

School of Computer Science

Title of Programme: Modular Masters Programme in Computer Science

Programme Code: CMCSM

Programme Specification

This programme specification is relevant to students entering:
01 September 2018

Associate Dean of School (Academic Quality Assurance):
Simon Trainis



Signature

A programme specification is a collection of key information about a programme of study (or course). It identifies the aims and learning outcomes of the programme, lists the modules that make up each stage (or year) of the programme, and the teaching, learning and assessment methods used by teaching staff. It also describes the structure of the programme, its progression requirements and any programme-specific regulations. This information is therefore useful to potential students to help them choose the right programme of study, to current students on the programme, and to staff teaching and administering the programme.

Summary of amendments to the programme

No.	Date	Section	Amendment
1	March 2018	Section 1 Page 3	Under " Programme accredited by " change from N/A to BCS (British Computer Society)
2	March 2018	Section 1D Page 12	Under " Professional and Statutory Regulatory Bodies " list the BCS accreditation statement for each award title
3	May 2018	Section 1A Page 4	Under " The Sandwich Placement " Change the description of progression

4	May 2018	Section 1D Page 18	Under “ The Progression to the Industrial Placement ” Change the description of progression
5	May 2018	Section 1D Page 13	In Table 1a , Remove the module 7COM1020 Human Computer Interaction: Principles and Practice
6	May 2018	Section 1D Page 16	In Table 1c , Remove the module 7COM1020 Human Computer Interaction: Principles and Practice
7	May 2018	Section 1D Page 23	In Table 2 , Remove the module 7COM1020 Human Computer Interaction: Principles and Practice
8	May 2018	Various places about Sandwich Semester B intake	Reiterate that the Sandwich Semester B (January) intake is NOT available to MSc Computer Science award where appropriate

If you have any queries regarding the changes please email AQO@herts.ac.uk

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	BCS (British Computer Society)
Final Award (Qualification)	MSc
All Final Award titles (Qualification and Subject)	MSc Artificial Intelligence with Robotics MSc Computer Networking Principles and Practice MSc Cyber Security MSc Software Engineering MSc Advanced Computer Science MSc Computer Science MSc Artificial Intelligence with Robotics (sandwich) MSc Computer Networking Principles and Practice (sandwich) MSc Cyber Security (sandwich) MSc Software Engineering (sandwich) MSc Advanced Computer Science (sandwich) MSc Computer Science (sandwich)*
	<i>* Note: Sandwich award for MSc Computer Science is available for Semester A (September) entrants only.</i>
FHEQ level of award	7
Language of Delivery	English

A. Programme Rationale

The Programme is intended to serve the needs of several kinds of postgraduate student, and offers a range of awards to suit their different backgrounds and circumstances. For the purposes of this document we divide the awards into three categories: Specialist, Generalist, and Crossover. Our purpose is to provide those working towards each of the awards with opportunities to study a set of subjects from within computer science that will complement their existing qualifications and enhance their career prospects, and to do this via a set of learning experiences that will support their personal development.

The Specialist Awards

MSc Artificial Intelligence with Robotics
MSc Computer Networking Principles and Practice
MSc Cyber Security
MSc Software Engineering

These awards are targeted at students who have a good Honours degree in computer science or a very closely related discipline, and who have decided upon a specialist career path or are aiming to enter a PhD programme

in one of the specialisms on offer. Those studying for one of these awards may concentrate entirely on their chosen specialism, and will be expected to complete a major project that is clearly situated within that specialism.

Specialist Award students will pursue study within their chosen area informed by current research and recent technological developments, and will be provided with the opportunity to carry out independent project work that is close to the forefront of the discipline. Graduates obtaining these awards will be equipped to pursue research to PhD level, or to enter specialist employment in technically advanced and unpredictable working environments requiring sound judgment and the exercise of personal responsibility and initiative.

The Generalist Award

MSc Advanced Computer Science

This award is targeted at those who have a good Honours degree in computer science or a very closely related discipline, and who wish to extend and deepen their knowledge in two or more different sub-discipline areas, with a view to enhancing their career prospects or preparing for a programme of research that requires knowledge of one or more of these sub-discipline areas. Those studying for this award will have a wide range of taught modules from which to choose, and will be expected to complete a major project that extends and applies what they have learnt in one or more of the taught modules they have taken.

Within their taught modules Generalist students will pursue study informed by current research and recent technological and developments. They will also be given opportunities to carry out independent project work that is close to the forefront of the discipline. Graduates obtaining this award 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.

The Crossover Award

MSc Computer Science

This award is targeted at those who have a good Honours degree (or equivalent knowledge and experience) in a numerate discipline other than computer science, and who wish to obtain core knowledge and skills in computer science that they can apply to problems drawn from the subject discipline of their first degree, and to problems that are relevant to their chosen career. Those working towards this award will be required to follow a prescribed course of taught modules, and will be expected to complete a major independent project that applies what they have learnt to a problem drawn from the subject of their first degree, or from their chosen career path.

The purpose of this award is to provide a pathway into employment for those seeking positions in which they will apply their knowledge of computer science to their previous discipline area, or apply aspects of their previous discipline to problems in computer science. They are required to follow a programme of studies that rapidly brings them up to an advanced standard in a set of key subject areas, with the aim of enabling them to execute a major project in which they apply their knowledge and skills in Computer Science to a problem taken from the domain of their first degree, from their recent work experience, or from some other area.

The Sandwich Placement

Applicable to all awards

All awards offer the opportunity for students to undertake a period of industrial placement, and so develop their understanding and skills within a professional environment. In order to be eligible for a placement, students must have completed 120 credits if they are Semester A (September) entrants of the programme, or 60 credits if they are Semester B (January – not available for the MSc Computer Science award) entrants, and achieved a pass from their first attempt at the first 60 credits.

All students who have become eligible for a placement will be issued a statement of eligibility from the School of Computer Science. On top of the previous eligibility statement, students who have become eligible for a placement with a grade arithmetic mean of 60 or higher from their first attempt at the first 60 credits of study in the programme, will be issued a recommendation letter from the School of Computer Science for them to present to their potential employers.

Students who have outstanding deferrals from their first attempt at their first 60 credits, are not eligible to progress to a placement until they do meet it. Students who do not pass at their first attempt all of the first 60 credits attempted are not eligible to continue on the placement route.

B. Educational Aims of the Programme

The programme has been devised in accordance with the University's graduate attributes of programmes of study as set out in [UPR TL03](#).

Additionally this programme aims to:

- build upon their existing degree-level knowledge and practical experience;
- undertake a substantial programme of individual project work at postgraduate level;
- evaluate and further develop their skills in research, independent study and self-management, and prepare themselves for lifelong learning;
- develop an understanding of the social, legal and ethical context within which a computing professional is expected to operate, and of the standards that will be expected of them when they graduate;
- acquire the necessary skills to undertake further study or research at postgraduate level, and to secure employment in their chosen career.

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

- develop awareness of current research and practice in artificial intelligence and robotics;
- acquire the 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.

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

- develop awareness of current research in the areas of computer networking, distributed systems and security;
- extend their knowledge of the principles underpinning technologies used for computer networking, distributed systems and security;
- extend their technical expertise and practical skills in the design, management and evaluation of networks;
- extend knowledge of and critically evaluate, techniques and tools employed in system security;
- develop the ability to respond to rapid technological change in the area of distributed systems and networks.

For the **MSc Cyber Security**, to provide the students with the opportunity to:

- develop awareness of current research and practice in cyber security;
- extend their knowledge and understanding of the theory, concept, principles, policies and standards in cyber security;
- extend their technical expertise and practical skills in the design, management and evaluation of methods and procedures employed in cyber defense;
- develop the ability to respond to rapid technological change in cyber security.

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;
- extend and deepen their knowledge and skills in the design and implementation of programmed systems;
- apply and critically evaluate a variety of software engineering practices.

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

- develop awareness of current research and practice in two or more sub-discipline areas of computer science;
- develop an understanding of a variety of paradigms within which programmed systems may be developed, and how the choice of paradigm affects the approach to solving problems and the nature of the solutions obtained;
- extend their knowledge and understanding of, and their practical skills in, a range of advanced computer science topics.

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

- deploy, articulate and evaluate advanced and key principles and techniques of computer science and be in a position to make critical responses and design decisions on the basis of those principles;

- develop a deep and systematic understanding of the application of computer science principles and techniques to the modelling and solution of problems in computer science and other disciplines;
- develop a deep understanding of, and practical skills in, the design and development of programmed systems that complex solve problems from within and outside computer science;
- develop a deep understanding of, and be able to critically evaluate how different approaches to modelling, design and programming can affect the nature of solutions to complex computational problems and their fitness for purpose.

