

School of Computer Science

Title of Programme: Modular Masters Programme in Computer Science

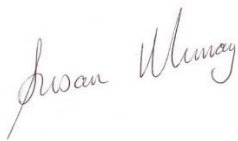
Programme Code: CMCSM

Programme Specification

This programme specification is relevant to students entering:
01 September 2019

Associate Dean of School (Academic Quality Assurance):
Susan Murray

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

Date	Section	Amendment
March 2019	Various sections	To add specification about the following awards <ul style="list-style-type: none">• MSc Data Science and Analytics• MSc Data Science and Analytics (sandwich)

March 2019	Various sections	Change the award title MSc Artificial Intelligence with Robotics to MSc Artificial Intelligence and Robotics
March 2019	Various sections	To add specification about the 'with Advanced Research' awards <ul style="list-style-type: none"> • MSc Artificial Intelligence and Robotics with Advanced Research • MSc Computer Networks and Systems Security with Advanced Research • MSc Cyber Security with Advanced Research • MSc Data Science and Analytics with Advanced Research • MSc Software Engineering with Advanced Research • MSc Advanced Computer Science with Research
March 2019	Various sections	To stop offering MSc Computer Science (sandwich) route in Semester A
April 2019	Various sections	To change the progression rule to project for all the sandwich awards
April 2019	Various sections	Structure change to allow 60 credits of subject core modules in Semester B in all specialist award titles and the MSc Computer Science award. The new structure enables all sandwich students (Semester A or B intakes) to study at least 60 credits of subject core modules before going to their placement and can progress to project straight on completing a successful placement of minimum 36 weeks and passing at least 60 credits of subject core modules.
April 2019	Section H	To add transitional arrangements
August 2019	Various Sections	To add the route of MSc Computer Science (sandwich)

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	Not applicable
Final Award (Qualification)	MSc
All Final Award titles (Qualification and Subject)	MSc Artificial Intelligence and Robotics MSc Computer Networks and Systems Security MSc Cyber Security MSc Data Science and Analytics MSc Software Engineering MSc Advanced Computer Science MSc Computer Science MSc Artificial Intelligence and Robotics (sandwich) MSc Computer Networks and Systems Security (sandwich) MSc Cyber Security (sandwich) MSc Data Science and Analytics (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> MSc Artificial Intelligence and Robotics with Advanced Research MSc Computer Networks and Systems Security with Advanced Research MSc Cyber Security with Advanced Research MSc Data Science and Analytics with Advanced Research MSc Software Engineering with Advanced Research MSc Advanced Computer Science with Research <i>* Note: the 'with Advanced Research' award is NOT available for MSc Computer Science</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 and Robotics
MSc Computer Networks and Systems Security
MSc Cyber Security
MSc Data Science and Analytics
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 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 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 Awards

Applicable to all specialist awards and MSc Advanced Computer Science award

MSc Artificial Intelligence and Robotics (sandwich)
MSc Computer Networks and Systems Security (sandwich)
MSc Cyber Security (sandwich)
MSc Data Science and Analytics (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.

All above 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) 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 Department 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 Department 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.

The 'with Advanced Research' Awards

Applicable to specialist awards and MSc Advanced Computer Science award

MSc Artificial Intelligence and Robotics with Advanced Research

MSc Computer Networks and Systems Security with Advanced Research

MSc Cyber Security with Advanced Research

MSc Data Science and Analytics with Advanced Research

MSc Software Engineering with Advanced Research

MSc Advanced Computer Science with Research

* **Note:** The 'with Advanced Research' award is NOT available for MSc Computer Science

All above awards offer the opportunity for students to study advanced research topics in computer science, normally across multiple specialisms, and comprehensive research methods, and to undertake an extended masters project on a cutting-edge research topic.

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.

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 and 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 Networks and Systems Security**, 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 Data Science and Analytics**, to provide the students with the opportunity to:

- develop awareness of current research and practice in data science and analytics;
- extend their knowledge and understanding of the fundamental mathematical ideas behind data science and relevant computational algorithms and the fundamentals of probability, information and statistical methods
- extend their knowledge and understanding of the principles and practice of obtaining data from various sources, the essential methods for pre-processing and cleaning data, data analytics and modelling
- develop their ability of producing appreciate algorithmic definitions to provide useful data science analysis

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.

Knowledge and Understanding:	Teaching/learning methods & strategies	Assessment
<p>MSc Artificial Intelligence and 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>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>MSc Computer Networks and Systems Security 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>
<p>MSc Cyber Security graduates should have knowledge and understanding of:</p> <p>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</p> <p>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</p>	<p>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.</p> <p>Throughout, the learner is encouraged to undertake independent study both to supplement and consolidate what is being taught/learned and to broaden their individual knowledge and understanding of the subject.</p>	<p>To achieve A20, students on the Sandwich award reflect on knowledge gained from the placement: reconsidering theory in light of practice, the transferable skills that they have enhanced, and goals for further professional development.</p>

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 Data Science and Analytics graduates should have knowledge and understanding of:

A9. The fundamental mathematical ideas behind data science and relevant computational algorithms and the fundamentals of probability, information and statistical methods

A10. The principles and practice of obtaining data from various sources, the essential methods for data pre-processing and cleaning, and data visualisation.

A11. The underlying ethical and legal issues and constraints on the holding and the use of data.

MSc Software Engineering graduates should have knowledge and understanding of:

A12. The complex relationships between models of software engineering processes and the artefacts produced by such processes.

A13. The role of estimation and measurement in making effective technical decisions in the software engineering process.

A14. The leading edge technical practices implemented within software engineering processes.

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

A15. The relationships between computational problems and the choice of programming paradigm to solve them.

A16. At least two specialist topics of computer science to advanced depth.

MSc Computer Science graduates should have knowledge and understanding of:

A20 is achieved through the full-time, industry work placement experienced by students on the 'Sandwich' award.

<p>A17. Fundamental computer science concepts and how they may be applied to the solution of complex problems from within and outside computer science.</p> <p>A18. Principles and practices of software development methodologies.</p> <p>For all MSc Awards, students should be able to:</p> <p>A19. Critically evaluate and reflect on professional, social, legal and ethical issues related to contemporary practices in computer science.</p> <p>For all Sandwich Awards, students should be able to:</p> <p>A20. Build contextual knowledge of practical and operational aspects of a CS or IT related role through a substantive work placement experience</p>		
<p>Intellectual skills:</p>	<p>Teaching/learning methods & strategies</p>	<p>Assessment</p>
<p>MSc Artificial Intelligence and Robotics students should be able to:</p> <p>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.</p> <p>MSc Computer Networks and Systems Security students should be able to:</p> <p>B2. Use and critically evaluate a range of tools in designing and managing networks.</p> <p>B3. Critically evaluate the implications of different design and configuration decisions for particular scenarios.</p> <p>MSc Cyber Security students should be able to:</p> <p>B4. Identify and critically evaluate vulnerabilities of and threats to the security and integrity of distributed systems</p>	<p>Intellectual skills are developed through 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.</p> <p>Throughout, the learner is encouraged to develop intellectual skills further by independent study</p>	<p>Domain-specific Intellectual skills are assessed through in-course assignments and the project, but also indirectly through unseen examinations where understanding developed through activity relying on these skills is required.</p>

B5. Conduct and manage a comprehensive risk assessment of the distributed systems in a complex and unpredictable environment.

MSc Data Science and Analytics students should be able to:

B6. Apply mathematical skills to simple data science problems, implement algorithms and programs to analyse a given dataset, and make sensible recommendations of the nature of the data analysed

MSc Software Engineering students should be able to:

B7. Produce models of software engineering processes and artefacts using appropriate modelling techniques.

B8. Apply measures to software engineering processes and artefacts and use the data produced to evaluate software engineering activities.

MSc Advanced Computer Science students should be able to:

B9. Use and critically evaluate a range of methods and tools currently employed in at least two specialist topics of computer science to advanced depth.

MSc Computer Science students should be able to:

B10. 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.

Practical skills:

Teaching/learning methods & strategies

Assessment

MSc Artificial Intelligence and Robotics students should be able to:

C1. Carry out a significant independent investigation as part of their project, typically including software development.

Practical skills are developed through 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

Domain-specific practical abilities are assessed directly through in-course assignments and the project, but also indirectly through unseen examinations where understanding developed

MSc Computer Networks and Systems Security students should be able to:

- C2. Apply the methods of computer science to various aspects of the analysis, design, implementation and evaluation of a range of networking technologies.
- C3. 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:

- C4. 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.
- C5. Individually pursue an investigation into an agreed area of study relating to cyber security such as security analysis, risk assessment, or cyber operations.

