative strengths and weaknesses of a range of programming language and software features from a security perspective.

For the MSc Business Computing, to provide students with opportunities to:

- extend knowledge and understanding of a range of topics from computer science and business studies;
- apply and reflect upon, the utilisation of gained knowledge in specific business-oriented situations.

For the MSc Multimedia Technology, to provide students with opportunities to:

- develop the ability to respond to rapid technological change in the area of multimedia technology;
- gain an awareness of current research in the area of multimedia technology;
- critically apply the theoretical aspects of multimedia technology to the design, practical development and implementation of multimedia computer systems.

For the MSc E-Learning Technology, to provide students with opportunities to:

- gain a systematic knowledge and a critical awareness of current research in the area of E-Learning technology;
- develop a comprehensive understanding of theoretical background upon which e-learning design and development work can be founded;
- evaluate methodologies and develop critiques of them and propose ways to implement them in the design and development of e-learning technologies.

C. Intended Learning Outcomes

The programme provides opportunities for students to develop and demonstrate knowledge and understanding, skills and other attributes in the following areas. The programme outcomes are referenced to the Framework for Higher Education Qualifications in England, Wales and Northern Ireland (2008) and relate to the typical student. Additionally, the SEEC Credit Level Descriptors for Further and Higher Education 2003 have been used as a guiding framework for curriculum design.

A - Knowledge and Understanding	Teaching/learning methods & strategies	Assessment
<p>MSc Artificial Intelligence with Robotics students should have knowledge and understanding of:</p> <ol style="list-style-type: none"> 1 The distinctive features of a range of AI (Artificial Intelligence) paradigms. 2 Advanced theoretical issues and their practical implementation, underlying developments in topics covered by this award. <p>MSc Distributed Systems and Network students should have knowledge and understanding of:</p> <ol style="list-style-type: none"> 3 The issues and problems of importance in the design and deployment of networks and distributed systems. 4 How research in the area of distributed systems and networks may be applied to modern computer systems and applications. <p>MSc Software Engineering students should have knowledge and understanding of:</p> <ol style="list-style-type: none"> 5 The complex relationships between models of software engineering processes and the artefacts produced by such a process. 6 The role of measurement data in making effective technical decisions in the software engineering process. 7 The leading edge technical practices implemented within software engineering processes. <p>MSc Distributed Data</p>	<p>Acquisition of A1 to A28 is through a combination of, initially, lecturer-led presentation of specific topics using lectures, tutorials and practicals and later increasingly via guided reading among specialist textbooks and journals as the means of acquainting students with topics at the forefront of the discipline. Students are progressively expected to integrate such leading-edge material into the core themes for their subject area with a minimum of support and to take responsibility for selection and use of advanced theories, principles and methods in particular contexts, developing their understanding of these independently. Subject-specific research methods are embedded in the taught modules. The general principles are covered explicitly in the supporting material for the project module. In the project, students learn how to apply these methods, where appropriate, to their chosen subject area, under the guidance of their project supervisor.</p> <p>Throughout, the learner is encouraged to undertake independent study both to supplement and consolidate what is being taught/learnt and to broaden their individual knowledge and understanding of the subject.</p>	<p>Testing of knowledge and understanding is through a combination of coursework, unseen examination or a combination of the two, as appropriate for the modules in question, followed by the project, in which this knowledge and understanding must be shown to be applied to a substantial piece of independent investigative and/or developmental work.</p>

Management students should have knowledge and understanding of:

- 8 The distinctive features of a range of data modelling paradigms.
- 9 Advanced theoretical issues and their practical implementation, underlying developments in topics covered by this award.
- 10 The issues and problems in developing distributed data intensive systems and delivering them in a networked environment.

MSc Mobile Computing students should have knowledge and understanding of:

- 11 The variety of advanced approaches to providing mobility in computer networks.
- 12 How mobile applications can be delivered in a networked environment using a range of devices employing advanced technology.
- 13 The advanced theoretical and practical issues of Quality of Service (QoS) in a mobile computing environment with limited wireless bandwidth.
- 14 The advanced theoretical and practical usability principles which apply to mobile devices.
- 15 Advanced theoretical and practical security issues in mobile computing.

MSc Computer Science students should have knowledge and understanding of:

- 16 At least two topics of computer science to advanced depth.

MSc Computer Networking

Principles and Practice students should have knowledge and understanding of:

- 17 The complex interaction between different components in current and developing network technologies.
- 18 The range of leading edge tools and techniques that can be used in developing and managing a network application/system.
- 19 A comprehensive set of approaches to providing mobility and QoS in computer networks.

MSc Secure Computing Systems students should have knowledge and understanding of:

- 20 A comprehensive range of security requirements, services, threats and countermeasures.
- 21 Advanced technologies, tools and techniques (such as cryptography and security protocols) which can be used to enhance or break system security properties.

MSc Business Computing students should have knowledge and understanding of:

- 22 A range of advanced topics from computer science and business studies.
- 23 The relevance of these topics to solving complex business problems.

MSc Multimedia

Technology students should have knowledge and understanding of:

- 24 The properties and qualities of a range of current and leading edge digital media.
- 25 The complex relationship between the quality of different multimedia and platform, storage and delivery considerations.
- 26 How the advanced multimedia applications may be delivered on networks.
- 27 Quality of Service requirements on networked multimedia and on advanced appreciation of how these may be delivered in different circumstances.
- 28 How research in the area of multimedia technology may be applied to the development of multimedia computer systems.