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 the Frameworks for Higher Education Qualifications of UK Degree-Awarding Bodies (2014), and relate to the typical student. Additionally, the SEEC Credit Level Descriptors for Further and Higher Education (2016) 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 graduates should have knowledge and understanding of:</p> <p>A1. The distinctive features of a variety of problem-solving paradigms within the sub-discipline area of Artificial Intelligence and Robotics Advanced principles and their practical implementation, underlying developments in Artificial Intelligence.</p>	<p>Acquisition of knowledge and understanding is through a combination of, initially, lecturer-led presentation of specific topics using lectures, tutorials and practical classes 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.</p> <p>Students are progressively expected to integrate 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. There is a module in which investigative 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>Testing of knowledge and understanding is through a combination of in-course assessment and unseen examinations for taught modules, as deemed appropriate for the subject knowledge and skills under assessment.</p> <p>The capstone is a major project, in which knowledge and understanding must be evidenced, and must be shown to be applied in the context of a substantial piece of independent investigative and/or development work (depending upon the award being sought). The principal assessment of project outcomes is via a dissertation, which would normally include a review of relevant literature.</p>
<p>MSc Computer Networking Principles and Practice graduates should have knowledge and understanding of:</p> <p>A2. The complex interaction between different components in current and developing network technologies.</p> <p>A3. A range of leading edge tools and techniques that can be used in developing and managing a network application/system.</p> <p>A4. The issues and problems of importance in the design and deployment of networks and distributed systems.</p> <p>A5. How research in the area of distributed systems and networks may be applied to modern computer systems and applications.</p>	<p>Students are progressively expected to integrate 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. There is a module in which investigative 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>The capstone is a major project, in which knowledge and understanding must be evidenced, and must be shown to be applied in the context of a substantial piece of independent investigative and/or development work (depending upon the award being sought). The principal assessment of project outcomes is via a dissertation, which would normally include a review of relevant literature.</p>

MSc Cyber Security graduates should have knowledge and understanding of:

- A6. The fundamental and advanced aspects of cyber security in terms of theory, practice, policy and security standard to enable critical cyber security decision making
- A7. The extant threats to current and emerging systems and networks and the effective countermeasures to such threats in compliance with information security management standards
- A8. The social, legal and ethical issues relating to cyber security in the context of secure system design and programming, information security management, penetrating testing and cyber operations

MSc Software Engineering graduates should have knowledge and understanding of:

- A9. The complex relationships between models of software engineering processes and the artefacts produced by such processes.
- A10. The role of estimation and measurement in making effective technical decisions in the software engineering process.
- A11. The leading edge technical practices implemented within software engineering processes.

MSc Advanced Computer Science graduates should have knowledge and understanding of:

- A12. The relationships between computational problems and the choice of programming paradigm to solve them.

The optional industrial placement provides the opportunity to contextualise knowledge and understanding in a working environment, and to develop through interaction with professionals in the discipline.

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.

A13. At least two specialist topics of computer science to advanced depth.

MSc Computer Science graduates should have knowledge and understanding of:

A14. Fundamental computer science concepts and how they may be applied to the solution of complex problems from within and outside computer science.

A15. Principles and practices of software development methodologies.

For all MSc Awards, students should be able to:

A16. Critically evaluate and reflect on professional, social, legal and ethical issues related to contemporary practices in computer science.

B - Computing-related practical abilities

MSc Artificial Intelligence with Robotics students should be able to:

B1. Use and critically 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.

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

B3. Apply the methods of computer science to various aspects of the analysis, design, implementation and

Teaching/learning methods & strategies

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.

The optional industrial work placement provides the opportunity to enhance the development of computing related practical abilities through interaction with professionals in the discipline

Assessment

Domain-specific practical abilities are assessed directly through in-course assignments and the project, but also indirectly through unseen examinations where understanding developed through activity relying on these skills is required.

Planning, analysis and design activities 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.

evaluation of a range of networking technologies.

- B4. Use and critically evaluate a range of tools in designing and managing networks.
- B5. Critically evaluate the implications of different design and configuration decisions for particular scenarios.
- B6. Individually pursue an investigation into an agreed area of study relating to networking, distributed systems, or system security.

MSc Cyber Security students should be able to:

- B7. Identify and critically evaluate vulnerabilities of and threats to the security and integrity of distributed systems
- B8. Conduct and manage a comprehensive risk assessment of the distributed systems in a complex and unpredictable environment.
- B9. Select, deploy, and critically evaluate context-appropriate countermeasures which may include but are not limited to the use of specific cryptographic technology, techniques in writing secure code, and designing and developing a cyber defense environment.
- B10. Individually pursue an investigation into an agreed area of study relating to cyber security such as security analysis, risk assessment, or cyber operations.

MSc Software Engineering students should be able to:

- B11. Produce models of software engineering processes and artefacts using appropriate modelling techniques.
- B12. Apply measures to software engineering processes and artefacts and use the data produced to evaluate software engineering activities.
- B13. Apply and critically evaluate appropriate software

Throughout, the learner is encouraged to develop intellectual skills further by independent study.

engineering practices with account taken of the contextual limitations of specific software development environments.

- B14. Individually pursue an investigation into an agreed area of study relating to software engineering, typically including software development.

MSc Advanced Computer Science students should be able to:

- B15. Use and critically evaluate a range of methods and tools currently employed in at least two specialist topics of computer science to advanced depth.
- B16. Individually pursue a significant independent investigation into an agreed area of study in computer science as part of their project, typically including software development.

MSc Computer Science students should be able to:

- B17. Use and critically evaluate a range of methods and tools currently employed in the design and/or development of computer systems to solve problems from within or without computer science.
- B18. Plan, execute, monitor and reflect upon a substantial piece of independent development work or experimentation solving problems from within or without computer science.

C - Transferable skills

All students should be able to:

- C1. Undertake a substantial piece of practical work at postgraduate level,

Teaching/learning methods & strategies

Transferable skills are developed through the programme by the following:

Assessment

Transferable skills are assessed through the following:

Skill C1 is assessed through the final project.

- independent of close supervision.
- C2. Evaluate and make critical use of relevant academic and technical literature.
 - C3. Utilise their knowledge in practical applications.
 - C4. Build upon and extend their knowledge with a minimum of guidance.
 - C5. Express themselves knowledgably and coherently, both in writing and orally.
 - C6. Be able to explain, justify and otherwise defend their work and ideas, both in its specific details and within a broader context.

Skill C1 is developed through the final project and supporting lectures.

Skill C2 is developed through guided reading, coursework assignments, the final project and supporting lectures.

Skill C3 is developed through coursework assignments and the final project.

Skill C4 is developed through coursework assignments and the final project.

Skill C5 is developed through coursework assignments and the final project.

The optional industrial placement period offers enhanced opportunities for developing either a wider range of skills, or developing specific skills to higher levels of proficiency.

Students are encouraged to develop transferable skills by maintaining a record of evidence and completing a personal development plan.

Skill C2 is assessed through examinations, coursework assignments and the final project

Skill C3 is assessed through coursework assignments and the final project.

Skill C4 is assessed through examinations, coursework assignments and the final project.

Skill C5 is assessed through examinations, coursework assignments and the final project.

Skill C6 is assessed through coursework assignments and the final project.

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

The programme is offered in full-time (12 or 18 months), sandwich (24 or 30 months) and part-time (up to 3 years) modes, and leads to the award of:

MSc Artificial Intelligence with Robotics
 MSc Computer Networking Principles and Practice
 MSc Cyber Security
 MSc Software Engineering
 MSc Advanced Computer Science
 MSc Computer Science

MSc Artificial Intelligence with Robotics (sandwich)
 MSc Computer Networking Principles and Practice (sandwich)
 MSc Cyber Security (sandwich)
 MSc Software Engineering (sandwich)
 MSc Advanced Computer Science (sandwich)
 MSc Computer Science (sandwich)*

* Note: Sandwich award for MSc Computer Science is available for Semester A (September) entrants only.

Entry is normally at Masters (level 7) with related and appropriate degree qualifications.
Intake is normally Semester A (September) and Semester B (January).

All award titles are also offered as a sandwich award. The duration of sandwich programmes, which incorporates a one-year industrial placement, in full-time study mode is 24 months for Semester A (September) entrants and 30 months for Semester B (January - not available for the MSc Computer Science award) entry.