MSc Data Science and Analytics students should be able to:

- C6. Apply a commonly used data science software framework that provides the essential algorithms for data visualisation and analytics for various use cases
- C7. Individually pursue an investigation into an agreed area of study relating to data science and analytics

MSc Software Engineering students should be able to:

- C8. Apply and critically evaluate appropriate software engineering practices with account taken of the contextual limitations of specific software development environments.
- C9. Individually pursue an investigation into an agreed area of study relating to software engineering, typically including software development.

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

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.

MSc Advanced Computer Science students should be able to:

C10. 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:

C11. Plan, execute, monitor and reflect upon a substantial piece of independent development work or experimentation solving problems from within or without computer science

Transferable skills:	Teaching/learning methods & strategies	Assessment
<p>D1. Undertake a substantial piece of practical work at postgraduate level, independent of close supervision.</p> <p>D2. Evaluate and make critical use of relevant academic and technical literature.</p> <p>D3. Utilise their knowledge in practical applications.</p> <p>D4. Build upon and extend their knowledge with a minimum of guidance.</p> <p>D5. Express themselves knowledgably and coherently, both in writing and orally.</p> <p>D6. Explain, justify and otherwise defend their work and ideas, both in its specific details and within a broader context.</p> <p>D7. Examine and apply advanced skills in computer science research</p>	<p>Transferable skills are developed through the programme by the following:</p> <p>Skill D1 is developed through the final project and supporting lectures.</p> <p>Skill D2 is developed through guided reading, coursework assignments, the final project and supporting lectures.</p> <p>Skill D3 is developed through coursework assignments and the final project.</p> <p>Skill D4 is developed through coursework assignments and the final project.</p> <p>Skill D5 is developed through coursework assignments and the final project.</p> <p>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.</p> <p>Students on the 'with Advanced Research' award study 'Advanced Research Topics in Computer Science' and 'Research Methods' in their second year, alongside</p>	<p>Transferable skills are assessed through the following:</p> <p>Skill D1 is assessed through the final project.</p> <p>Skill D2 is assessed through examinations, coursework assignments and the final project</p> <p>Skill D3 is assessed through coursework assignments and the final project.</p> <p>Skill D4 is assessed through examinations, coursework assignments and the final project.</p> <p>Skill D5 is assessed through examinations, coursework assignments and the final project.</p> <p>Skill D6 is assessed through coursework assignments and the final project.</p> <p>Skill D7 is assessed by coursework assignments in 'Advanced Research Topics in Computer Science' and 'Research Methods', requiring students to demonstrate knowledge in a variety of</p>

their dissertation. These two double modules provide a strong grounding in application of research and analysis, project management, and soft skills including creative problem solving.

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

advanced research and skills areas through portfolio assessment.

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

The programme is offered in 1-year full-time (12 or 16 months), 2-year sandwich (24 months), part-time (up to 32 months) modes. In addition, the programme also offers 2-year full time (24 months) 'with advanced research' awards. The study on the programme leads to the award of:

The Standard Awards

MSc Artificial Intelligence and Robotics
MSc Computer Networks and Systems Security
MSc Cyber Security
MSc Data Science and Analytics
MSc Software Engineering
MSc Advanced Computer Science
MSc Computer Science

The duration of 1-year full time programmes, in full-time study mode is 12 months for Semester A (September) entrants and 16 months for Semester B (January) entrants. Part time students can take up to 32 months to complete the study.

The Sandwich Awards

MSc Artificial Intelligence and Robotics (sandwich)
MSc Computer Networks and Systems Security (sandwich)
MSc Cyber Security (sandwich)
MSc Data Science and Analytics (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.

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 24 months for Semester B (January) entrants. Sandwich awards are for full time study only.

The 'with Advanced Research' Awards

MSc Artificial Intelligence and Robotics with Advanced Research
MSc Computer Networks and Systems Security with Advanced Research
MSc Cyber Security with Advanced Research
MSc Data Science and Analytics with Advanced Research
MSc Software Engineering with Advanced Research
MSc Advanced Computer Science with Advanced Research

* Note: the 'with Advanced Research' award is NOT available for MSc Computer Science

The duration of programmes with advanced research, which incorporates a second year of modules on advanced research and longer period of MSc dissertation, is 24 months for Semester A (September) entrants

and 24 months for Semester B (January) entrants. Awards with advanced research are for full time study only.

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

Professional and Statutory Regulatory Bodies

The previous incarnation of this programme and its awards achieved accreditation from the BCS (British Computer Society) as shown in the table below.

Award Title (for all study modes including full-time, sandwich and part-time)	BCS Accreditation in previous incarnation of this programme
MSc Artificial Intelligence and Robotics	<p>Accredited by BCS, accredited under the award title MSc Artificial Intelligence with Robotics as below.</p> <p>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</p> <p>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</p>
MSc Software Engineering	<p>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</p>
MSc Advanced Computer Science	<p>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</p>
MSc Computer Networks and Systems Security	<p>Accredited by BCS, accredited under the award title MSc Computer Networking Principles and Practice as below.</p> <p>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</p> <p>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</p>
MSc Cyber Security	<p>Not accredited: The department is currently in touch with the BCS regarding accreditation.</p>
MSc Data Science and Analytics	<p>Not accredited: BCS accreditation will be sought after the award title has its first group of graduates in 2020.</p>
MSc Computer Science	<p>Accredited by BCS, The Chartered Institute for IT for the purposes of partially meeting the academic requirement for registration as a Chartered IT Professional</p>

This new version of the programme has been carefully designed to achieve appropriate levels of accreditation, and the department is currently in touch with the BCS regarding continued accreditation.

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 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 identifies where each learning outcome is assessed.

Table 1a Outline 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							
Artificial Life with Robotics	7COM1032	30	English	0	100	0	A
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
Data Mining	7COM1018	15	English	60	40	0	B
Applied Data Science and Analytics	7COM1074	15	English	0	100	0	B
Foundations of Data Science	7COM1073	30	English	0	100	0	A, B
Wireless Mobile and Multimedia Networking	7COM1076	30	English	70	30	0	A
Network System Administration	7COM1029	15	English	0	100	0	B, A*
Secure Systems Programming	7COM1028	15	English	50	0	50	B
Distributed Systems Security	7COM1027	30	English	100	0	0	B
Penetration Testing	7COM1068	15	English	0	100	0	B
Digital Forensics	7COM1067	15	English	0	100	0	B
Cyber Operations	7COM1069	15	English	0	100	0	A
Information Security Management and Compliance	7COM1066	15	English	0	100	0	A
Measures & Models for Software Engineering	7COM1024	30	English	67	33	0	A
Software Engineering Practice & Experience	7COM1026	30	English	0	80	20	B
Programming for Software Engineers	7COM1025	30	English	50	50	0	B, A*
Computational Algorithms and Paradigms	7COM1078	30	English	100	0	0	B, A*
Team Research and Development Project	7COM1079	15	English	0	100	0	A
Legal and Ethical Practice Exercise	7COM1080	15	English	0	100	0	A
Advanced Research Topics in Computer Science	7COM1084	30	English	0	100	0	A, B
Research Methods	7COM1085	30	English	0	100	0	B, C
Programming and Program Design	7COM1015	30	English	60	40	0	A
Operating Systems and Networks	7COM1012	15	English	0	100	0	A
Computer Architectures	7COM1013	15	English	0	100	0	B, A*
Multi-User Database Systems	7COM1082	15	English	50	50	0	B
Software Development Exercise	7COM1081	30	English	0	100	0	B

A* indicates that the module is run in Semester A as a transitional arrangement for programme structure change.

Module Title	Module Code	Credit Points	Language of Delivery	% examination	% coursework	% practical	Semester
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[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 Department'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 the Semester before they go for placement 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 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	B
Professional Work Placement for MSc Computer Science	7COM1065	0	English	0	100	0	CAB

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. The period of placement may only occur between the first semester of taught modules 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, followed by their second semester of taught modules.

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

Modules on the 'with Advanced Research' Awards

Students enrolled on the two-year awards with advanced research will be enrolled on two 30-credited modules in their second year of study.