MSc E-Learning Technology students should have the knowledge and understanding of:

- 29 A variety of approaches to e-learning technology design and development.
- 30 Standards and guidelines for e-learning technology design and development.
- 31 Learning theories as they pertain to the development of e-learning technologies.
- 32 Aspects of e-learning technology that impact upon its educational value.

B - Computing-related practical abilities	Teaching/learning methods & strategies	Assessment
<p>MSc Artificial Intelligence with Robotics students should be able to:</p> <ol style="list-style-type: none"> 1 Use and evaluate methods currently employed in fields covered by this route, such as neural computing, intelligent agents systems, robotics and artificial life. 2 Carry out a significant independent investigation as part of their project, typically including software development. <p>MSc Distributed Systems and Networks students should be able to:</p> <ol style="list-style-type: none"> 3 Apply the methods of computer science and related disciplines to the investigation of specific aspects of distributed computer systems and networks. 4 Describe and evaluate the technologies used in selected networks and distributed systems. <p>MSc Software Engineering students should be able to:</p> <ol style="list-style-type: none"> 5 Produce models of software engineering processes and artefacts using appropriate modelling techniques. 6 Apply measures to software engineering processes and artefacts and use the data produced to evaluate software engineering activities. 7 Apply and evaluate appropriate software engineering practices with account taken of the contextual limitations of specific software development environments. <p>MSc Distributed Data Management should be able</p>	<p>Computing and related practical abilities are developed throughout the programme by the methods and strategies outlined in section A, above. There is a strong expectation that students independently will develop the capacity to evaluate and select suitable candidates for specific tasks. The major vehicle for this development is the final project, where they are guided by one-to-one supervision from a member of the academic staff.</p> <p>Throughout, the learner is encouraged to develop intellectual skills further by independent study.</p>	<p>Domain-specific practical abilities are assessed directly through coursework and project, but also indirectly through unseen examinations where understanding developed through activity relying on these skills is required.</p> <p>The planning, analysis and design activities encompassed by B1 – B21 are also assessed by the individual project, within which development work applying practical skills to novel problems is also normally needed in order for students to demonstrate mastery of the computing-related practical abilities relevant to their award.</p>

to:

- 8 Apply the methods of computer science and related disciplines to the analysis, design, implementation and evaluation of local and distributed data intensive systems.
- 9 Describe, evaluate and apply technologies used in local and distributed data intensive systems.

MSc Mobile Computing students should be able to:

- 10 Apply and evaluate the methods of computer science and related disciplines to the conception, scoping and development of mobile computer systems.
- 11 Program in one of the major development platforms for mobile computing and demonstrate familiarity with the mode of operation of one other.

MSc Computer Science students should be able to:

- 12 Plan, execute, monitor and reflect upon a substantial piece of independent development work or experimentation in computer science.

MSc Computer Networking Principles and Practice students should be able to:

- 13 Apply the methods of computer science to various aspects of the analysis, design, implementation and evaluation of a range of networking technologies.
- 14 Use and evaluate a range of tools in designing and managing a real network.

MSc Secure Computing Systems students should be able to:

able to:

- 15 Specify a range of security problem types and identify their causes.
- 16 Evaluate the implications of different design and configuration decisions for particular scenarios.
- 17 Individually pursue an investigation into an agreed area of study relating to system security.

MSc Business Computing students should be able to:

- 18 Plan, execute, monitor and reflect upon a substantial piece of independent development work or experimentation in the application of computer science to a business problem.

MSc Multimedia Technology students should be able to:

- 19 Apply the methods of computer science and related disciplines to the analysis, design, implementation and evaluation of multimedia computer systems.

MSc E-Learning Technology students should be able to:

- 20 Create e-learning resources and justify design and development decisions made on the basis of pedagogical as well as technical requirements.
- 21 Make informed choices about the technologies and approaches to use in a given educational context and critically analyse and evaluate given e-learning technologies.

C - Transferable skills	Teaching/learning methods & strategies	Assessment
<p>All students should be able to:</p> <ol style="list-style-type: none"> 1 Undertake substantial investigative and practical work at postgraduate level. 2 Evaluate and make critical use of relevant technical literature. 3 Utilise their knowledge in practical applications. 4 Build on and enlarge their knowledge with a minimum of guidance. 5 Express themselves knowledgeably and coherently, both in writing and orally and be able to explain, justify and otherwise defend their work and ideas, both the specific details and its broader context. 	<p>Transferable skills are developed through the programme by the following:</p> <p>Skill C1 is developed through the final project and supportive lectures.</p> <p>Skill C2 is developed through coursework assignments, the final project and supportive lectures.</p> <p>Skill C3 is developed through coursework assignments and the final project.</p> <p>Skill C4 is developed through coursework assignments and the final project.</p> <p>Skill C5 is developed through coursework assignments and the final project.</p> <p>Throughout, the learner is encouraged to develop transferable skills by maintaining a record of evidence and completing a personal development plan.</p>	<p>Transferable skills are assessed through the following:</p> <p>Skill C1 is assessed through the final project.</p> <p>Skill C2 is assessed through coursework assignments and the final project</p> <p>Skill C3 is assessed through coursework assignments and the final project.</p> <p>Skill C4 is assessed through coursework assignments and the final project.</p> <p>Skill C5 is assessed through coursework assignments and the final project.</p>

D. Programme Structures, Features, Levels, Modules and Credits

The programme is offered in full-time and part-time and in leads to the award of:

- MSc Artificial Intelligence with Robotics
- MSc Distributed Systems and Networks
- MSc Software Engineering
- MSc Distributed Data Management
- MSc Mobile Computing
- MSc Computer Science
- MSc Computer Networking Principles and Practice
- MSc Business computing
- MSc Secure Computing Systems
- MSc Multimedia Technology
- MSc E-Learning Technology

Intake is normally Semester A (September) and B (February).