Professional and Statutory Regulatory Bodies

The programme is accredited by BCS (British Computer Science) as below.

Award Title (for all study modes including full-time, sandwich and part-time)	BCS Accreditation
MSc Artificial Intelligence with Robotics	Accredited by BCS, The Chartered Institute for IT for the purposes of fully meeting the further learning academic requirement for registration as a Chartered IT Professional
MSc Computer Networking Principles and Practice	Accredited by BCS, The Chartered Institute for IT on behalf of the Engineering Council for the purposes of partially meeting the academic requirement for registration as a Chartered Engineer
MSc Software Engineering	
MSc Advanced Computer Science	
MSc Cyber Security	Not accredited: BCS accreditation will be sought after the award title has its first group of graduates in September 2018.
MSc Computer Science	Accredited by BCS, The Chartered Institute for IT for the purposes of partially meeting the academic requirement for registration as a Chartered IT Professional

Work-Based Learning, including Sandwich Programmes

An award in the sandwich mode is made to a student who has successfully completed the requirements for a full-time award, and also successfully completed at least 36 weeks of approved, supervised work experience. Students are supported by the Careers and Placements Office in finding a placement

Programme Structure

The programme structure and progression information below (Table 1a and 1b) is provided for the MSc award. Any interim awards are identified in Table 1b.

Table 1a Outline Programme Structure

Module Title	Module Code	Credit Points	Language of Delivery	% examination	% coursework	% practical	Semester
Taught Module							
Theory and Practice of Artificial Intelligence	7COM1034	30	English	0	100	0	B
Neural Networks and Machine Learning	7COM1033	30	English	0	100	0	B
Artificial Life with Robotics	7COM1032	30	English	0	80	20	A
Wireless, Mobile and Ad-hoc Networking	7COM1031	15	English	70	30	0	A
Multicast and Multimedia Networking	7COM1030	15	English	75	25	0	A
Network System Administration	7COM1029	15	English	0	70	30	A
Secure Systems Programming	7COM1028	15	English	50	0	50	B
Distributed Systems Security	7COM1027	30	English	100	0	0	B

Module Title	Module Code	Credit Points	Language of Delivery	% examination	% coursework	% practical	Semester
Cyber Operations	7COM1069	15	English	0	100	0	A
Penetration Testing	7COM1068	15	English	0	100	0	B
Information Security Management and Compliance	7COM1066	15	English	0	100	0	A
Software Engineering Practice & Experience	7COM1026	30	English	0	80	20	B
Programming for Software Engineers	7COM1025	30	English	60	40	0	A
Measures & Models for Software Engineering	7COM1024	30	English	67	33	0	A
Programming Paradigms	7COM1023	30	English	100	0	0	A
Data Mining	7COM1018	15	English	60	40	0	B
Digital Forensics	7COM1067	15	English	0	100	0	B
Investigative Methods for Computer Science	7COM1071	15	English	0	100	0	A, B
Professional Issues	7COM1072	15	English	70	30	0	A, B
Programming and Program Design	7COM1015	30	English	60	40	0	A, B
Systems Modelling	7COM1014	30	English	60	40	0	B
Computer Architectures	7COM1013	15	English	0	100	0	A
Operating Systems and Networks	7COM1012	15	English	0	100	0	A
Software Development Exercise	7COM1035	15	English	0	100	0	A, B

[Please note that from time to time, modules may be run in a different semester other than to the one indicated above. Furthermore, from time to time, a module may become unavailable if there are fewer than 6 students opting to take it or because of circumstances beyond the school's control, such as key staff becoming unavailable. However, these circumstances are exceptional and disruption to any student's programme will be kept to a minimum.]

Subject to availability, and with the prior approval of both the Programme Leader and the Chair of the Board of Examiners, a student may substitute up to 30 credits of modules with 30 credits of equivalent modules from the MSc Computer Science on-line programme (EIMASTW).

Sandwich Placement

Students enrolled on the sandwich version of their award will be enrolled on a zero credited module (7COM1064) during their first two Semesters to prepare them for a placement, and support their efforts in securing an appropriate placement.

Semester A (September) Sandwich Entrants

Students will be enrolled on the 7COM1064 Preparation for Placement in Semesters A and B. The period of placement may only occur between the taught elements of the programme and the final Masters project period. The placement period will normally begin immediately after the end of Semester B (end of May) in the academic year of starting the programme and end just before Semester C (end of May) of the subsequent year. Immediately following the placement, students return to study for the final Masters project.

Preparation for Placement	7COM1064	0	English	0	100	0	AB
Professional Work Placement for MSc Computer Science	7COM1065	0	English	0	100	0	CAB

Module Title	Module Code	Credit Points	Language of Delivery	% examination	% coursework	% practical	Semester
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Note: Sandwich award students are not permitted to be simultaneously registered for their project whilst completing their period of industrial placement.

Semester B (January) Sandwich Entrants - not available for the MSc Computer Science award

Students will be enrolled on the 7COM1064 Preparation for Placement in Semesters B and C. The period of placement may only occur between the first semester of taught modules and the second semester of taught modules. The placement period will normally begin immediately after the end of Semester C (middle of September) in the academic year of starting the programme and end just before Semester A (middle of September) of the subsequent year. Immediately following the placement, students return to study for their second semester of taught modules, followed by the final Masters project.

Preparation for Placement	7COM1064	0	English	0	100	0	BC
Professional Work Placement for MSc Computer Science	7COM1065	0	English	0	100	0	ABC

Masters Project Modules

Artificial Intelligence with Robotics Masters Project	7COM1036	60	English	0	100	0	A, B, C, AB, BC
Computer Networking Principles and Practice Masters Project	7COM1037	60	English	0	100	0	A, B, C, AB, BC
Cyber Security Masters Project	7COM1070	60	English	0	100	0	A, B, C, AB, BC
Software Engineering Masters Project	7COM1038	60	English	0	100	0	A, B, C, AB, BC
Advanced Computer Science Masters Project	7COM1039	60	English	0	100	0	A, B, C, AB, BC
Computer Science Masters Project	7COM1040	60	English	0	100	0	A, B, C, AB, BC

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).

The programme provides the following final and interim awards shown in Table 1b.

Table 1b Final and Interim Awards Available

Award	Minimum requirements	Available at end of (normally)	Programme Learning Outcomes developed (see above)
Postgraduate Certificate (untitled)	60 credit points, including at least 45 at Level 7	1-2 Semesters	See UPR AS11, section 13: http://sitem.herts.ac.uk/secreg/upr/AS11.htm
Postgraduate Diploma Artificial Intelligence with Robotics	120 credit points, including at least 90 at level 7	2-3 Semesters	A1, A13, A16, B1, C2, C3, C4, C5, C6
Postgraduate Diploma Computer Networking Principles and Practice			A2, A3, A4, A5, A13, A16, B3, B4, B5, C2, C3, C4, C5, C6
Postgraduate Diploma Cyber Security			A6, A7, A8, A13, A16, B7, B8, B9, C2, C3, C4, C5, C6

Postgraduate Diploma Software Engineering			A9, A10, A11, A13, A16, B11, B12, B13, C2, C3, C4, C5, C6	
Postgraduate Diploma Advanced Computer Science			A12, A13, A16, B15, C2, C3, C4, C5, C6	
Postgraduate Diploma Computer Science			A14, A15, A16, B17, C2, C3, C4, C5, C6	
MSc Artificial Intelligence with Robotics	180 credit points including at least 150 at level 7	3 Semesters for Semester A (September) entrants.	A1, A13, A16, B1, B2, C1, C2, C3, C4, C5, C6	
MSc Computer Networking Principles and Practice			A2, A3, A4, A5, A13, A16, B3, B4, B5, B6, C1, C2, C3, C4, C5, C6	
MSc Cyber Security			1 Semester plus vacation plus 2 further Semesters for Semester B (January) entrants	A6, A7, A8, A13, A16, B7, B8, B9, B10, C2, C3, C4, C5, C6
MSc Software Engineering			A9, A10, A11, A13, A16, B11, B12, B13, B14, C1, C2, C3, C4, C5, C6	
MSc Advanced Computer Science			A12, A13, A16, B15, B16, C2, C3, C4, C5, C6	
MSc Computer Science			A14, A15, A16, B17, B18, C1, C2, C3, C4, C5, C6	
MSc Artificial Intelligence with Robotics (sandwich)			180 credit points including at least 150 at level 7, and a year's approved and satisfactory industrial placement.	2 Semesters plus 1 year's placement plus a further Semester for Semester A (September) entrants
MSc Computer Networking Principles and Practice (sandwich)	A2, A3, A4, A5, A13, A16, B3, B4, B5, B6, C1, C2, C3, C4, C5, C6			
MSc Cyber Security (sandwich)	A6, A7, A8, A13, A16, B7, B8, B9, B10, C2, C3, C4, C5, C6			
MSc Software Engineering (sandwich)	2 Semesters plus 1 year's placement plus two further Semesters for Semester B (January - not available for the MSc Computer Science award) entrants	A9, A10, A11, A13, A16, B11, B12, B13, B14, C1, C2, C3, C4, C5, C6		
MSc Advanced Computer Science (sandwich)	A12, A13, A16, B15, B16, C2, C3, C4, C5, C6			
MSc Computer Science (sandwich)	A14, A15, A16, B17, B18, C1, C2, C3, C4, C5, C6			

Masters and Diploma awards can be made "with Distinction" or "with Commendation" where criteria as described in [UPR AS14](#), Section D and the students' handbook are met.