Advanced Research Topics in Computer Science	7COM1084	30	English	0	100	0	A, B
Research Methods	7COM1085	30	English	0	100	0	B, C

Module Title	Module Code	Credit Points	Language of Delivery	% examination	% coursework	% practical	Semester
Masters Project Modules							
All students will be enrolled on the 7COM1083 Preparation for Project before they take on their project.							
Preparation for Project	7COM1083	0	English	0	100	0	A, B
Artificial Intelligence and Robotics Masters Project	7COM1086	60	English	0	100	0	A, B, C, AB, BC, CA
Computer Networks and Systems Security Masters Project	7COM1077	60	English	0	100	0	A, B, C, AB, BC, CA
Cyber Security Masters Project	7COM1070	60	English	0	100	0	A, B, C, AB, BC, CA
Data Science and Analytics Masters Project	7COM1075	60	English	0	100	0	A, B, C, AB, BC, CA
Software Engineering Masters Project	7COM1038	60	English	0	100	0	A, B, C, AB, BC, CA
Advanced Computer Science Masters Project	7COM1039	60	English	0	100	0	A, B, C, AB, BC, CA
Computer Science Masters Project	7COM1040	60	English	0	100	0	A, B, C, AB, BC, CA

Some modules are compulsory for certain awards as detailed in Table 1c, Table 1d, and Table 1e in this Section and 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 and Robotics	120 credit points, including at least 90 at level 7	2-3 Semesters	A1, A16, A19, B1, D2, D3, D4, D5, D6
Postgraduate Diploma Computer Networks and Systems Security			A2, A3, A4, A5, A16, A19, B2, B3, C2, D2, D3, D4, D5, D6
Postgraduate Diploma Cyber Security			A6, A7, A8, A16, A19, B4, B5, C4, D2, D3, D4, D5, D6

Postgraduate Diploma Data Science & Analytics			A9, A10, A11, A16, A19 B6, C6, D2, D3, D4, D5, D6	
Postgraduate Diploma Software Engineering			A12, A13, A14, A16, A19, B7, B8, C8, D2, D3, D4, D5, D6	
Postgraduate Diploma Advanced Computer Science			A15, A16, A19, B9, D2, D3, D4, D5, D6	
Postgraduate Diploma Computer Science			A17, A18, A19, B10, D2, D3, D4, D5, D6	
MSc Artificial Intelligence and Robotics	180 credit points including at least 150 at level 7	3 Semesters for Semester A (September) entrants.	A1, A16, A19, B1, C1, D1, D2, D3, D4, D5, D6	
MSc Computer Networks and Systems Security		1 Semester plus vacation plus 2 further Semesters for Semester B (January) entrants	A2, A3, A4, A5, A16, A19, B2, B3, C2, C3 D1, D2, D3, D4, D5, D6	
MSc Cyber Security			A6, A7, A8, A16, A19, B4, B5, C4, C5 D1, D2, D3, D4, D5, D6	
MSc Data Science and Analytics			A9, A10, A11, A16, A19 B6, C6, C7 D1, D2, D3, D4, D5, D6	
MSc Software Engineering			A12, A13, A14, A16, A19, B7, B8, C8, C9 D1, D2, D3, D4, D5, D6	
MSc Advanced Computer Science			A15, A16, A19, B9, C10, D1, D2, D3, D4, D5, D6	
MSc Computer Science			A17, A18, A19, B10, C11, D1, D2, D3, D4, D5, D6	
MSc Artificial Intelligence and 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	A1, A16, A19, A20 B1, C1, D1, D2, D3, D4, D5, D6
MSc Computer Networks and Systems Security (sandwich)				A2, A3, A4, A5, A16, A19, A20 B2, B3, C2, C3 D1, D2, D3, D4, D5, D6
MSc Cyber Security (sandwich)			2 Semesters plus 1 year's placement plus two further Semesters for Semester B (January) entrants	A6, A7, A8, A16, A19, A20 B4, B5, C4, C5 D2, D3, D4, D5, D6
MSc Data Science and Analytics (sandwich)			A9, A10, A11, A16, A19, A20 B6, C6, C7 D1, D2, D3, D4, D5, D6	
MSc Software Engineering (sandwich)			A12, A13, A14, A16, A19, A20 B7, B8, C8, C9 D1, D2, D3, D4, D5, D6	
MSc Advanced Computer Science (sandwich)			A15, A16, A19, A20 B9, C10, D1, D2, D3, D4, D5, D6	
MSc Computer Science (sandwich)			A17, A18, A19, A20 B10, C11, D1, D2, D3, D4, D5, D6	

MSc Artificial Intelligence and Robotics with Advanced Research	180 credit points including at least 150 at level 7, and passing the module Advanced Research Topics in Computer Science (30 credits) and Research Methods (30 credits).	2 Years' programme which incorporates a second year of modules on advanced research and a double Semesters of MSc dissertation	A1, A16, A19, B1, C1, D1, D2, D3, D4, D5, D6, D7
MSc Computer Networks and Systems Security with Advanced Research			A2, A3, A4, A5, A16, A19, B2, B3, C2, C3 D1, D2, D3, D4, D5, D6, D7
MSc Cyber Security with Advanced Research			A6, A7, A8, A16, A19, B4, B5, C4, C5 D1, D2, D3, D4, D5, D6, D7
MSc Data Science and Analytics with Advanced Research			A9, A10, A11, A16, A19 B6, C6, C7 D1, D2, D3, D4, D5, D6, D7
MSc Software Engineering with Advanced Research			A12, A13, A14, A16, A19, B7, B8, C8, C9 D1, D2, D3, D4, D5, D6, D7
MSc Advanced Computer Science with Research			A15, A16, A19, B9, C10, D1, D2, D3, D4, D5, D6, D7

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.

Modules on offer for each award:

Table 1c, 1d, and 1e below show the modules on offer for each award for different study mode:

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).

With the prior approval of both the Programme Leader and the Chair of the Board of Examiners, students on specialist awards may substitute up to 30 credits of specialist modules with 30 credits of non-specialist modules after attempting all the 90 credits of specialist modules and passing at least 60 credits of them.

Module Titles (credit points)	The Standard Masters Awards (1-year full time route and part time route)						
	MAIR	MSDA	MCNSS	MCYS	MSE	MACS	MCS
A. Taught modules							
Theory and Practice of Artificial Intelligence	Core	X	X	X	X	Elective	X
Artificial Life with Robotics	Core	X	X	X	X	Elective	X
Neural Networks and Machine Learning	Core	Core	X	X	X	Elective	X
Data Mining	X	Core	X	X	X	Elective	X
Applied Data Science and Analytics	X	Core	X	X	X	Elective	X
Foundations of Data Science	X	Core	X	X	X	Elective	X
Wireless Mobile and Multimedia Networking	X	X	Core	X	X	Elective	X
Network System Administration	X	X	Core	X	X	Elective	X
Secure Systems Programming	X	X	Core	X	X	Elective	X
Distributed Systems Security	X	X	Core	Core	X	Elective	X
Cyber Operations	X	X	X	Core	X	Elective	X
Penetration Testing	X	X	X	Core	X	Elective	X
Information Security Management and Compliance	X	X	X	Core	X	Elective	X
Digital Forensics	X	X	X	Core	X	Elective	X
Software Engineering Practice & Experience	X	X	X	X	Core	Elective	X
Programming for Software Engineers	X	X	X	X	Core	Elective	X
Measures & Models for Software Engineering	X	X	X	X	Core	Elective	X
Computational Algorithms and Paradigms	X	X	X	X	X	Core	X
Team Research and Development Project	Core	Core	Core	Core	Core	Core	X
Legal and Ethical Practice Exercise	Core	Core	Core	Core	Core	Core	Core
Preparation for Project	Core	Core	Core	Core	Core	Core	Core
Programming and Program Design	X	X	X	X	X	X	Core
Multi-User Database Systems	X	X	X	X	X	X	Core
Computer Architectures	X	X	X	X	X	X	Core
Operating Systems and Networks	X	X	X	X	X	X	Core
Software Development Exercise	X	X	X	X	X	X	Core
B. Project modules (each 60 credits)							
Artificial Intelligence with Robotics Masters Project	Core	X	X	X	X	X	X
Data Science and Analytics Masters Project	X	Core	X	X	X	X	X
Computer Networks and Systems Security Masters Project	X	X	Core	X	X	X	X
Cyber Security Masters Project	X	X	X	Core	X	X	X
Software Engineering Masters Project	X	X	X	X	Core	X	X
Advanced Computer Science Masters Project	X	X	X	X	X	Core	X
Computer Science Masters Project	X	X	X	X	X	X	Core

Key to terminology used in the table:

Awards	MAIR = MSc Artificial Intelligence and Robotics; MCNSS = MSc Computer Networks and Systems Security; MCYS = MSc Cyber Security; MSDA = MSc Data Science and Analytics; MSE = MSc Software Engineering; MACS = MSc Advanced Computer Science; 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.