Professional and Statutory Regulatory Bodies

Accreditation and exemption for all the awards on the Programme is being sought.

Programme Structure

The programme structure and progression information below (Table 1a and 1b) is provided for the award. Any interim awards are identified in Table 1b. The Programme Learning Outcomes detailed above are developed and assessed through the constituent modules. Table 2 (in section 2) identifies where each learning outcome is assessed.

Table 1a Outline Programme Structure

Level 7 Modules

Module Title	Module Code	Credit Points	% examination	% coursework	Semester
Artificial Life	7COM0188	30	0	100	A
Theory and Practice of Artificial Intelligence	7COM0186	30	0	100	B
Neural Networks and Evolutionary Computation	7COM0187	30	0	100	B
Distributed Systems Security	7COM0108	30	100	0	B
Wireless, Mobile and Ad-hoc Networking	7COM0184	15	70	30	A
Multicast and Multimedia Networking	7COM0185	15	75	25	A
Measures and Models for Software Engineering	7COM1001	30	67	33	A
Software Engineering Practice & Experience	7COM0113	30	0	100	B
Advanced Database	7COM0105	30	67	33	A
Web Services	7COM0104	30	67	33	B
Multimedia Specification, Design & Production	7COM0102	30	0	100	B
Human Computer Interaction: Principles and Practice	7COM0103	30	0	100	B
Mobile Standards, Interfaces & Applications	7COM0101	15	0	100	B
Software Development Tools and Methods	7COM0099	15	50	50	A,B
Professional Issues	7COM0097	15	50	50	A, B
Network System Administration	7COM0098	15	0	100	A, B
Secure Systems Programming	7COM1010	15	50	50	B
Data Mining	7COM0200	15	60	40	B
Principles and Practice of E-Learning Design and Development	7COM0202	30	0	100	B
Web Scripting and Context Creation	7COM0203	30	0	100	A,B
E-Business Processes and Strategies	7BSP0198	30	0	100	AB
Computer Simulation for Business	7BSP0413	15	50	50	A, B
Creative Problem Solving	7BSP0392	15	0	100	A
Information Management	7BSP0352	15	50	50	A, B
Principles of Project Management	7BSP0333	15	70	30	A, B
Agile Project Management	7BSP0402	15	0	100	A, B
Artificial Intelligence with Robotics MSc Project	7COM0095	60	0	100	A, B, C
Distributed Systems & Networks MSc Project	7COM0093	60	0	100	A, B, C
Secure Computing Systems MSc Project	7COM0092	60	0	100	A, B, C
Software Engineering MSc Project	7COM0091	60	0	100	A, B, C

Module Title	Module Code	Credit Points	% examination	% coursework	Semester
Distributed Data Management MSc Project	7COM0090	60	0	100	A, B, C
Mobile Computing MSc Project	7COM0089	60	0	100	A, B, C
Computer Science MSc Project	7COM0088	60	0	100	A, B, C
Computer Networking Principles and Practice MSc Project	7COM0087	60	0	100	A, B, C
Multimedia Technology MSc Project	7COM0161	60	0	100	A, B, C
Business Computing MSc Project	7COM0114	60	0	100	A, B, C
E-Learning Technology MSc Project	7COM0201	60	0	100	A, B, C

Level 6 Modules

Module Title	Module Code	Credit Points	% examination	% coursework	Semester
Object- oriented Programming	6COM1029	30	60	40	A,B,C

Some modules are compulsory for certain awards as detailed in Section 2 (Programme-specific assessment regulations).

The award of an MSc degree requires 180 credit points with at least 150 points passed at level 7 plus the requirements specified in Section 2 (Programme-specific assessment regulations).

Table 1b Interim awards available

The programme provides the following interim awards:

Award	Minimum requirements	Available at end of (normally):
Postgraduate Certificate	60 credit points, including at least 30 at level 7, plus the requirements specified in Section 2 (Programme-specific assessment regulations.)	depends on mode of study
Postgraduate Diploma	120 credit points, including at least 90 at level 7, plus the requirements specified in Section 2 (Programme-specific assessment regulations.)	depends on mode of study

The titles of Postgraduate Diploma awards are decorated with subject specialisms as listed below.

- Postgraduate Diploma Artificial Intelligence with Robotics
- Postgraduate Diploma Distributed Systems and Networks
- Postgraduate Diploma Software Engineering
- Postgraduate Diploma Distributed Data Management
- Postgraduate Diploma Mobile Computing
- Postgraduate Diploma Computer Science
- Postgraduate Diploma Computer Networking Principles and Practice
- Postgraduate Diploma Business Computing
- Postgraduate Diploma Secure Computing Systems *or*
- Postgraduate Diploma Multimedia Technology
- Postgraduate Diploma E-Learning Technology

Masters and Diploma awards can be made "with Distinction" or "with Commendation" where criteria as described in UPR AS14 and the students' handbook are met.