Programme-specific assessment regulations

The programme is compliant with the University's academic regulations (in particular, [UPR AS11](#), [UPR AS12/UPR AS13](#) (*delete as applicable*) and [UPR AS14](#)) with the exception of those listed below, which have been specifically approved by the University:

None

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

Modules on offer for each award:

Table 1c below shows the modules on offer for each award:

Table 1c Modules on Offer for Each Award

Module Titles (credit points)	Masters Awards (both full time and sandwich routes)					
	MAIR	MCNPP	MCyS	MSE	MACS	MCS
A. Taught modules						
Theory and Practice of Artificial Intelligence (30)	Core	X	X	X	Elective	X
Neural Networks & Machine Learning (30)	Core	X	X	X	Elective	X
Artificial Life with Robotics (30)	Core	X	X	X	Elective	X
Wireless, Mobile and Ad-hoc Networking (15)	X	Core	X	X	Elective	X
Multicast and Multimedia Networking (15)	X	Core	X	X	Elective	X
Network System Administration (15)	X	Core	X	X	Elective	X
Secure Systems Programming (15)	X	Core	Core	X	Elective	X
Distributed Systems Security (30)	X	Core	Core	X	Elective	X
Cyber Operations (15)	X	X	Core	X	Elective	X
Information Security Management and Compliance (15)	X	X	Core	X	Elective	X
Penetration Testing (15)	X	X	Core	X	Elective	X
Software Engineering Practice & Experience (30)	X	X	X	Core	Elective	X
Programming for Software Engineers (30)	X	X	X	Core	Elective	X
Measures and Models for Software Engineering (30)	X	X	X	Core	Elective	X
Programming Paradigms (30)	X	X	X	X	Core	X
Data Mining (15)	X	X	X	X	Elective	X
Digital Forensics (15)	X	X	X	X	Elective	X
Investigative Methods for Computer Science (15)	Core	Core	Core	Core	Core	X
Professional Issues (15)	Core	Core	Core	Core	Core	Core
Programming and Program Design (30)	X	X	X	X	X	Core
Systems Modelling (30)	X	X	X	X	X	Core
Computer Architectures (15)	X	X	X	X	X	Core
Operating Systems and Networks (15)	X	X	X	X	X	Core
Software Development Exercise (15)	X	X	X	X	X	Core
B. Additional Requirements for the Sandwich Placement Award						
Preparation for Placement (0)	Core	Core	Core	Core	Core	Core
Professional Work Placement for MSc Computer Science (0)	Core	Core	Core	Core	Core	Core
Note: Sandwich award students are not permitted to be registered for their project whilst simultaneously completing their period of industrial placement.						
C. Project Modules (each 60 credits)						
Artificial Intelligence with Robotics Masters Project	Core	X	X	X	X	X
Computer Networking Principles & Practice Masters Project	X	Core	X	X	X	X
Cyber Security Masters Project	X	X	Core	X	X	X
Software Engineering Masters Project	X	X	X	Core	X	X
Advanced Computer Science Masters Project	X	X	X	X	Core	X
Computer Science Masters Project	X	X	X	X	X	Core

Key to terminology used in the table:

Awards	MAIR = MSc Artificial Intelligence with Robotics; MCyS = MSc Cyber Security; MACS = MSc Advanced Computer Science; All awards are also available as a sandwich award.	MCNPP = MSc Networks Principles & Practice; MSE = MSc Software Engineering; MCS = MSc Computer Science
Core	A module that is compulsory	
<i>Elective</i>	An optional module for an award as prescribed in the table.	
X	A prohibited module for an award.	

Subject to availability, and with the prior approval of both the Programme Leader and the Chair of the Board of Examiners, a student may substitute up to 30 credits of modules with 30 credits of equivalent modules from the MSc Computer Science on-line programme (EIMASTW).

Eligibility for Specific Awards:

PG Cert Award

To be eligible for the award of Pg Cert, students must have met the general requirements set out in Section 1D. In addition they must pass 60 credits of taught modules from a set of modules listed in Table 1c above.

PG Dip Awards

To be eligible for the award of Pg Dip, students must have met the general requirements set out in Section 1D. In addition, they must meet the requirements set out below for one of the three different types of award.

Requirements for Specialist Awards

- PG Dip Artificial Intelligence with Robotics
- PG Dip Computer Networking Principles and Practices
- PG Dip Cyber Security
- PG Dip Software Engineering

Students must pass 120 credits worth of taught modules. All taught modules for each specialist award are **Core** (compulsory), though compensation may be allowed at the discretion of the Programme Board of Examiners.

Requirements for the Award of PG Dip Advanced Computer Science

Students must pass 120 credits worth of taught modules. This must include 60 credits worth of **Core** (compulsory) taught modules, which are the 15 credit Investigative Methods for Computer Science module, the 15 credit Professional Issues module, and the 30 credit Programming Paradigms module; and a further 60 credits worth of taught modules that are **Elective** for the award, though compensation may be allowed at the discretion of the Programme Board of Examiners.

At the discretion of the Programme Board of Examiners, candidates with an FNFA in the Programming Paradigms module may be permitted to substitute an approved 30 credits of modules that are **Elective** for the award.

Requirements for the Award of PG Dip Computer Science

Students must pass 120 credits worth of taught modules. All taught modules for this award are **Core** (compulsory), though compensation may be allowed at the discretion of the Programme Board of Examiners.

Masters Awards

To be eligible for the award of MSc, students must have met the general requirements set out in Section 1D. In addition they must pass 120 credits of taught modules that meet the requirement (set out above) of the PG Dip award corresponding to their MSc award title, and must pass (without compensation) the corresponding 60 credit major project.

Additional Requirements for the Sandwich Award

Graduates must pass 120 credits worth of taught modules as defined by the chosen award, and the 60 credit major project (without compensation) as defined by the chosen award. In addition, graduates must pass the "Professional Work Placement for MSc Computer Science" module (7COM1065).

Progression

To Progress to the Project

To gain a Masters award a student requires passes (or accreditation) in 120 credits worth of taught modules and a 60 credit major project. In common with other Masters programmes the design of this programme

assumes that the major project is the last element that the student will complete. However, in some cases students may be allowed to proceed to a project without having first passed (or gained accreditation for) 120 credits worth of taught modules.

To proceed to the project stage, students must therefore have studied 120 credits of taught modules from the programme (or gained credit that is deemed equivalent via an approved accreditation process) 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 student has passed a sufficient subset of the taught modules to support a project in the particular award;
- b) the imminence of any referral opportunities in the modules that the student has not passed;
- c) the total credit value and nature of taught modules passed.

When deciding upon progression the Board will be concerned principally with the student's welfare, and the likelihood that (s)he will succeed in obtaining a Masters degree.

It is unlikely that a student who has not yet passed at least 90 credits on the programme will be allowed to proceed to the project stage:

- In the case of the Specialist Awards, the 90 credits must all be **core** and must include 15 credits from the Investigative Methods for Computer Science module.
- In the case of the MSc Advanced Computer Science award, the 90 credits must include 15 credits from the Investigative Methods for Computer Science module.
- In the case of the MSc Computer Science any 90 credits from those prescribed must be passed.