Table 1c Modules on Offer for Each Award for the Standard Masters Awards

Module Titles (credit points)	Masters Awards (Sandwich) (2-year full time routes)						
	MAIR sandwich	MSDA sandwich	MCNSS sandwich	MCYS sandwich	MSE sandwich	MACS sandwich	MCS sandwich
A. Taught modules							
Theory and Practice of Artificial Intelligence	Core	X	X	X	X	Elective	X
Artificial Life with Robotics	Core	X	X	X	X	Elective	X
Neural Networks and Machine Learning	Core	Core	X	X	X	Elective	X
Data Mining	X	Core	X	X	X	Elective	X
Applied Data Science and Analytics	X	Core	X	X	X	Elective	X
Foundations of Data Science	X	Core	X	X	X	Elective	X
Wireless Mobile and Multimedia Networking	X	X	Core	X	X	Elective	X
Network System Administration	X	X	Core	X	X	Elective	X
Secure Systems Programming	X	X	Core	X	X	Elective	X
Distributed Systems Security	X	X	Core	Core	X	Elective	X
Cyber Operations	X	X	X	Core	X	Elective	X
Penetration Testing	X	X	X	Core	X	Elective	X
Information Security Management and Compliance	X	X	X	Core	X	Elective	X
Digital Forensics	X	X	X	Core	X	Elective	X
Software Engineering Practice & Experience	X	X	X	X	Core	Elective	X
Programming for Software Engineers	X	X	X	X	Core	Elective	X
Measures & Models for Software Engineering	X	X	X	X	Core	Elective	X
Computational Algorithms and Paradigms	X	X	X	X	X	Core	X
Team Research and Development Project	Core	Core	Core	Core	Core	Core	X
Legal and Ethical Practice Exercise	Core	Core	Core	Core	Core	Core	Core
Preparation for Project	Core	Core	Core	Core	Core	Core	Core
Programming and Program Design	X	X	X	X	X	X	Core
Multi-User Database Systems	X	X	X	X	X	X	Core
Computer Architectures	X	X	X	X	X	X	Core
Operating Systems and Networks	X	X	X	X	X	X	Core
Software Development Exercise	X	X	X	X	X	X	Core
B. Project modules (each 60 credits)							
Artificial Intelligence with Robotics Masters Project	Core	X	X	X	X	X	X
Data Science and Analytics Masters Project	X	Core	X	X	X	X	X
Computer Networks and Systems Security Masters Project	X	X	Core	X	X	X	X
Cyber Security Masters Project	X	X	X	Core	X	X	X
Software Engineering Masters Project	X	X	X	X	Core	X	X
Advanced Computer Science Masters Project	X	X	X	X	X	Core	X
Computer Science Masters Project	X	X	X	X	X	X	Core
C. Placement modules (each zero credit)							
Preparation for Placement	Core	Core	Core	Core	Core	Core	Core
Professional Work Placement for MSc Computer Science	Core	Core	Core	Core	Core	Core	Core

Key to terminology used in the table:

Awards	<p>MAIR sandwich = MSc Artificial Intelligence and Robotics (sandwich); MCNSS sandwich = MSc Computer Networks and Systems Security (sandwich); MCYS sandwich = MSc Cyber Security (sandwich); MDSA sandwich = MSc Data Science and Analytics (sandwich); MSE sandwich = MSc Software Engineering (sandwich); MACS sandwich = MSc Advanced Computer Science (sandwich); MCS sandwich = MSc Computer Science (sandwich) * * Note: Sandwich award for MSc Computer Science is available for Semester A (September) entrants only.</p>
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.

Table 1d Modules on Offer for Each Award for the 2-year Sandwich Masters Awards

Module Titles (credit points)	Masters Awards with Advanced Research (2-year full time routes)					
	MAIR with AR	MSDA with AR	MCNSS with AR	MCYS with AR	MSE with AR	MACS with Research
A. Taught modules						
Theory and Practice of Artificial Intelligence	Core	X	X	X	X	Elective
Artificial Life with Robotics	Core	X	X	X	X	Elective
Neural Networks and Machine Learning	Core	Core	X	X	X	Elective
Data Mining	X	Core	X	X	X	Elective
Applied Data Science and Analytics	X	Core	X	X	X	Elective
Foundations of Data Science	X	Core	X	X	X	Elective
Wireless Mobile and Multimedia Networking	X	X	Core	X	X	Elective
Network System Administration	X	X	Core	X	X	Elective
Secure Systems Programming	X	X	Core	X	X	Elective
Distributed Systems Security	X	X	Core	Core	X	Elective
Cyber Operations	X	X	X	Core	X	Elective
Penetration Testing	X	X	X	Core	X	Elective
Information Security Management and Compliance	X	X	X	Core	X	Elective
Digital Forensics	X	X	X	Core	X	Elective
Software Engineering Practice & Experience	X	X	X	X	Core	Elective
Programming for Software Engineers	X	X	X	X	Core	Elective
Measures & Models for Software Engineering	X	X	X	X	Core	Elective
Computational Algorithms and Paradigms	X	X	X	X	X	Core
Team Research and Development Project	Core	Core	Core	Core	Core	Core
Legal and Ethical Practice Exercise	Core	Core	Core	Core	Core	Core
Preparation for Project	Core	Core	Core	Core	Core	Core
B. Project modules (each 60 credits)						
Artificial Intelligence with Robotics Masters Project	Core	X	X	X	X	X
Data Science and Analytics Masters Project	X	Core	X	X	X	X
Computer Networks and Systems Security Masters Project	X	X	Core	X	X	X
Cyber Security Masters Project	X	X	X	Core	X	X
Software Engineering Masters Project	X	X	X	X	Core	X
Advanced Computer Science Masters Project	X	X	X	X	X	Core
C. Advanced Research modules (each 30 credits)						
Advanced Research Topics in Computer Science	Core	Core	Core	Core	Core	Core
Research Methods	Core	Core	Core	Core	Core	Core

Key to terminology used in the table:

Awards	MAIR with AR = MSc Artificial Intelligence and Robotics with Advanced Research; MCNSS with AR = MSc Computer Networks and Systems Security with Advanced Research; MCYS with AR = MSc Cyber Security with Advanced Research; MDSA with AR = MSc Data Science and Analytics with Advanced Research; MSE with AR = MSc Software Engineering with Advanced Research; MACS with Research = MSc Advanced Computer Science with Research;
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.

Table 1e Modules on Offer for Each Award for the 2-year Masters' Awards with Advanced Research

The study patterns for each award and their mode of study are presented below.

MSc Artificial Intelligence and Robotics: Study Pattern of Semester A Entry, Full time

MSc Artificial Intelligence and Robotics (1-year) full time SA entry	YEAR 1 (180 credits)					
	SEMESTER A		SEMESTER B		SEMESTER C	
	Artificial Life with Robotics (30 credits)		Theory and Practice of Artificial Intelligence (30 credits)		AIR Masters Projects (60 credits)	
	Team Research and Development Project (15 credits)		Neural Networks & Machine Learning (30 credits)			
Legal and Ethical Practice Exercise (15 credits)		Preparation for Project (zero credit)				
MSc Artificial Intelligence and Robotics (sandwich) (2-year) full time SA entry	YEAR 1 (120 credits and placement)				YEAR 2 Year 2 (placement and 60 credits)	
	SEMESTER A		SEMESTER B		SEMESTER C	
	Artificial Life with Robotics (30 credits)		Theory and Practice of Artificial Intelligence (30 credits)		WORK PLACEMENT HAPPENING (0 Credit Module)	
	Team Research and Development Project (15 credits)		Neural Networks & Machine Learning (30 credits)			
	Legal and Ethical Practice Exercise (15 credits)		Preparation for placement			
					AIR Masters Projects (60 credits)	
				Preparation for Project (zero credit)		
MSc Artificial Intelligence and Robotics with Advanced Research (2-year) full time SA entry	YEAR 1 (120 credits)				YEAR 2 (120 credits)	
	SEMESTER A		SEMESTER B		SEMESTER C	
	Artificial Life with Robotics (30 credits)		Theory and Practice of Artificial Intelligence (30 credits)		VACATION PERIOD	
	Team Research and Development Project (15 credits)		Neural Networks & Machine Learning (30 credits)			
	Legal and Ethical Practice Exercise (15 credits)					
				Advanced Research Topics in CS (30 credits)		
				Research Methods (30 credits)		
				AIR Masters Projects (60 credits)		
				Preparation for Project (zero credit)		