E. Support for students and their learning

Students are supported by:

- an induction week at the beginning of each new academic session;
- an extensive Learning Resources Centre, incorporating a library and computer centre;
- a Postgraduate Tutor to help students understand the course/programme structure;
- a substantial Student Centre that provides advice on issues such as finance, University regulations, legal matters etc.;
- overseas orientation;
- an Equal Opportunities Officer;
- Personal Tutors to provide academic and pastoral support;
- student handbook to explain the programme, the student support services available and give the calendar of events for the year;
- module delivery information given out at the commencement of each module;
- specialised computer laboratories;
- email account with free access to the World Wide Web and email access to all tutors;
- StudyNet (web based information to support the programme and modules);
- student pigeon-holes and notice boards where messages and letters can be left by the tutors for the students;
- a project tutor who will provide one-to-one tutoring during the 60 credit project module;
- Faculty Special Needs Officer, who can advise and offer assistance to those with a disability, dyslexia, or other special needs;
- Student Counselling Service, that not only offers a counselling service but will run workshops to help with examination worries etc.;
- Information Consultant, who specialises in the needs of computing students and will guide those students in the use of the Learning Resources Centre;
- Help Desks in both the Learning Resources Centre and the more specialised Computing laboratories;
- Student Finance Advice Centre;
- Careers Office to advise on opportunities for further study or employment;
- on campus accommodation, University tenancy accommodation, on site catering facilities, permits for on-site parking (limited) and a Day Nursery for pre-school children;
- opportunities for student representation in the body that plans and monitors the programme;
- opportunities to give formal feedback through representatives and participate in an annual questionnaire about the staff, modules, the programme and University facilities as a whole.

F. Entry requirements

The principal criterion for admission to the Programme will be the applicants' ability to succeed at and benefit from, one or more awards of the Programme.

For guidance purposes, the normal entry requirements for the Programme are:

- a recent Honours Degree in Computer Science (or equivalent);
- a less recent Honours Degree in Computer Science (or equivalent);
- an Honours Degree in a non-CS subject combined with some level of computer literacy.

Entrants with a recent Honours Degree in Computer Science (or equivalent) may be registered for any of the awards provided by the Programme.

Depending on the award concerned and the computing background of the entrant, he or she may be required to take some combination of the modules:

- Object-oriented Programming
- Software Development Tools and Methods
- Web Scripting and Content Creation

The table below will be used as a guide for students' choice of Module:

1 st degree in Computer Science	1 st Degree not in Computer Science		
No restriction in Module Choices	Evidence of Programming at degree level:	No Programming at First degree level Study for MSc Comp Science:	No Programming at First degree level Study for MSc E-Learning:
	No restriction in Module Choices	Must study Programming Module 6COM1029	Must study Web Scripting Module 7COM0203

Entrants without a recent Honours Degree in Computer Science (or equivalent) may be registered for one of the awards, below and dependent on the extent of their computing background they may be required to study specific Modules to prepare them for their specialist award.

- MSc Artificial Intelligence with Robotics
- MSc E-Learning Technology
- MSc Software Engineering
- MSc Computer Science *or*
- MSc Business Computing

Applicants whose first language is not English must demonstrate sufficient competence in English to benefit from the Programme. This is normally demonstrated by recognised awards equivalent to a TOEFL score of 550 in the written test or 213 in the CBT test together with a TOEFL Test of Written English of 4.0, or an overall IELTS score of 6.0. Candidates who do not satisfy these requirements will be considered on a case-by-case basis.

The programme is subject to the University's Principles, Policies, Regulations and Procedures for the Admission of Students to Undergraduate and Taught Postgraduate Programmes and will take account of University policy and guidelines for assessing accredited prior credited learning (APCL) and accredited prior experiential learning (APEL).

Section 2

Programme management

JACS code(s)	G400
Modes of study	F/T, P/T
Intake	Semester A,B
Relevant QAA subject benchmarking group	None
Date of validation/last periodic review	February 2009
Date of production/ last revision of PS	March 2011
Relevant cohorts	September 2011
Faculty	Science Technology and Creative Arts
Administrative School(s)/Departments	Computer Science

Course (i.e. pathway) details:

Course (i.e. Pathway Point) Titles	Course (i.e. Pathway Point) Codes
MSc Artificial Intelligence with Robotics	EIMAST/AIR1
MSc Distributed Systems and Networks	EIMAST/DSN1/DSNB1
MSc Software Engineering	EIMAST/SE1
MSc Distributed Data Management	EIMAST/DDM1
MSc Mobile Computing	EIMAST/MC1/MCB1
MSc Computer Science	EIMAST/MCS1/MCSB1
MSc Computer Networking Principles and Practice	EIMAST/NPP1/NPPB1
MSc Business Computing	EIMAST/BC1
MSc Secure Computing Systems	EIMAST/SCS1/SCSB1
MSc Multimedia Technology	EIMAST/MLT1
MSc E-Learning Technology	EIMAST/ELT1

The programme is managed by:

- the Associate Head of School (Academic) who has overall responsibility for programmes in Computer Science;
- the Programme Tutor and an Assistant Programme Tutor who are responsible for day to day management: each has a designated area of responsibility, which is described in the student handbook; management is conducted through the Programme Committee, which includes representation from each cohort of students;
- an Admissions Tutor, with specific responsibility for selection;
- a Programme Administrator to deal with day-to-day administration of the Programme;
- Module Leaders who are responsible for the delivery of individual modules.