Students who have not yet met this progression criterion will normally be withdrawn from the project to facilitate the opportunity for further attempts to satisfy the progression requirements. If there is a possibility of referral or deferral assessments being taken that could potentially satisfy the progression criteria before the projects are submitted for assessment, a student will usually be allowed to continue working on the project until those assessments outcomes are known. If at that point, the student still does not meet the progression requirements, they will be withdrawn from the project prior to project submission, and the student encouraged to repeat or complete other modules to meet the project progression requirements at the next available opportunity. Students who have exhausted all opportunities to meet the progression requirements to the project or who have reached the maximum registration duration on the programme will be withdrawn from the programme.

To Progress to the Industrial Placement

All awards offer the opportunity for students to undertake a period of industrial placement, and so develop their understanding and skills within a professional environment. In order to be eligible for a placement, students must have completed 120 credits if they are Semester A (September) entrants of the programme, or 60 credits if they are Semester B (January – not available for the MSc Computer Science award) entrants, and achieved a pass from their first attempt at the first 60 credits.

All students who have become eligible for a placement will be issued a statement of eligibility from the School of Computer Science. On top of the previous eligibility statement, students who have become eligible for a placement with a grade arithmetic mean of 60 or higher from their first attempt at the first 60 credits of study in the programme, will be issued a recommendation letter from the School of Computer Science for them to present to their potential employers.

Students who have outstanding deferrals from their first attempt at their first 60 credits, are not eligible to progress to a placement until they do meet it. Students who do not pass at their first attempt all of the first 60 credits attempted are not eligible to continue on the placement route.

Period of Registration

Table 1d provides examples of indicative patterns of study. As can be seen in Table 1d, the typical duration of learning, teaching and assessment activities for the programme as follows:

- September starters on the full time route: 12 months (September to September, with the conferment of awards in late October or early November)
- September starters on the sandwich route: 24 months (September to September, with the conferment of awards in late October or early November)
- January starters on the full time route: 18 months (January to June, with the conferment of awards in later June or early July)
- January starters on the sandwich route (not available for the MSc Computer Science award): 30 months (January to June, with the conferment of awards in later June or early July)
- September starters on the part time route: 36 months (September to September, with the conferment of awards in late October or early November)
- January starters on the part time route: 33 months (January to September, with the conferment of awards in late October or early November)

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 worldwide web, 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 recognize 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 source or appropriated material is committing an act of plagiarism.

Collusion

If the joint work of two or more individuals is passed off as the independent work of each, then each individual is guilty of collusion. They will also be guilty of collusion if one individual knowingly allows another to plagiarise his or her 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.

Table 1d (part 1): Indicative Patterns of Study (Semester A and Semester B intakes)

The table below provides a small set of examples of the modules that students may choose to study. In the case of Specialist Awards, the study patterns illustrate a student who chooses to take 90 credits of core modules. It should be noted that other patterns of study are available for those students on the Specialist and Advanced Computer Science Awards. Students on the Crossover Award must study according to the pattern shown below.

Award	Semester A	Semester B	Semester C	Semester A	Semester B
MSc Artificial Intelligence with Robotics (Sem A intake)	Artificial Life with Robotics (30) Investigative Methods for Computer Science (15) Professional Issues (15)	Theory and Practice of Artificial Intelligence (30) Neural Networks & Machine Learning (30)	Artificial Intelligence with Robotics Masters Project (60)		
MSc Artificial Intelligence with Robotics (Sem B intake)		Theory and Practice of Artificial Intelligence (30) Neural Networks & Machine Learning (30)		Artificial Life with Robotics (30) Investigative Methods for Computer Science (15) Professional Issues (15)	Artificial Intelligence with Robotics Masters Project (60)
MSc Computer Networking Principles and Practice (Sem A intake)	Wireless, Mobile and Ad-hoc Networking (15) Multicast and Multimedia Networking (15) Network System Administration (15) Professional Issues (15)	Secure Systems Programming (15) Distributed Systems Security (30) Investigative Methods for Computer Science (15)	Computer Networking Principles and Practice Masters Project (60)		
MSc Computer Networking Principles and Practice (Sem B intake)		Secure Systems Programming (15) Distributed Systems Security (30) Professional Issues (15)		Wireless, Mobile and Ad-hoc Networking (15) Multicast and Multimedia Networking (15) Network System Administration (15) Investigative Methods for Computer Science (15)	Computer Networking Principles and Practice Masters Project (60)
MSc Cyber Security (Sem A intake)	Information Security Management and Compliance (15) Cyber Operations (15) Professional Issues (15) Investigative Methods for Computer Science (15)	Secure Systems Programming (15) Distributed Systems Security (30) Penetrating Testing (15)	Cyber Security Masters Project (60)		

Award	Semester A	Semester B	Semester C	Semester A	Semester B
MSc Cyber Security (Sem B intake)		Secure Systems Programming (15) Distributed Systems Security (30) Penetrating Testing (15)		Information Security Management and Compliance (15) Cyber Operations (15) Professional Issues (15) Investigative Methods for Computer Science (15)	Cyber Security Masters Project (60)
MSc Software Engineering (Sem A intake)	Measures and Models for Software Engineering (30) Programming for Software Engineers (30)	Software Engineering Practice & Experience (30) Investigative Methods for Computer Science (15) Professional Issues (15)	Software Engineering Masters Project (60)		
MSc Software Engineering (Sem B intake)		Software Engineering Practice & Experience (30) Investigative Methods for Computer Science (15) Professional Issues (15)		Measures and Models for Software Engineering (30) Programming for Software Engineers (30)	Software Engineering Masters Project (60)
MSc Advanced Computer Science (Sem A intake)	Programming Paradigms (30) Elective module(s) (30)	Investigative Methods for Computer Science (15) Professional Issues (15) Elective module(s) (30)	Advanced Computer Science Masters Project (60)		
MSc Advanced Computer Science (Sem B intake)		Investigative Methods for Computer Science (15) Professional Issues (15) Elective module(s) (30)		Programming Paradigms (30) Elective module(s) (30)	Advanced Computer Science Masters Project (60)
MSc Computer Science (Sem A intake)	Programming and Program Design (30) Computer Architectures (15) Operating Systems and Networks (15)	Systems Modelling (30) Software Development Exercise (15) Professional Issues (15)	Computer Science Masters Project (60)		
MSc Computer Science (Sem B intake)		Programming and Program Design (30) Systems Modelling (30)		Computer Architectures (15) Operating Systems and Networks (15) Software Development Exercise (15) Professional Issues (15)	Computer Science Masters Project (60)

Table 1d (part 2): Indicative Patterns of Study

Semester A intake with a sandwich work placement

The table below provides an overview of the study pattern should a semester A entrant choose to take a sandwich placement during their study. Refer to parts 1 of table 5, for detailed examples of the taught modules and Masters projects available for each award.

Award	Semester A	Semester B	Semester C	Semester A	Semester B	Semester C
All Awards	7COM1064 and Taught modules as defined by the chosen award	7COM1064 and Taught modules as defined by the chosen award	7COM1065 Placement period (minimum of 36 weeks)			Masters project as defined by the chosen award

Semester B intake with a sandwich work placement

The table below provides an overview of the study pattern should a semester B entrant choose to take a sandwich placement during their study. Refer to parts 1 of table 5, for detailed examples of the taught modules and Masters projects available for each award.

Award	Semester B	Semester C	Semester A	Semester B	Semester C	Semester A	Semester B
All Awards (except MSc Computer Science)	7COM1064 and Taught modules as defined by the chosen award	7COM1064 only	7COM1065 Placement period (minimum of 36 weeks)			Taught modules as defined by the chosen award	Masters project as defined by the chosen award

Table 2: 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.