MSc Artificial Intelligence and Robotics: Study Pattern of Semester B Entry, Full time

MSc Artificial Intelligence and Robotics (1-year) full time SB entry	YEAR 1 (half year, 60 credits)			YEAR 2 (120 credits)				
	SEMESTER A	SEMESTER B	SEMESTER C	SEMESTER A	SEMESTER B			
		Theory and Practice of Artificial Intelligence (30 credits)	VACATION PERIOD	Artificial Life with Robotics (30 credits)	AIR Masters Projects (60 credits)			
		Neural Networks & Machine Learning (30 credits)		Team Research and Development Project (15 credits)				
		Legal and Ethical Practice Exercise (15 credits)						
		Preparation for Project (zero credit)						
MSc Artificial Intelligence and Robotics (sandwich) (2-year) full time SB entry	YEAR 1 (half year, 60 credits)			YEAR 2 (placement)			YEAR 3 (120 credits)	
	SEMESTER A	SEMESTER B	SEMESTER C	SEMESTER A	SEMESTER B	SEMESTER C	SEMESTER A	
		Theory and Practice of Artificial Intelligence (30 credits)	WORK PLACEMENT HAPPENING (0 Credit Module)	AIR Masters Projects (60 credits)	Preparation for Project (zero credit)			Artificial Life with Robotics (30 credits)
		Neural Networks & Machine Learning (30 credits)						Team Research and Development Project (15 credits)
		Preparation for placement (zero credit)						Legal and Ethical Practice Exercise (15 credits)
MSc Artificial Intelligence and Robotics with Advanced Research (2-year) full time SA entry	YEAR 1 (half year, 60 credits)			YEAR 2 (120 credits)			YEAR 3 (half year, 60 credits)	
	SEMESTER A	SEMESTER B	SEMESTER C	SEMESTER A	SEMESTER B	SEMESTER C	SEMESTER A	
		Theory and Practice of Artificial Intelligence (30 credits)	VACATION PERIOD	Artificial Life with Robotics (30 credits)	Advanced Research Topics in CS (30 credits)	Research Methods (30 credits)	AIR Masters Projects (60 credits)	
		Neural Networks & Machine Learning (30 credits)		Team Research and Development Project (15 credits)	Preparation for Project (zero credit)			
				Legal and Ethical Practice Exercise (15 credits)				

MSc Computer Networks and Systems Security: Study Pattern of Semester A Entry, Full time

MSc Computer Networks and Systems Security (1-year) full time SA entry	YEAR 1 (180 credits)						
	SEMESTER A	SEMESTER B	SEMESTER C				
	Wireless, Mobile and Multimedia Networking (30 credits)	Distributed Systems Security (30 credits)	CNSS Masters Projects (60 credits)				
	Team Research and Development Project (15 credits)	Secure Systems Programming (15 credits)					
Legal and Ethical Practice Exercise (15 credits)	Network System Administration (15 credits)						
		Preparation for Project (zero credit)					
MSc Computer Networks and Systems Security (sandwich) (2-year) full time SA entry	YEAR 1 (120 credits and placement)			YEAR 2 Year 2 (placement and 60 credits)			
	SEMESTER A	SEMESTER B	SEMESTER C	SEMESTER A	SEMESTER B	SEMESTER C	
	Wireless, Mobile and Multimedia Networking (30 credits)	Distributed Systems Security (30 credits)	WORK PLACEMENT HAPPENING (0 Credit Module)	CNSS Masters Projects (60 credits)			
	Team Research and Development Project (15 credits)	Secure Systems Programming (15 credits)					
	Legal and Ethical Practice Exercise (15 credits)	Network System Administration (15 credits)					
		Preparation for placement		Preparation for Project (zero credit)			
MSc Computer Networks and Systems Security with Advanced Research (2-year) full time SA entry	YEAR 1 (120 credits)			YEAR 2 (120 credits)			
	SEMESTER A	SEMESTER B	SEMESTER C	SEMESTER A	SEMESTER B	SEMESTER C	
	Wireless, Mobile and Multimedia Networking (30 credits)	Distributed Systems Security (30 credits)	VACATION PERIOD	Advanced Research Topics in CS (30 credits)	Research Methods (30 credits)	CNSS Masters Projects (60 credits)	
	Team Research and Development Project (15 credits)	Secure Systems Programming (15 credits)		Preparation for Project (zero credit)			
	Legal and Ethical Practice Exercise (15 credits)	Network System Administration (15 credits)					

MSc Computer Networks and Systems Security: Study Pattern of Semester B Entry, Full time

MSc Computer Networks and Systems Security (1-year) full time SB entry	YEAR 1 (half year, 60 credits)			YEAR 2 (120 credits)			
	SEMESTER A	SEMESTER B	SEMESTER C	SEMESTER A	SEMESTER B		
		Distributed Systems Security (30 credits)	VACATION PERIOD	Wireless, Mobile and Multimedia Networking (30 credits)	CNSS Masters Projects (60 credits)		
		Secure Systems Programming (15 credits)		Team Research and Development Project (15 credits)			
	Network System Administration (15 credits)	Legal and Ethical Practice Exercise (15 credits)					
		Preparation for Project (zero credit)					
MSc Computer Networks and Systems Security (sandwich) (2-year) full time SB entry	YEAR 1 (half year, 60 credits)			YEAR 2 (placement)			YEAR 3 (120 credits)
	SEMESTER A	SEMESTER B	SEMESTER C	SEMESTER A	SEMESTER B	SEMESTER C	SEMESTER A
		Distributed Systems Security (30 credits)	WORK PLACEMENT HAPPENING (0 Credit Module)	CNSS Masters Projects (60 credits)	Preparation for Project (zero credit)	Legal and Ethical Practice Exercise (15 credits)	Wireless, Mobile and Multimedia Networking (30 credits)
		Secure Systems Programming (15 credits)					Team Research and Development Project (15 credits)
		Network System Administration (15 credits)					
		Preparation for placement (zero credit)					
MSc Computer Networks and Systems Security with Advanced Research (2-year) full time SB entry	YEAR 1 (half year, 60 credits)			YEAR 2 (120 credits)			YEAR 3 (half year, 60 credits)
	SEMESTER A	SEMESTER B	SEMESTER C	SEMESTER A	SEMESTER B	SEMESTER C	SEMESTER A
		Distributed Systems Security (30 credits)	VACATION PERIOD	Wireless, Mobile and Multimedia Networking (30 credits)	Advanced Research Topics in CS (30 credits)	Research Methods (30 credits)	CNSS Masters Projects (60 credits)
		Secure Systems Programming (15 credits)		Team Research and Development Project (15 credits)	Preparation for Project (zero credit)		
	Network System Administration (15 credits)	Legal and Ethical Practice Exercise (15 credits)					

MSc Cyber Security: Study Pattern of Semester A Entry, Full time

MSc Cyber Security (1-year) full time SA entry	YEAR 1 (180 credits)						
	SEMESTER A		SEMESTER B		SEMESTER C		
	Information Security Management and Compliance (15 credits)		Distributed Systems Security (30 credits)		CYS Masters Projects (60 credits)		
	Cyber Operations (15 credits)		Digital Forensics (15 credits)				
	Team Research and Development Project (15 credits)		Penetrating Testing (15 credits)				
Legal and Ethical Practice Exercise (15 credits)		Preparation for Project (zero credit)					
MSc Cyber Security (sandwich) (2-year) full time SA entry	YEAR 1 (120 credits and placement)				YEAR 2 Year 2 (placement and 60 credits)		
	SEMESTER A		SEMESTER B		SEMESTER A	SEMESTER B	
	Information Security Management and Compliance (15 credits)		Distributed Systems Security (30 credits)		WORK PLACEMENT HAPPENING (0 Credit Module)		
	Cyber Operations (15 credits)		Digital Forensics (15 credits)				
	Team Research and Development Project (15 credits)		Penetrating Testing (15 credits)				
Legal and Ethical Practice Exercise (15 credits)		Preparation for placement (zero credit)		Preparation for Project (zero credit)		CYS Masters Projects (60 credits)	
MSc Cyber Security with Advanced Research (2-year) full time SA entry	YEAR 1 (120 credits)				YEAR 2 (120 credits)		
	SEMESTER A		SEMESTER B		SEMESTER A	SEMESTER B	
	Information Security Management and Compliance (15 credits)		Distributed Systems Security (30 credits)		VACATION PERIOD		
	Cyber Operations (15 credits)		Digital Forensics (15 credits)				
	Team Research and Development Project (15 credits)		Penetrating Testing (15 credits)				
Legal and Ethical Practice Exercise (15 credits)				Advanced Research Topics in CS (30 credits)	Research Methods (30 credits)		
				Preparation for Project (zero credit)	CYS Masters Projects (60 credits)		