Programme-specific assessment regulations

The programme is compliant with the University's generic assessment regulations (Structure and Assessment Regulations for Academic Programmes, UPR AS14) with the exception of those listed below, which have been specifically approved by the University.

Further points of clarification and interpretation relevant to this specific programme are given below:

Taught modules on offer for each award:

The tables below shows the modules on offer for each award:

Modules (credit points)	Awards											
	AIR	ELT	MT	DSN	SE	DDM	MC	CS	NPP	SCS	BC	
Artificial Life (30)	C	O	O	O	O	O	O	O	O	O	O	60 credit points to be passed-
Theory and Practice of Artificial Intelligence (30)	O	O	O	O	O	O	O	O	O	O	O	
Neural Networks and Evolutionary Computation (30)	C	O	O	O	O	O	O	O	O	O	O	
Distributed Systems Security (30)	O	O	O	C	O	O	O	O	O	O	C	
Wireless, Mobile and Ad-hoc Networking (15)	O	O	C	C	O	O	C	O	C	C	O	
Multicast and Multimedia Networking (15)	O	O	C	C	O	O	C	O	C	C	O	
Measures and Models for Software Engineering (30)	O	O	O	O	C	O	O	O	O	O	O	
Software Engineering Practice & Experience (30)	O	O	O	O	C	O	O	O	O	O	O	
Advanced Database (30)	O	O	O	O	O	C	O	O	O	O	O	
Web Services (30)	O	O	O	O	O	C	O	O	O	O	O	
Multimedia Specification, Design & Production (30)	O	C	C	O	O	O	O	O	O	O	O	
Human Computer Interaction: Principles and Practice (30)	O	O	O	O	O	O	O	O	O	O	O	
Mobile Standards, Interfaces & Applications (15)	O	O	O	O	O	O	C	O	O	O	O	
Object-oriented Programming (30)	O*~	O*~	O*~	O*~	O*~	O*~	O*~	O*~	O*~	O*~	O*~	
Software Development Tools and Methods (15)	O*~	O*~	O*~	O*~	O*~	O*~	O*~	O*~	O*~	O*~	O*~	
Professional Issues (15)	O*	O*~	O*	O*	O*	O*	O*	O*	O*	O*	O*	
Network System Administration (15)	O	O	O	O	O	O	O	O	C	C	C	
Secure Systems Programming (15)	O	O	O	O	O	O	C	O	C	C	C	
Web Scripting and Context Creation (30)	O*~	O*~	O*~	O*~	O*~	O*~	O*~	O*~	O*~	O*~	O*~	
Principles and Practice of E-learning Design and Development (30)	O	C	O	O	O	O	O	O	O	O	O	

Modules (credit points)	Awards											
	AIR	MT	ELT	DSN	SE	DDM	MC	CS	NPP	SCS	BC	
E-Business Processes and Strategies (30)	30 credits maximum to be passed	30 credits maximum to be passed	30 credits maximum to be passed	30 credits maximum to be passed	30 credits maximum to be passed	30 credits maximum to be passed	30 credits maximum to be passed	30 credits maximum to be passed	30 credits maximum to be passed	30 credits maximum to be passed	30 credits maximum to be passed	60 credit points to be passed
Data Mining (15)												
Computer Simulation for Business (15)												
Creative Problem Solving (15)												
Information Management (15)												
Principles of Project Management (15)												
Agile Project Management (15)												

C indicates a core module for an award.

O indicates an optional module for an award.

O* indicates an optional module for an award for entrants with a Computer Science degree (or equivalent) with the agreement of the Programme Tutor but advisory for other entrants.

X represents a prohibited module for an award.

~ but entrants without a Computer Science degree (or equivalent) may need to study Object-oriented Programming and/or Software Development Tools and Methods to meet the technical prerequisites for studying some Computer Science modules (as specified in the DMDs).

Students may take modules chosen from the above, subject to any constraints on the total number of credit points taken from particular classes of modules, for the chosen award, as described above.

MSc award

To be eligible for the award of MSc, students must have:

- met the requirements of Section 1D;
- passed (without compensation) all modules listed above as core for the chosen award title;
- passed (without compensation) the Project module for the student's chosen award title.

PG Dip award

To be eligible for the award of Pg Dip, students must have:

- met the requirements of Section 1D;
- passed (without compensation) all modules listed above as core for the MSc title equivalent to the chosen award title.

PG Cert award

To be eligible for the award of Pg C, students must have:

- met the requirements of Section 1D;
- passed 60 credits in a set of modules listed in the table above.

Progression

To proceed to the project stage, students must have studied 120 credits of taught modules and satisfied regulations of UPR AS14, D5.2.3.

The Programme Board of Examiners will decide whether a student is ready to proceed to, or continue on, the project stage. In arriving at this decision the Board will consider:

- a) whether the core taught modules for the particular award have been passed;
- b) the imminence of any referral opportunities;
- c) the total credit value and nature of taught modules passed (for the award of MSc in Computer Science only).

Period of Registration

For registration to continue, students should have met the requirements for the PG Dip award within three years and the MSc award within four years (all periods calculated from date of registration on the Programme).

Cheating

On this Programme, the following, inter alia, will be taken to constitute plagiarism and collusion.

Plagiarism

Plagiarism is the act of passing off the work of another as one's own. In the context of in-course assessment, a student who makes a copy of another's work and then hands the work in as his or her own is committing plagiarism. It is legitimate to quote from published texts or sources such as the www, provided the sources are properly acknowledged and the rules of copyright are obeyed. Failure to make clear that the work is that of another is plagiarism. In the context of a test or examination, looking at someone else's answer paper and using their answers is plagiarism.