Module Title	Module Code	Programme Learning Outcomes																																	
		Knowledge & Understanding														Computing Related Practical Abilities																			
		A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	B18
Theory and Practice of Artificial Intelligence	7COM1034	X											X				X																		
Neural Networks and Machine Learning	7COM1033	X											X				X																		
Artificial Life with Robotics	7COM1032	X											X				X																		
Wireless, Mobile and Ad-hoc Networking	7COM1031		X	X	X	X							X						X	X	X														
Multicast and Multimedia Networking	7COM1030		X	X	X	X							X						X	X	X														
Network System Administration	7COM1029		X	X									X						X	X	X														
Secure Systems Programming	7COM1028		X	X	X	X	X	X	X				X						X	X	X		X	X	X										
Distributed Systems Security	7COM1027		X	X	X	X	X	X	X				X						X	X	X		X	X	X										
Cyber Operations	7COM1069					X	X	X					X										X	X	X										
Penetration Testing	7COM1068					X	X	X					X										X	X	X						X				
Information Security Management and Compliance	7COM1066					X	X	X					X										X	X	X							X			
Software Engineering Practice & Experience	7COM1026								X	X	X		X														X		X						
Programming for Software Engineers	7COM1025											X	X																						
Measures and Models for Software Engineering	7COM1024								X	X	X		X														X	X	X						
Programming Paradigms	7COM1023											X	X																				X		
Data Mining	7COM1018												X																				X		

		Programme Learning Outcomes																																			
		Knowledge & Understanding												Computing Related Practical Abilities																							
Module Title	Module Code	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	B18		
Digital Forensics	7COM1067													X																	X						
Investigative Methods for Computer Science	7COM1071													X					X				X						X			X					
Professional Issues	7COM1072													X		X			X				X					X			X			X			
Programming and Program Design	7COM1015														X	X																			X		
Systems Modelling	7COM1014														X	X																			X		
Computer Architectures	7COM1013														X																				X		
Operating Systems and Networks	7COM1012														X																				X		
Software Development Exercise	7COM1035														X	X																			X		
Preparation for Placement	7COM1064	This module will prepare students on the sandwich awards for a placement, and support their efforts in securing an appropriate placement.																																			
Professional Work Placement for MSc Computer Science	7COM1065	This module will enhance both knowledge and understanding, and computing related practical abilities through the subject context of the placement taken and through interaction with professionals in the discipline																																			
Artificial Intelligence with Robotics Masters Project	7COM1036	X															X	X	X																		
Computer Networking Principles and Practice Masters Project	7COM1037		X	X	X	X											X			X	X	X	X														
Cyber Security Masters Project	7COM1070						X	X	X								X							X	X	X	X										
Software Engineering Masters Project	7COM1038									X	X	X					X												X	X	X	X					
Advanced Computer Science Masters Project	7COM1039												X	X			X																X	X			
Computer Science Masters Project	7COM1040														X	X	X																		X	X	

Key: Learning Outcome which is assessed as part of the module ☒

Key to Programme Learning Outcomes

A. Knowledge and Understanding of

- A1. The distinctive features of a variety of problem-solving paradigms within the sub-discipline area of Artificial Intelligence and Robotics Advanced principles and their practical implementation, underlying developments in Artificial Intelligence.
- A2. The complex interaction between different components in current and developing network technologies.
- A3. A range of leading edge tools and techniques that can be used in developing and managing a network application/system.
- A4. The issues and problems of importance in the design and deployment of networks and distributed systems.
- A5. How research in the area of distributed systems and networks may be applied to modern computer systems and applications.
- A6. The fundamental and advanced aspects of cyber security in terms of theory, practice, policy and security standard to enable critical cyber security decision making
- A7. The extant threats to current and emerging systems and networks and the effective countermeasures to such threats in compliance with information security
- A8. The social, legal and ethical issues relating to cyber security in the context of secure system design and programming, information security management, penetrating testing and cyber operations
- A9. The complex relationships between models of software engineering processes and the artefacts produced by such processes.
- A10. The role of estimation and measurement in making effective technical decisions in the software engineering process.
- A11. The leading edge technical practices implemented within software engineering processes.
- A12. The relationships between computational problems and the choice of programming paradigm to solve them.
- A13. At least two specialist topics of computer science to advanced depth.
- A14. Fundamental computer science concepts and how they may be applied to the solution of problems from outside computer science.
- A15. Principles and practices of software development.
- A16. Evaluate professional, social and ethical issues related to contemporary practices in computer science.

B. Computing Related Practical Abilities

- 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 to various aspects of the analysis, design, implementation and evaluation of a range of networking technologies.
- B4. Use and evaluate a range of tools in designing and managing networks.
- B5. Evaluate the implications of different design and configuration decisions for particular scenarios.
- B6. Individually pursue an investigation into an agreed area of study relating to networking, distributed systems, or system security.
- B7. Identify and critically evaluate vulnerabilities of and threats to the security and integrity of distributed systems
- B8. Conduct and manage a comprehensive risk assessment of the distributed systems in a complex and unpredictable environment.
- B9. Select, deploy, and critically evaluate context-appropriate countermeasures which may include but are not limited to the use of specific cryptographic technology, techniques in writing secure code, and designing and developing a cyber defense environment.
- B10. Individually pursue an investigation into an agreed area of study relating to cyber security such as security analysis, risk assessment, or cyber operations.
- B11. Produce models of software engineering processes and artefacts using appropriate modelling techniques.
- B12. Apply measures to software engineering processes and artefacts and use the data produced to evaluate software engineering activities.
- B13. Apply and evaluate appropriate software engineering practices with account taken of the contextual limitations of specific software development environments.
- B14. Individually pursue an investigation into an agreed area of study relating to software engineering, typically including software development.
- B15. Use and evaluate a range of methods and tools currently employed in at least two specialist topics of computer science to advanced depth.

- B16. Individually pursue a significant independent investigation into an agreed area of study in computer science as part of their project, typically including software development.
- B17. Use and evaluate a range of methods and tools currently employed in the design and/or development of computer systems.
- B18. Plan, execute, monitor and reflect upon a substantial piece of independent development work or experimentation in computer science.

C. Transferable Skills

- C1 Undertake a substantial piece of practical work at postgraduate level, independent of close supervision.
- C2 Evaluate and make critical use of relevant academic and technical literature.
- C3 Utilise their knowledge in practical applications.
- C4 Build upon and extend their knowledge with a minimum of guidance.
- C5 Express themselves knowledgably and coherently, both in writing and orally.
- C6 Be able to explain, justify and otherwise defend their work and ideas, both in its specific details and within a broader context.

E. Management of Programme & Support for student learning

Management

The programme is managed and administered through:

- A Programme Leader to help students understand the programme structure and provide academic and pastoral support
- A designated Programme Administrator
- Module Leaders
- An induction week at the beginning of each new academic session
- Student representatives on programme committees
- Opportunities for student representation in the body that plans and monitors the programme;
- Opportunities to give formal feedback through representatives and to participate in an annual questionnaire about the staff, modules, the programme and University facilities as a whole.
- A Programme Team led by a Programme Leader to help students understand the course/programme structure;
- A Student Handbook to explain the programme, the support services available and to provide a calendar of events for the year;
- Module delivery information given out at the commencement of each module;
- Project Supervisors who provide one-to-one tutoring during the 60 credit project module
- A dedicated reception area based in the school of computer science
- A student disability team, who can advise and offer assistance to those with a disability, dyslexia, or other special needs;
- An Information Manager, who specialises in the needs of computer science students and will guide those students in the use of the Learning Resources Centres;

Support

Students are supported by:

- An Overseas Orientation Programme at the beginning of each new academic session;
- Specialised computer laboratories and well equipped learning resources centres on each campus;
- StudyNet, a versatile on-line inter-active intranet and learning environment;
- Access to extensive digital and print collections of information resources;
- Attractive modern study environments in 2 Learning Resources Centres;
- A substantial Student Centre that provides advice on issues such as finance, University regulations, legal matters, accommodation, international student support, etc.;
- Office of Dean of Students, incorporating Chaplaincy, Counselling and nursery;
- Medical Centre;
- A Mathematics Drop-in Centre;
- University Disability Advisors;
- An Equal Opportunities Officer;
- The Students' Union;
- Guided student-centred learning through the use of StudyNet;
- A Careers Service for all current students and graduates to advise on opportunities for industrial placement, further study and employment;
- On-campus accommodation, University head-tenancy accommodation, on-site catering and entertainment facilities, permits for on-site parking (limited) and a Day Nursery for pre-school children;
- Help Desks in both the Learning Resources Centres and the more specialised Computing laboratories;
- A Student Counselling Service, that counselling and advice, and runs workshops to help with examination worries and other common concerns

F. Other sources of information

In addition to this Programme Specification, the University publishes guidance to registered students on the programme and its constituent modules:

- A Programme (or Student) Handbook;
- A Definitive Module Document (DMD) for each constituent module;
- A Module Guide for each constituent module.

The [A-Z of the University of Hertfordshire](#) is an introduction to the academic, social, cultural and sporting services and opportunities available at the University of Hertfordshire, and includes the Student Charter and Student Code of Conduct.

As a condition of registration, all students of the University of Hertfordshire are required to comply with the University's rules, regulations and procedures. These are published in a series of documents called 'University Policies and Regulations' (UPRs). The University requires that all students consult these documents which are available on-line, on the UPR web site, at: <http://www.herts.ac.uk/secreg/upr/>. In particular, [UPR SA07](#) 'Regulations and Advice for Students' Particular Attention - Index' provides information on the UPRs that contain the academic regulations of particular relevance for undergraduate and taught postgraduate students.