MSc Cyber Security: Study Pattern of Semester B Entry, Full time

	YEAR 1 (half year, 60 credits)			YEAR 2 (120 credits)			
	SEMESTER A	SEMESTER B	SEMESTER C	SEMESTER A	SEMESTER B		
MSc Cyber Security (1-year) full time SB entry		Distributed Systems Security (30 credits)	VACATION PERIOD	Information Security Management and Compliance (15 credits)	CYS Masters Projects (60 credits)		
		Digital Forensics (15 credits)		Cyber Operations (15 credits)			
		Penetrating Testing (15 credits)		Team Research and Development Project (15 credits)			
				Legal and Ethical Practice Exercise (15 credits)			
			Preparation for Project (zero credit)				
	YEAR 1 (half year, 60 credits)			YEAR 2 (placement)			YEAR 3 (120 credits)
	SEMESTER A	SEMESTER B	SEMESTER C	SEMESTER A	SEMESTER B	SEMESTER C	SEMESTER A
MSc Cyber Security (sandwich) (2-year) full time SB entry		Distributed Systems Security (30 credits)	WORK PLACEMENT HAPPENING (0 Credit Module)		CYS Masters Projects (60 credits)		Information Security Management and Compliance (15 credits)
		Digital Forensics (15 credits)					Cyber Operations (15 credits)
		Penetrating Testing (15 credits)					Team Research and Development Project (15 credits)
		Preparation for placement (zero credit)					Legal and Ethical Practice Exercise (15 credits)
							Preparation for Project (zero credit)
	YEAR 1 (half year, 60 credits)			YEAR 2 (120 credits)			YEAR 3 (half year, 60 credits)
	SEMESTER A	SEMESTER B	SEMESTER C	SEMESTER A	SEMESTER B	SEMESTER C	SEMESTER A
MSc Cyber Security with Advanced Research (2-year) full time SB entry		Distributed Systems Security (30 credits)	VACATION PERIOD	Information Security Management and Compliance (15 credits)	Advanced Research Topics in CS (30 credits)	Research Methods (30 credits)	CYS Masters Projects (60 credits)
		Digital Forensics (15 credits)		Cyber Operations (15 credits)			
		Penetrating Testing (15 credits)		Team Research and Development Project (15 credits)	Preparation for Project (zero credit)		
				Legal and Ethical Practice Exercise (15 credits)			

MSc Data Science and Analytics: Study Pattern of Semester A Entry, Full time

MSc Data Science and Analytics (1-year) full time SA entry	YEAR 1 (180 credits)					
	SEMESTER A		SEMESTER B		SEMESTER C	
	Foundations of Data Science (30 credits)		Neural Networks & Machine Learning (30 credits)		DSA Masters Projects (60 credits)	
	Legal and Ethical Practice Exercise (15 credits)		Data Mining (15 credits)			
Team Research and Development Project (15 credits)		Applied Data Science and Analytics (15 credits)				
		Preparation for Project (zero credit)				
MSc Data Science and Analytics (sandwich) (2-year) full time SA entry	YEAR 1 (120 credits and placement)				YEAR 2 Year 2 (placement and 60 credits)	
	SEMESTER A		SEMESTER B		SEMESTER C	
	Foundations of Data Science (30 credits)		Neural Networks & Machine Learning (30 credits)		WORK PLACEMENT HAPPENING (0 Credit Module)	
	Legal and Ethical Practice Exercise (15 credits)		Data Mining (15 credits)			
	Team Research and Development Project (15 credits)		Applied Data Science and Analytics (15 credits)			
			Preparation for placement		Preparation for Project (zero credit)	
				DSA Masters Projects (60 credits)		
MSc Data Science and Analytics with Advanced Research (2-year) full time SA entry	YEAR 1 (120 credits)				YEAR 2 (120 credits)	
	SEMESTER A		SEMESTER B		SEMESTER C	
	Foundations of Data Science (30 credits)		Neural Networks & Machine Learning (30 credits)		VACATION PERIOD	
	Legal and Ethical Practice Exercise (15 credits)		Data Mining (15 credits)			
Team Research and Development Project (15 credits)		Applied Data Science and Analytics (15 credits)				
				Advanced Research Topics in CS (30 credits)		
				Research Methods (30 credits)		
				Preparation for Project (zero credit)		
				DSA Masters Projects (60 credits)		

MSc Data Science and Analytics: Study Pattern of Semester B Entry, Full time

MSc Data Science and Analytics (1-year) full time SB entry	YEAR 1 (half year, 60 credits)			YEAR 2 (120 credits)			
	SEMESTER A	SEMESTER B	SEMESTER C	SEMESTER A	SEMESTER B		
		Neural Networks & Machine Learning (30 credits)	VACATION PERIOD	Legal and Ethical Practice Exercise (15 credits)	DSA Masters Projects (60 credits)		
		Foundations of Data Science (30 credits)		Team Research and Development Project (15 credits)			
				Data Mining (15 credits)			
	Applied Data Science and Analytics (15 credits)						
		Preparation for Project (zero credit)					
MSc Data Science and Analytics (sandwich) (2-year) full time SB entry	YEAR 1 (half year, 60 credits)			YEAR 2 (placement)			YEAR 3 (120 credits)
	SEMESTER A	SEMESTER B	SEMESTER C	SEMESTER A	SEMESTER B	SEMESTER C	SEMESTER A
		Neural Networks & Machine Learning (30 credits)	WORK PLACEMENT HAPPENING (0 Credit Module)	DSA Masters Projects (60 credits)	Preparation for Project (zero credit)		Legal and Ethical Practice Exercise (15 credits)
		Foundations of Data Science (30 credits)					Team Research and Development Project (15 credits)
		Preparation for placement (zero credit)					Data Mining (15 credits)
		Applied Data Science and Analytics (15 credits)					
MSc Data Science and Analytics with Advanced Research (2-year) full time SB entry	YEAR 1 (half year, 60 credits)			YEAR 2 (120 credits)			YEAR 3 (half year, 60 credits)
	SEMESTER A	SEMESTER B	SEMESTER C	SEMESTER A	SEMESTER B	SEMESTER C	SEMESTER A
		Neural Networks & Machine Learning (30 credits)	VACATION PERIOD	Legal and Ethical Practice Exercise (15 credits)	Advanced Research Topics in CS (30 credits)	Research Methods (30 credits)	DSA Masters Projects (60 credits)
		Foundations of Data Science (30 credits)		Team Research and Development Project (15 credits)			
				Data Mining (15 credits)			
	Applied Data Science and Analytics (15 credits)			Preparation for Project (zero credit)			

MSc Software Engineering: Study Pattern of Semester A Entry, Full time

MSc Software Engineering (1-year) full time SA entry	YEAR 1 (180 credits)					
	SEMESTER A		SEMESTER B		SEMESTER C	
	Measures and Models for Software Engineering (30 credits)		Software Engineering Practice & Experience (30 credits)		SE Masters Projects (60 credits)	
	Team Research and Development Project (15 credits)		Programming for Software Engineers			
Legal and Ethical Practice Exercise (15 credits)		Preparation for Project (zero credit)				
MSc Software Engineering (sandwich) (2-year) full time SA entry	YEAR 1 (120 credits and placement)				YEAR 2 Year 2 (placement and 60 credits)	
	SEMESTER A		SEMESTER B		SEMESTER A	
	Measures and Models for Software Engineering (30 credits)		Software Engineering Practice & Experience (30 credits)		SE Masters Projects (60 credits)	
	Team Research and Development Project (15 credits)		Programming for Software Engineers			
Legal and Ethical Practice Exercise (15 credits)		Preparation for placement				
WORK PLACEMENT HAPPENING (0 Credit Module)				Preparation for Project (zero credit)		
MSc Software Engineering with Advanced Research (2-year) full time SA entry	YEAR 1 (120 credits)				YEAR 2 (120 credits)	
	SEMESTER A		SEMESTER B		SEMESTER A	
	Measures and Models for Software Engineering (30 credits)		Software Engineering Practice & Experience (30 credits)		SE Masters Projects (60 credits)	
	Team Research and Development Project (15 credits)		Programming for Software Engineers			
Legal and Ethical Practice Exercise (15 credits)		VACATION PERIOD				
Advanced Research Topics in CS (30 credits)		Research Methods (30 credits)		Preparation for Project (zero credit)		