It is important to recognise that for students working with digital media and often within a context of creative reworking of material drawn from the media world, the full acknowledgement of all sources is required. A student failing to acknowledge the source of a sampled or appropriated material is committing an act of plagiarism.

Collusion

If the joint work of two individuals is passed off as the independent work of each, then they are both guilty of collusion. They will also be guilty of collusion if one knowingly allows the other to plagiarise his or her own work.

The procedure for investigating cases of suspected cheating and the penalties in proven cases will be as laid down in UPR AS14, Section C3.6.

Equivalence of modules with the Modular Masters Programme in Computer Science (Online/Tutored e-Learning)

In this section this programme will be referred to below as the "campus programme". A separate programme is the Modular Masters Programme in Computer Science (Online/Tutored e-Learning), often referred to below as the "online programme". The online programme provides an alternative route to the awards of the campus programme and students may, optionally, register on modules offered on the online programme to advance their studies on the campus programme. In these circumstances the following equivalences will apply as regards to completing the programme, to eligibility to repeat a module after the award of an FREN grade and to the significance of an FNFA grade. Where a module from the campus programme is equivalent to two modules from the online programme then a pass in both of the online modules will be equivalent to a pass in the campus module, a grade obtained in the campus module will be equivalent to obtaining the same grade in both of the modules of the online programme and an FNFA grade in either of the online modules will be equivalent to the award of an FNFA grade in the campus module.

Modular Masters Programme In Computer Science Module(s) – EIMAST	Equivalent Modular Masters Programme In Computer Science Module (On-Line/Tutored E-Learning) Module(s) - EIMASTW
Distributed Systems Security	Distributed Systems Security (online)
Multicast and Multimedia Networking	Multicast and Multimedia Networking (online)
Wireless, Mobile and Ad-hoc Networking	Wireless, Mobile and Ad-hoc Networking (online)
Measures & Modules for Software Engineering	Measures & Modules for Software Engineering (online)
Software Engineering Practice & Experience	Software Engineering Practice and Experience (online)
Advanced Database	Advanced Database (online)
Web Services	Web Services (online)
Multimedia Specification, Design & Production	Multimedia Specification, Design & Production (online)
Human Computer Interaction: Principles and Practice	Human Computer Interaction: Selecting Usable Systems & Human Computer Interaction: Developing Usable Systems (online)
Mobile Standards, Interfaces & Applications	Mobile Standards, Interfaces and Applications (online)
Object-oriented Programming	Introduction To Programming (online) Object-oriented Development (online)
Software Development Tools And Methods	Software Development Tools and Methods (online)
Professional Issues	Professional Issues (online)
Web Scripting and Content Creation	Web Scripting and Content Creation (online)
Principles and Practice of E-Learning Design and Development	Principles and Practice of E-Learning Design and Development (online)

Other sources of information

- Definitive Module Documents.
- Module Guides.
- Student Handbook.
- Programme Specification website: <http://perseus.herts.ac.uk/uhinfo/administration/aqo/programmes/programmes.cfm>.
- University of Hertfordshire Prospectus website: http://perseus.herts.ac.uk/prospectus/prospectus_home.cfm.
- The Framework for Higher Education Qualifications in England, Wales and Northern Ireland, 2008: <http://www.qaa.ac.uk/academicinfrastructure/FHEQ/EWNI/default.asp>.
- SEEC Credit Level Descriptors for Further and Higher Education 2003: <http://www.seec-office.org.uk/creditlevel descriptors2003.pdf>.
- External Quality Review report website: http://www.qaa.ac.uk/revreps/inst_reports.asp?instID=H-0060.
- Professional or Statutory Regulatory Body information: <http://www.bcs.org.uk>.
- Teaching Quality Information (TQI) website: <http://www1.tqi.ac.uk/sites/tqi/home/index.cfm>.
- University of Hertfordshire Academic Quality Office website: <http://perseus.herts.ac.uk/uhinfo/administration/aqo/general/aqo.cfm>.
- Structure & Assessment Regulations - Undergraduate & Taught Postgraduate Programmes, UPR AS14: <http://www.herts.ac.uk/secreg/upr/AS14.htm>.
- Learning and Teaching Policy and General Educational Aims, UPR TL01: <http://www.herts.ac.uk/secreg/upr/TL01.htm>.
- Admissions - Undergraduate & Taught Postgraduate Students, UPR SA03: <http://www.herts.ac.uk/secreg/upr/SA03.htm>.
- Academic Quality, UPR AS17: <http://www.herts.ac.uk/secreg/upr/AS17.htm>.
- Index of UPRs for students: http://www.herts.ac.uk/secreg/upr/upr_azlist_student_info.htm.

Other information relevant to the programme

None.

University policies relevant to the Programme

The University undertakes to use all reasonable endeavours to deliver, assess and administer this programme in accordance with this Programme Specification. At the same time it is recognised that it is in the nature of academic developments that changes, for example to the structure, curriculum and assessment of a programme may be necessary in order to ensure that the programme remains up to date, in response to issues raised as a result of on-going monitoring and evaluation and/or in order to conform to new regulatory requirements imposed by this institution, by professional or statutory bodies, or by national or governmental bodies.