The UK Quality Assurance Agency for Higher Education (QAA) has confirmed the quality and standards of provision at the University of Hertfordshire. A key part of QAA's role is to review and report on how universities maintain their academic standards and quality, to inform students and the wider public. The team of QAA reviewers visited the University of Hertfordshire in 2015/16 and judged that its academic standards, the quality and enhancement of its students' learning experience, and the quality of information about this learning experience all meet UK expectations. In other words, the University meets national requirements for standards and quality. The QAA's report can be accessed at: <http://www.qaa.ac.uk/reviews-and-reports/provider?UKPRN=10007147#.V-KHajXy0nE>

G. Entry requirements

The normal entry requirements for the programme are:

For admission to:

- MSc Advanced Computer Science,
- MSc Artificial Intelligence with Robotics,
- MSc Computer Networking Principles and Practice,
- MSc Cyber Security,
- MSc Software Engineering:

a good Honours Degree (or equivalent) in computer science or cognate discipline;

For admission to:

- MSc Computer Science:

a good Honours Degree in a numerate discipline other than computer science, with knowledge or experience of computing that goes beyond that of an end-user.

The choice of award title students may be accepted on to will be determined by the award applied for and the prior learning of the student as demonstrated by the transcript for existing qualifications held by the applicant.

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 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 and Regulations for the Admission of Students to Undergraduate and Taught Postgraduate Programmes (in [UPR SA03](#)), along with associated procedures. These will take account of University policy and guidelines for assessing accredited prior certificated learning (APCL) and accredited prior experiential learning (APEL).

If you would like this information in an alternative format please contact: MSc Programme Leader (h.xiao@herts.ac.uk)

If you wish to receive a copy of the latest Programme Annual Monitoring and Evaluation Report (AMER) and/or the External Examiner's Report for the programme, please email a request to aqo@herts.ac.uk

Section 2

Programme management

Relevant QAA subject benchmarking statements

Type of programme

Date of validation/last periodic review

Date of production/ last revision of PS

Relevant to level/cohort

Administrative School

Masters in Computing

Taught postgraduate

March 13

March 2018

Level 7 entering September 2017

School of Computer Science

Table 3 Course Structure

Course details					
Course code	Course description			JACS	
CMCSM	Modular Masters Computer Science			I100	
Course Instances					
Instances code	Intake	Stream	Instances Year	Location:	Mode of study
AIRMSEP1F-1	A	Artificial Intelligence with Robotics	1	Hatfield	Full-time
AIRMSEP1F-2	A	Artificial Intelligence with Robotics	1	Hatfield	Full-time
AIRMYSEP1S	A	Artificial Intelligence with Robotics	1	Hatfield	Full-time/Sandwich
AIRMYSEP1PS-1	A	Artificial Intelligence with Robotics	1	Hatfield	Placement Sandwich
AIRMYSEP1PS-2	A	Artificial Intelligence with Robotics	1	Hatfield	Placement Sandwich
AIRMYSEP2S-1	A	Artificial Intelligence with Robotics	2	Hatfield	Sandwich
AIRMYSEP2S-2	A	Artificial Intelligence with Robotics	2	Hatfield	Sandwich
AIRMSEP1P-1	A	Artificial Intelligence with Robotics	1	Hatfield	Part-time
AIRMSEP1P-2	A	Artificial Intelligence with Robotics	1	Hatfield	Part-time
AIRMSEP2P-1	A	Artificial Intelligence with Robotics	2	Hatfield	Part-time
AIRMSEP2P-2	A	Artificial Intelligence with Robotics	2	Hatfield	Part-time
AIRMSEP3P-1	A	Artificial Intelligence with Robotics	3	Hatfield	Part-time
AIRMSEP3P-2	A	Artificial Intelligence with Robotics	3	Hatfield	Part-time
AIRMFEB1F-1	B	Artificial Intelligence with Robotics	1	Hatfield	Full-time
AIRMFEB1F-2	B	Artificial Intelligence with Robotics	1	Hatfield	Full-time
AIRMFEB1S-1	B	Artificial Intelligence with Robotics	1	Hatfield	Full-time/Sandwich
AIRMFEB1S-2	B	Artificial Intelligence with Robotics	1	Hatfield	Full-time/Sandwich
AIRMFEB2PS-1	B	Artificial Intelligence with Robotics	2	Hatfield	Placement Sandwich
AIRMFEB2PS-2	B	Artificial Intelligence with Robotics	2	Hatfield	Placement Sandwich
AIRMFEB3S	B	Artificial Intelligence with Robotics	3	Hatfield	Sandwich

AIRMFEB1P-1	B	Artificial Intelligence with Robotics	1	Hatfield	Part-time
AIRMFEB1P-2	B	Artificial Intelligence with Robotics	1	Hatfield	Part-time
AIRMFEB2P-1	B	Artificial Intelligence with Robotics	2	Hatfield	Part-time
AIRMFEB2P-2	B	Artificial Intelligence with Robotics	2	Hatfield	Part-time
AIRMFEB3P-1	B	Artificial Intelligence with Robotics	3	Hatfield	Part-time
AIRMFEB3P-2	B	Artificial Intelligence with Robotics	3	Hatfield	Part-time
CSMSEP1F-1	A	Computer Science	1	Hatfield	Full-time
CSMSEP1F-2	A	Computer Science	1	Hatfield	Full-time
CSMYSEP1S	A	Computer Science	1	Hatfield	Full-time/Sandwich
CSMYSEP1PS-1	A	Computer Science	1	Hatfield	Placement Sandwich
CSMYSEP1PS-2	A	Computer Science	1	Hatfield	Placement Sandwich
CSMYSEP2S-1	A	Computer Science	2	Hatfield	Sandwich
CSMYSEP2S-2	A	Computer Science	2	Hatfield	Sandwich
CSMSEP1P-1	A	Computer Science	1	Hatfield	Part-time
CSMSEP1P-2	A	Computer Science	1	Hatfield	Part-time
CSMSEP2P-1	A	Computer Science	2	Hatfield	Part-time
CSMSEP2P-2	A	Computer Science	2	Hatfield	Part-time
CSMSEP3P-1	A	Computer Science	3	Hatfield	Part-time
CSMSEP3P-2	A	Computer Science	3	Hatfield	Part-time
CSMFEB1F-1	B	Computer Science	1	Hatfield	Full-time
CSMFEB1F-2	B	Computer Science	1	Hatfield	Full-time
CSMFEB1P-1	B	Computer Science	1	Hatfield	Part-time
CSMFEB1P-2	B	Computer Science	1	Hatfield	Part-time
CSMFEB2P-1	B	Computer Science	1	Hatfield	Part-time
CSMFEB2P-2	B	Computer Science	1	Hatfield	Part-time
CSMFEB3P-1	B	Computer Science	1	Hatfield	Part-time
CSMFEB3P-2	B	Computer Science	1	Hatfield	Part-time
ACSMSEP1F-1	A	Advanced Computer Science	1	Hatfield	Full-time
ACSMSEP1F-2	A	Advanced Computer Science	1	Hatfield	Full-time
ACSMYSEP1S	A	Advanced Computer Science	1	Hatfield	Full-time/Sandwich
ACSMYSEP1PS-1	A	Advanced Computer Science	1	Hatfield	Placement Sandwich
ACSMYSEP1PS-2	A	Advanced Computer Science	1	Hatfield	Placement Sandwich
ACSMYSEP2S-1	A	Advanced Computer Science	2	Hatfield	Sandwich
ACSMYSEP2S-2	A	Advanced Computer Science	2	Hatfield	Sandwich
ACSMSEP1P-1	A	Advanced Computer Science	1	Hatfield	Part-time
ACSMSEP1P-2	A	Advanced Computer Science	1	Hatfield	Part-time
ACSMSEP2P-1	A	Advanced Computer Science	2	Hatfield	Part-time
ACSMSEP2P-2	A	Advanced Computer Science	2	Hatfield	Part-time
ACSMSEP3P-1	A	Advanced Computer Science	3	Hatfield	Part-time
ACSMSEP3P-2	A	Advanced Computer Science	3	Hatfield	Part-time