MSc Software Engineering: Study Pattern of Semester B Entry, Full time

MSc Software Engineering (1-year) full time SB entry	YEAR 1 (half year, 60 credits)			YEAR 2 (120 credits)				
	SEMESTER A	SEMESTER B	SEMESTER C	SEMESTER A	SEMESTER B			
		Software Engineering Practice & Experience (30 credits)	VACATION PERIOD	Measures and Models for Software Engineering (30 credits)	SE Masters Projects (60 credits)			
		Programming for Software Engineers (30 credits)		Team Research and Development Project (15 credits)				
		Legal and Ethical Practice Exercise (15 credits)						
		Preparation for Project (zero credit)						
MSc Software Engineering (1-year) full time SB entry	YEAR 1 (half year, 60 credits)			YEAR 2 (placement)			YEAR 3 (120 credits)	
	SEMESTER A	SEMESTER B	SEMESTER C	SEMESTER A	SEMESTER B	SEMESTER C	SEMESTER A	
		Software Engineering Practice & Experience (30 credits)	WORK PLACEMENT HAPPENING (0 Credit Module)	SE Masters Projects (60 credits)	Preparation for Project (zero credit)			Measures and Models for Software Engineering (30 credits)
		Programming for Software Engineers (30 credits)						Team Research and Development Project (15 credits)
		Preparation for placement (zero credit)						Legal and Ethical Practice Exercise (15 credits)
		Preparation for Project (zero credit)						
							Preparation for Project (zero credit)	
MSc Software Engineering (1-year) full time SB entry	YEAR 1 (half year, 60 credits)			YEAR 2 (120 credits)			YEAR 3 (half year, 60 credits)	
	SEMESTER A	SEMESTER B	SEMESTER C	SEMESTER A	SEMESTER B	SEMESTER C	SEMESTER A	
		Software Engineering Practice & Experience (30 credits)	VACATION PERIOD	Measures and Models for Software Engineering (30 credits)	Advanced Research Topics in CS (30 credits)	Research Methods (30 credits)	SE Masters Projects (60 credits)	
		Programming for Software Engineers (30 credits)		Team Research and Development Project (15 credits)	Preparation for Project (zero credit)			
		Legal and Ethical Practice Exercise (15 credits)						

MSc Advanced Computer Science: Study Pattern of Semester A Entry, Full time

MSc Advanced Computer Science (1-year) full time SA entry	YEAR 1 (180 credits)							
	SEMESTER A		SEMESTER B		SEMESTER C			
	Legal and Ethical Practice Exercise (15 credits)		Computational Algorithms and Paradigms (30 credits)		ACS Masters Projects (60 credits)			
	Team Research and Development Project (15 credits)							
Elective Modules (30 credits)		Elective Modules (30 credits)						
		Preparation for Project (zero credit)						
MSc Advanced Computer Science (sandwich) (2-year) full time SA entry	YEAR 1 (120 credits and placement)			YEAR 2 Year 2 (placement and 60 credits)				
	SEMESTER A		SEMESTER B	SEMESTER C		SEMESTER A	SEMESTER B	SEMESTER C
	Legal and Ethical Practice Exercise (15 credits)		Computational Algorithms and Paradigms (30 credits)	WORK PLACEMENT HAPPENING (0 Credit Module)			ACS Masters Projects (60 credits)	
	Team Research and Development Project (15 credits)							
Elective Modules (30 credits)		Elective Modules (30 credits)	Preparation for Project (zero credit)					
		Preparation for placement (zero credit)						
MSc Advanced Computer Science with Research (2-year) full time SA entry	YEAR 1 (120 credits)			YEAR 2 (120 credits)				
	SEMESTER A		SEMESTER B	SEMESTER C		SEMESTER A	SEMESTER B	SEMESTER C
	Legal and Ethical Practice Exercise (15 credits)		Computational Algorithms and Paradigms (30 credits)	VACATION PERIOD	Advanced Research Topics in CS (30 credits)	Research Methods (30 credits)	ACS Masters Projects (60 credits)	
	Team Research and Development Project (15 credits)							
Elective Modules (30 credits)		Elective Modules (30 credits)	Preparation for Project (zero credit)		ACS Masters Projects (60 credits)			

MSc Advanced Computer Science: Study Pattern of Semester B Entry, Full time

MSc Advanced Computer Science (1-year) full time SB entry	YEAR 1 (half year, 60 credits)			YEAR 2 (120 credits)			
	SEMESTER A	SEMESTER B	SEMESTER C	SEMESTER A	SEMESTER B		
		Computational Algorithms and Paradigms (30 credits)	VACATION PERIOD	Legal and Ethical Practice Exercise (15 credits)	ACS Masters Projects (60 credits)		
		Elective Modules (30 credits)		Team Research and Development Project (15 credits)			
		Elective Modules (30 credits)					
			Preparation for Project (zero credit)				
MSc Advanced Computer Science (sandwich) (2-year) full time SB entry	YEAR 1 (half year, 60 credits)			YEAR 2 (placement)			YEAR 3 (120 credits)
	SEMESTER A	SEMESTER B	SEMESTER C	SEMESTER A	SEMESTER B	SEMESTER C	SEMESTER A
		Computational Algorithms and Paradigms (30 credits)	WORK PLACEMENT HAPPENING (0 Credit Module)	ACS Masters Projects (60 credits)	Preparation for Project (zero credit)		Legal and Ethical Practice Exercise (15 credits)
		Elective Modules (30 credits)					Team Research and Development Project (15 credits)
		Preparation for placement (zero credit)					Elective Modules (30 credits)
		Preparation for Project (zero credit)					
		Preparation for Project (zero credit)					
MSc Advanced Computer Science with Research (2-year) full time SB entry	YEAR 1 (half year, 60 credits)			YEAR 2 (120 credits)			YEAR 3 (half year, 60 credits)
	SEMESTER A	SEMESTER B	SEMESTER C	SEMESTER A	SEMESTER B	SEMESTER C	SEMESTER A
		Computational Algorithms and Paradigms (30 credits)	VACATION PERIOD	Legal and Ethical Practice Exercise (15 credits)	Advanced Research Topics in CS (30 credits)	Research Methods (30 credits)	ACS Masters Projects (60 credits)
		Elective Modules (30 credits)		Team Research and Development Project (15 credits)			
		Elective Modules (30 credits)		Preparation for Project (zero credit)			

MSc Computer Science: Study Pattern of Semester A Entry, Full time

MSc Computer Science (1-year) full time SA entry	YEAR 1 (180 credits)						
	SEMESTER A	SEMESTER B	SEMESTER C				
	Programming and Program Design (30)	Software Development Exercise (30)	CS Masters Projects (60 credits)				
		Multi-User Database Systems (15)					
Operating Systems and Networks (15)	Legal and Ethical Practice Exercise (15)						
	Preparation for Project (zero credit)						
MSc Computer Science (sandwich) (2-year) full time SA entry	YEAR 1 (120 credits and placement)			YEAR 2 Year 2 (placement and 60 credits)			
	SEMESTER A	SEMESTER B	SEMESTER C	SEMESTER A	SEMESTER B	SEMESTER C	
	Programming and Program Design (30)	Software Development Exercise (30)	WORK PLACEMENT HAPPENING (0 Credit Module)				CS Masters Projects (60 credits)
		Multi-User Database Systems (15)					
	Operating Systems and Networks (15)	Legal and Ethical Practice Exercise (15)					
Preparation for placement (zero credit)							

MSc Computer Science: Study Pattern of Semester B Entry, Full time

MSc Computer Science (1-year) full time SB entry	YEAR 1 (half year, 60 credits)			YEAR 2 (120 credits)	
	SEMESTER A	SEMESTER B	SEMESTER C	SEMESTER A	SEMESTER B
		Computer Architectures (15)	VACATION PERIOD	Programming and Program Design (30)	CS Masters Projects (60 credits)
		Multi-User Database Systems (15)		Operating Systems and Networks (15)	
		Software Development Exercise (30)		Legal and Ethical Practice Exercise (15)	
			Preparation for Project (zero credit)		

Study pattern for part time students on the standard MSc awards, Semester A Entry, Part Time

Note: the sandwich awards and 'with advanced research' awards are not available for part time students