The programme operates within the guidelines and policies relating to equal opportunities and environmental issues which may be agreed from time to time by the Board of Governors and/or the Academic Board of the University.

Where the programme is offered in collaboration with another institution these policies and guidelines will normally be those of the partner institution.

The programme operates in accordance with the University's Regulations Governing Studies Involving the Use of Human Subjects (UPR RE01) agreed from time to time by the Academic Board of the University. However, where the programme is offered in collaboration with another institution (for example through a franchise arrangement for all or part of the programme) then specific approval must be obtained from the University for the operation of the programme within ethical guidelines prepared by the partner institution. The partner institution will be responsible for all insurance liability in connection with the observance of ethical guidelines.



Signed
Chair of Faculty Academic Quality Enhancement Committee

Date 19 August 2011

If you would like this information in an alternative format please contact:
Programme Tutor.

Table 2 (Part 1): Development of Programme Learning Outcomes in the Constituent Modules

This map identifies where the programme learning outcomes are assessed in the constituent modules. It provides (i) an aid to academic staff in understanding how individual modules contribute to the programme aims (ii) a checklist for quality control purposes and (iii) a means to help students monitor their own learning, personal and professional development as the programme progresses.

Faculty of Science, Technology and Creative Arts - Modular Masters Programme in Computer Science

Modules	Code	Programme Learning Outcomes																																
		Computing Related Cognitive Abilities																																
		A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	A18	A19	A20	A21	A22	A23	A24	A25	A26	A27	A28	A29	A30	A31	A32	
Artificial Life	7COM0188																																	
Neural Networks and Evolutionary Computation	7COM0187																																	
Distributed Systems Security	7COM0108																																	
Wireless, Mobile and Ad-hoc Networking	7COM0184																																	
Multicast and Multimedia Networking	7COM0185																																	
Measures and Models for Software Engineering	7COM1001																																	
Software Engineering Practice & Experience	7COM0113																																	
Advanced Database	7COM0105																																	
Web Services	7COM0104																																	
Multimedia Specification, Design & Production	7COM0102																																	
Human Computer Interaction: Principles and Practice	7COM0103																																	
Mobile Standards, Interfaces & Applications	7COM0101																																	
Object-oriented Programming	6COM1029																																	
Software Development Tools and Methods	7COM0099																																	
Professional Issues	7COM0097																																	
Network System Administration	7COM0098																																	
Secure Systems Programming	7COM1010																																	
Principles & Practice of E-Learning Design & Development	7COM0202																																	
Web Scripting and Content Creation	7COM0203																																	
Theory and Practice of Artificial Intelligence	7COM0186																																	
Artificial Intelligence with Robotics MSc Project *	7COM0095																																	
Distributed Systems & Networks MSc Project *	7COM0093																																	
Secure Computing Systems MSc Project *	7COM0092																																	
Software Engineering MSc Project *	7COM0091																																	
Distributed Data Management MSc Project *	7COM0090																																	
Mobile Computing MSc Project *	7COM0089																																	
Computer Science MSc Project *	7COM0088																																	
Computer Networking Principles and Practice MSc Project *	7COM0087																																	
Multimedia Technology MSc Project *	7COM0161																																	
Business Computing MSc Project *	7COM0114																																	
E-Learning Technology MSc Project *	7COM0201																																	

Key

Learning outcome which is assessed as part of the module

* Other learning outcomes assessed will depend on the nature of the final project, typically including one or more of A1-A32

Table 2 (Part 3): Development of Programme Learning Outcomes in the Constituent Modules

This map identifies where the programme learning outcomes are assessed in the constituent modules. It provides (i) an aid to academic staff in understanding how individual modules contribute to the programme aims (ii) a checklist for quality control purposes and (iii) a means to help students monitor their own learning, personal and professional development as the programme progresses.

Modules	Code	Programme Learning Outcomes																								
		Computing Related Practical Abilities																				Additional Generic Skills				
		B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	B18	B19	B20	B21	C1	C2	C3	C4
Artificial Life	7COM0188																									
Neural Networks and Evolutionary Computation	7COM0187																									
Distributed Systems Security	7COM0108																									
Wireless, Mobile and Ad-hoc Networking	7COM0184																									
Multicast and Multimedia Networking	7COM0185																									
Measures and Models for Software Engineering	7COM1001																									
Software Engineering Practice & Experience	7COM0113																									
Advanced Database	7COM0105																									
Web Services	7COM0104																									
Multimedia Specification, Design & Production	7COM0102																									
Human Computer Interaction: Principles and Practice	7COM0103																									
Mobile Standards, Interfaces & Applications	7COM0101																									
Object-oriented Programming	6COM1029																									
Principles & Practice of E-Learning Design and Development.	7COM0202																									
Web Scripting and Content Creation	7COM0203																									
Software Development Tools and Methods	7COM0099																									
Professional Issues	7COM0097																									
Network System Administration	7COM0098																									
Secure Systems Programming	7COM1010																									
Theory and Practice of Artificial Intelligence	7COM0186																									
Artificial Intelligence with Robotics MSc Project *	7COM0095																									
Software Engineering MSc Project *	7COM0091																									
Distributed Systems & Networks MSc Project *	7COM0093																									
Secure Computing Systems MSc Project *	7COM0092																									
Distributed Data Management MSc Project *	7COM0090																									
Mobile Computing MSc Project *	7COM0089																									
Computer Science MSc Project *	7COM0088																									
Computer Networking Principles and Practice MSc Project *	7COM0087																									
Multimedia Technology MSc Project *	7COM0161																									
Business Computing MSc Project *	7COM0114																									
E-Learning Technology MSc Project *	7COM0201																									

Key

Learning outcome which is assessed as part of the module: 

* Other learning outcomes assessed will depend on the nature of the final project, typically including one or more of B1-B21.