ACSMFEB1F-1	B	Advanced Computer Science	1	Hatfield	Full-time
ACSMFEB1F-2	B	Advanced Computer Science	1	Hatfield	Full-time
ACSMFEB1S-1	B	Advanced Computer Science	1	Hatfield	Full-time/Sandwich
ACSMFEB1S-2	B	Advanced Computer Science	1	Hatfield	Full-time/Sandwich
ACSMFEB2PS-1	B	Advanced Computer Science	2	Hatfield	Placement Sandwich
ACSMFEB2PS-2	B	Advanced Computer Science	2	Hatfield	Placement Sandwich
ACSMFEB3S	B	Advanced Computer Science	3	Hatfield	Sandwich
ACSMFEB1P-1	B	Advanced Computer Science	1	Hatfield	Part-time
ACSMFEB1P-2	B	Advanced Computer Science	1	Hatfield	Part-time
ACSMFEB2P-1	B	Advanced Computer Science	2	Hatfield	Part-time
ACSMFEB2P-2	B	Advanced Computer Science	2	Hatfield	Part-time
ACSMFEB3P-1	B	Advanced Computer Science	3	Hatfield	Part-time
ACSMFEB3P-2	B	Advanced Computer Science	3	Hatfield	Part-time
CNPPMSEP1F-1	A	Computing Networking Principles and Practice	1	Hatfield	Full-time
CNPPMSEP1F-2	A	Computing Networking Principles and Practice	1	Hatfield	Full-time
CNPPMYSEP1S	A	Computing Networking Principles and Practice	1	Hatfield	Full-time/Sandwich
CNPPMSEP1PS-1	A	Computing Networking Principles and Practice	1	Hatfield	Placement Sandwich
CNPPMSEP1PS-2	A	Computing Networking Principles and Practice	1	Hatfield	Placement Sandwich
CNPPMSEP2S-1	A	Computing Networking Principles and Practice	2	Hatfield	Sandwich
CNPPMSEP2S-2	A	Computing Networking Principles and Practice	2	Hatfield	Sandwich
CNPPMSEP1P-1	A	Computing Networking Principles and Practice	1	Hatfield	Part-time
CNPPMSEP1P-2	A	Computing Networking Principles and Practice	1	Hatfield	Part-time
CNPPMSEP2P-1	A	Computing Networking Principles and Practice	2	Hatfield	Part-time
CNPPMSEP2P-2	A	Computing Networking Principles and Practice	2	Hatfield	Part-time
CNPPMSEP3P-1	A	Computing Networking Principles and Practice	3	Hatfield	Part-time
CNPPMSEP3P-2	A	Computing Networking Principles and Practice	3	Hatfield	Part-time
CNPPMFEB1F-1	B	Computing Networking Principles and Practice	1	Hatfield	Full-time
CNPPMFEB1F-2	B	Computing Networking Principles and Practice	1	Hatfield	Full-time
CNPMFEB1S-1	B	Computing Networking Principles and Practice	1	Hatfield	Full-time/Sandwich
CNPMFEB1S-2	B	Computing Networking Principles and Practice	1	Hatfield	Full-time/Sandwich

CNPMFEB2PS-1	B	Computing Networking Principles and Practice	2	Hatfield	Placement Sandwich
CNPMFEB2PS-2	B	Computing Networking Principles and Practice	2	Hatfield	Placement Sandwich
CNPMFEB3S	B	Computing Networking Principles and Practice	3	Hatfield	Sandwich
CNPPMFEB1P-1	B	Computing Networking Principles and Practice	1	Hatfield	Part-time
CNPPMFEB1P-2	B	Computing Networking Principles and Practice	1	Hatfield	Part-time
CNPPMFEB2P-1	B	Computing Networking Principles and Practice	2	Hatfield	Part-time
CNPPMFEB2P-2	B	Computing Networking Principles and Practice	2	Hatfield	Part-time
CNPPMFEB3P-1	B	Computing Networking Principles and Practice	3	Hatfield	Part-time
CNPPMFEB3P-2	B	Computing Networking Principles and Practice	3	Hatfield	Part-time
SEMSEP1F-1	A	Software Engineering	1	Hatfield	Full-time
SEMSEP1F-2	A	Software Engineering	1	Hatfield	Full-time
SEMYSEP1S	A	Software Engineering	1	Hatfield	Full-time/Sandwich
SEMYSEP1PS-1	A	Software Engineering	1	Hatfield	Placement Sandwich
SEMYSEP1PS-2	A	Software Engineering	1	Hatfield	Placement Sandwich
SEMYSEP2S-1	A	Software Engineering	2	Hatfield	Sandwich
SEMYSEP2S-2	A	Software Engineering	2	Hatfield	Sandwich
SEMSEP1P-1	A	Software Engineering	1	Hatfield	Part-time
SEMSEP1P-2	A	Software Engineering	1	Hatfield	Part-time
SEMSEP2P-1	A	Software Engineering	2	Hatfield	Part-time
SEMSEP2P-2	A	Software Engineering	2	Hatfield	Part-time
SEMSEP3P-1	A	Software Engineering	3	Hatfield	Part-time
SEMSEP3P-2	A	Software Engineering	3	Hatfield	Part-time
SEMFEFEB1F-1	B	Software Engineering	1	Hatfield	Full-time
SEMFEFEB1F-2	B	Software Engineering	1	Hatfield	Full-time
SESMFEFEB1S-1	B	Software Engineering	1	Hatfield	Full-time/Sandwich
SESMFEFEB1S-2	B	Software Engineering	1	Hatfield	Full-time/Sandwich
SESMFEFEB2PS-1	B	Software Engineering	2	Hatfield	Placement Sandwich
SESMFEFEB2PS-2	B	Software Engineering	2	Hatfield	Placement Sandwich
SESMFEFEB3S	B	Software Engineering	3	Hatfield	Sandwich
SEMFEFEB1P-1	B	Software Engineering	1	Hatfield	Part-time
SEMFEFEB1P-2	B	Software Engineering	1	Hatfield	Part-time
SEMFEFEB2P-1	B	Software Engineering	2	Hatfield	Part-time
SEMFEFEB2P-2	B	Software Engineering	2	Hatfield	Part-time
SEMFEFEB3P-1	B	Software Engineering	3	Hatfield	Part-time
SEMFEFEB3P-2	B	Software Engineering	3	Hatfield	Part-time

CYSMSEP1F-1	A	Cyber Security	1	Hatfield	Full-time
CYSMSEP1F-2	A	Cyber Security	1	Hatfield	Full-time
CYSMYSEP1S	A	Cyber Security	1	Hatfield	Full-time/Sandwich
CYSMYSEP1PS-1	A	Cyber Security	1	Hatfield	Placement Sandwich
CYSMYSEP1PS-2	A	Cyber Security	1	Hatfield	Placement Sandwich
CYSMYSEP2S-1	A	Cyber Security	2	Hatfield	Sandwich
CYSMYSEP2S-2	A	Cyber Security	2	Hatfield	Sandwich
CYSMSEP1P-1	A	Cyber Security	1	Hatfield	Part-time
CYSMSEP1P-2	A	Cyber Security	1	Hatfield	Part-time
CYSMSEP2P-1	A	Cyber Security	2	Hatfield	Part-time
CYSMSEP2P-2	A	Cyber Security	2	Hatfield	Part-time
CYSMSEP3P-1	A	Cyber Security	3	Hatfield	Part-time
CYSMSEP3P-2	A	Cyber Security	3	Hatfield	Part-time
CYSMFEB1F-1	B	Cyber Security	1	Hatfield	Full-time
CYSMFEB1F-2	B	Cyber Security	1	Hatfield	Full-time
CYSMFEB1S-1	B	Cyber Security	1	Hatfield	Full-time/Sandwich
CYSMFEB1S-2	B	Cyber Security	1	Hatfield	Full-time/Sandwich
CYSMFEB2PS-1	B	Cyber Security	2	Hatfield	Placement Sandwich
CYSMFEB2PS-2	B	Cyber Security	2	Hatfield	Placement Sandwich
CYSMFEB3S	B	Cyber Security	3	Hatfield	Sandwich
CYSMFEB1P-1	B	Cyber Security	1	Hatfield	Part-time
CYSMFEB1P-2	B	Cyber Security	1	Hatfield	Part-time
CYSMFEB2P-1	B	Cyber Security	2	Hatfield	Part-time
CYSMFEB2P-2	B	Cyber Security	2	Hatfield	Part-time
CYSMFEB3P-1	B	Cyber Security	3	Hatfield	Part-time
CYSMFEB3P-2	B	Cyber Security	3	Hatfield	Part-time