Key to Programme Learning Outcomes

A. Knowledge and Understanding

- A1. The distinct features of a range of AI (Artificial Intelligence) paradigms.
- A2. Advanced theoretical issues and their practical implementation, underlying developments in topics covered by this award.
- A3. The issues and problems of importance in the design and deployment of networks and distributed systems.
- A4. How research in the area of distributed systems and networks may be applied to modern computer systems and applications.
- A5. The complex relationships between models of software engineering processes and the artefacts produced by such a process.
- A6. The role of measurement data in making effective technical decisions in the software engineering process.
- A7. The leading edge technical practices implemented within software engineering processes.
- A8. The distinctive features of a range of data modelling paradigms.
- A9. Advanced theoretical issues and their practical implementation, underlying developments in topics covered by this award.
- A10. The issues and problems in developing distributed data intensive systems and delivering them in a networked environment.
- A11. The variety of advanced approaches to providing mobility in computer networks.
- A12. How mobile applications can be delivered in a networked environment using a range of devices employing advanced technology.
- A13. The advanced theoretical and practical usability issues of Quality of Service (QoS) in a mobile computing environment with limited wireless bandwidth.
- A14. The advanced theoretical and practical usability principles which apply to mobile devices.
- A15. Advanced theoretical and practical security issues in mobile computing.
- A16. At least two topics of computer science to advanced depth.
- A17. The complex interaction between different components in current and developing network technologies.
- A18. The range of leading edge tools and techniques that can be used in developing and managing a network application/system.
- A19. A comprehensive set of approaches to providing mobility and QoS in computer networks.
- A20. A comprehensive range of security requirements, services, threats and countermeasures.
- A21. Advanced technologies, tools and techniques (such as cryptography and security protocols) which can be used to enhance or break system security properties.
- A22. A range of advanced topics from computer science and business studies.
- A23. The relevance of these topics to solving complex business problems.
- A24. The properties and qualities of a range of current and leading edge digital media.
- A25. The complex relationship between the quality of different multimedia and platform, storage and delivery considerations.
- A26. How the advanced multimedia applications may be delivered on networks.
- A27. Quality of Service requirements on networked multimedia and an advanced appreciation of how these may be delivered in different circumstances.
- A28. How research in the area of multimedia technology may be applied to the development of multimedia computer systems.
- A29. A variety of approaches to e-learning technology design and development.
- A30. Standards and guidelines for e-learning technology design and development.
- A31. Learning theories as they pertain to the development of e-learning technologies.
- A32. Aspects of e-learning technology that impact upon its educational value.

B. Computing-related practical activities

- B1. Use and evaluate methods currently employed in fields covered by this route, such as neural computing, intelligent agents systems, robotics and artificial life.
- B2. Carry out a significant independent investigation as part of their project, typically including software development.
- B3. Apply the methods of computer science and related disciplines to the investigation of specific aspects of distributed computer systems and networks.
- B4. Describe and evaluate the technologies used in selected networks and distributed systems.
- B5. Produce models of software engineering processes and artefacts using appropriate modelling techniques.
- B6. Apply measures to software engineering processes and artefacts and use the data produced to evaluate software engineering activities.
- B7. Apply and evaluate appropriate software engineering practices with account taken of the contextual limitations of specific software development environments.
- B8. Apply the methods of computer science and related disciplines to the analysis, design, implementation and evaluation of local and distributed data intensive systems.
- B9. Describe, evaluate and apply technologies used in local and distributed data intensive systems.
- B10. Apply and evaluate the methods of computer science and related disciplines to the conception, scoping and development of mobile computer systems.
- B11. Program in one of the major development platforms for mobile computing and demonstrate familiarity with the mode of operation of one other.
- B12. Plan, execute, monitor and reflect upon a substantial piece of independent development work or experimentation in computer science.
- B13. Apply the methods of computer science to various aspects of the analysis, design, implementation and evaluation of a range of networking technologies.
- B14. Use and evaluate a range of tools in designing and managing a real network.
- B15. Specify a range of security problem types and identify their causes.
- B16. Evaluate the implications of different design and configuration decisions for particular scenarios.
- B17. Individually pursue an investigation into an agreed area of study relating to system security.
- B18. Plan, execute monitor and reflect upon a substantial piece of independent development work or experimentation in the application of computer science to a business problem.
- B19. Apply the methods of computer science and related disciplines to the analysis, design, implementation and evaluation of multimedia computer systems.
- B20. Create e-learning resources and justify design and development decisions made on the basis of pedagogical as well as technical requirements.
- B21. Make informed choices about the technologies and approaches to use in a given educational context and critically analyse and evaluate given e-learning technologies.

C. Additional generic skills

- C1. Undertake substantial investigative and practical work at postgraduate level.
- C2. Evaluate and make critical use of relevant technical literature.
- C3. Utilise their knowledge in practical applications.
- C4. Build on and enlarge their knowledge with a minimum of guidance.
- C5. Express themselves knowledgeably and coherently, both in writing and orally and be able to explain, justify and otherwise defend their work and ideas, both the specific details and its broader context.