	YEAR 1 (60 credits)			YEAR 2 (60 credits)			YEAR 3 (60 credits)	
	SEMESTER A	SEMESTER B	SEMESTER C	SEMESTER A	SEMESTER B	SEMESTER C	SEMESTER A	SEMESTER B
MSc Artificial Intelligence and Robotics / MSc Computer Networks and Systems Security / MSc Cyber Security / MSc Data Science and Analytics / MSc Software Engineering / MSc Advanced Computer Science / MSc Computer Science part time, SA entry	Choose and study 30 credits from available modules running in Semester A on the award title	Choose and study 30 credits from available modules running in Semester B on the award title	VACATION PERIOD	Choose and study 30 credits from available modules running in Semester A on the award title	Choose and study 30 credits from available modules running in Semester B on the award title	VACATION PERIOD	Various Masters Project (60 credits)	
					Preparation for Project (zero credit)			

Study pattern for part time students on the standard MSc awards, Semester B Entry, Part Time

Note: the sandwich awards and 'with advanced research' awards are not available for part time students

	YEAR 1 (30 credits)			YEAR 2 (60 credits)			YEAR 3 (90 credits)		
	SEMESTER A	SEMESTER B	SEMESTER C	SEMESTER A	SEMESTER B	SEMESTER C	SEMESTER A	SEMESTER B	SEMESTER C
MSc Artificial Intelligence and Robotics / MSc Computer Networks and Systems Security / MSc Cyber Security / MSc Data Science and Analytics / MSc Software Engineering / MSc Advanced Computer Science / MSc Computer Science part time, SB entry		Choose and study 30 credits from available modules running in Semester B on the award title	VACATION PERIOD	Choose and study 30 credits from available modules running in Semester A on the award title	Choose and study 30 credits from available modules running in Semester B on the award title	VACATION PERIOD	Choose and study 30 credits from available modules running in Semester B on the award title	Various Masters Project (60 credits)	
							Preparation for Project (zero credit)		

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:

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 and Robotics
- PG Dip Computer Networks and Systems Security
- PG Dip Cyber Security
- PG Dip Data Science and Analytics
- 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 Team Research and Development Project module, the 15 credit Ethical and Legal Practice Exercise module, and the 30 credit Computational Algorithms and 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 Computational Algorithms and 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, though compensation may be allowed at the discretion of the Programme Board of Examiners, and must pass (without compensation) the corresponding 60 credit major project.

Additional Requirements for the Sandwich Award

To be eligible for the award of MSc Sandwich Award, students must have met the general requirements set out in Section 1D and met the requirement for Masters Awards (set out above). In addition, graduates must pass

the “Preparation for Placement” module (7COM1064) and “Professional Work Placement for MSc Computer Science” module (7COM1065).

Additional Requirements for the ‘with Advanced Research’ Award

To be eligible for the award of MSc ‘with Advanced Research’ Awards or MSc Advanced Computer Science with Research Award, students must have met the general requirements set out in Section 1D and met the requirement for Masters Awards (set out above). In addition, graduates must pass the “Advanced Research Topics in Computer Science” module (7COM1084) and the “Research Methods” module (7COM1085).

Progression

To Progress to the Project on the standard MSc and MSc with Advanced Research award titles

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**
- In the case of the MSc Advanced Computer Science award, the 90 credits can be **core or electives**
- In the case of the MSc Computer Science, the 90 credits must all be **core**

To Progress to the Project on the MSc sandwich award titles

To proceed to the project stage, students must have studied 120 credits of taught modules from the programme if they are Semester A entry (September), or 60 credits of subject core taught modules if they are Semester B entry (January). In addition, students must have completed at least 36 weeks of placement.

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 subject core 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;
- d) the knowledge and skills gained from industrial placement.

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 60 credits modules on the programme will be allowed to proceed to the project stage:

- In the case of the Specialist Awards, the 60 credits must all be subject core modules on the specialist awards excluding the module 7COM1080 Legal and Ethical Practice Exercise
- In the case of the MSc Advanced Computer Science award, the 60 credits can be **core or electives modules** on the award excluding the module 7COM1080 Legal and Ethical Practice Exercise

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 Department 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 Department 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.

For students on sandwich course who fail to meet the academic requirements to stay on the sandwich route or are unsuccessful in securing a placement within the defined deadline associated with their entry point into the programme, their study pattern will normally be changed to that of the corresponding 'with advanced research' course. When completing their study, students will be awarded the MSc 'with advanced research' award if they meet the requirements for the MSc 'with advanced research' award (see the above section on [Eligibility for Specific Awards](#)). If a student is not eligible for the MSc 'with advanced research' award, the Board of Examiners may offer the standard MSc award shall the student be eligible for the corresponding standard MSc award (see the above section on [Eligibility for Specific Awards](#)).

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)
- September starters on the 'with advanced research' route ([not available for the MSc Computer Science award](#)): 24 months (September to September, with the conferment of awards in late October or early November)
- January starters on the full time route: 16 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](#)): 24 months (January to June, with the conferment of awards in later June or early July)
- January starters on the 'with advanced research' route ([not available for the MSc Computer Science award](#)): 24 months (January to June, with the conferment of awards in middle February)
- September starters on the part time route: 32 months (September to May, with the conferment of awards in later June or early July)
- January starters on the part time route: 32 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).

Students who are registered on the standard 1-year fulltime course normally are not allowed to change their study pattern to the corresponding 2-year fulltime sandwich course or the 2-year fulltime 'with advanced research' course.

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 their 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.

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 [Ask Herts](#) website provides information on a wide range of resources and services available at the University of Hertfordshire including academic support, accommodation, fees, funding, visas, wellbeing services and student societies.

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.

In accordance with section 4(5) of the Higher Education and Research Act 2017 (HERA), the UK Office for Students (OfS) has registered the University of Hertfordshire in the register of English higher education providers. The Register can be viewed at: <https://www.officeforstudents.org.uk/advice-and-guidance/the-register/the-ofs-register/>. Furthermore, the OfS has judged that the University of Hertfordshire delivers consistently outstanding teaching, learning and outcomes for its students. It is of the highest quality found in the UK. Consequently, the University received a Gold award in the 2018 Teaching Excellence and Student Outcomes (TEF) exercise. This award was made in June 2018 and is valid for up to 3 years. The TEF panel's report and conclusions can be accessed at: <https://www.officeforstudents.org.uk/advice-and-guidance/teaching/tef-outcomes/#/provider/10007147>

G. Entry requirements

The normal entry requirements for the programme are:

For admission to:

- MSc Artificial Intelligence and Robotics,
- MSc Computer Networks and Systems Security,
- MSc Cyber Security,
- MSc Data Science and Analytics,
- MSc Software Engineering,
- MSc Advanced Computer Science:

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

For admission to:

- MSc Artificial Intelligence and Robotics (sandwich),
- MSc Computer Networks and Systems Security (sandwich),
- MSc Cyber Security (sandwich),
- MSc Data Science and Analytics (sandwich),
- MSc Software Engineering (sandwich),
- MSc Advanced Computer Science (sandwich):

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

For admission to:

- MSc Advanced Computer Science with Research,
- MSc Artificial Intelligence and Robotics with Advanced Research,
- MSc Computer Networks and Systems Security with Advanced Research,
- MSc Cyber Security with Advanced Research,
- MSc Data Science and Analytics with Advanced Research,
- MSc Software Engineering with Advanced Research:

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

For admission to:

- MSc Computer Science,
- MSc Computer Science (sandwich):

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).

H. Transitional Arrangements

The 2019/20 programme specification is the first version after the last programme periodic review in November 2018. The following modules are outgoing from the 2018/19 programme structure.

Outgoing modules from the 2018/19 programme specification

- 7COM1023 Programming Paradigms (30 credits, Semester A)
- 7COM1071 Investigative Methods for Computer Science (15 credits, Semester A or B)
- 7COM1072 Professional Issues (15 credits, Semester A or B)
- 7COM1031 Wireless Mobile and Ad Hoc Networking (15 credits, Semester A)
- 7COM1030 Multimedia and Multicast Networking (15 credits, Semester A)
- 7COM1035 Software Development Exercise (15 credits, Semester A or Semester B)
- 7COM1014 System Modelling (30 credits, Semester B)
- 7COM1037 Computer Networking Principals and Practice Masters Project (60 credits, Semester A or B or C or AB or BC)
- 7COM1036 Artificial Intelligence with Robotics Masters Project (60 credits, Semester A or B or C or AB or BC)

Transitional Arrangements for Referral/Deferral Assessment in Outgoing Modules

In the 2019/20 academic year, students with outstanding referral or deferral assessments from the outgoing 2018/19 modules will be given the referral or deferral assessments in the Semester A or Semester B assessment period where the outgoing modules were scheduled to run.

For example, if a student has an outstanding referral exam in Programming Paradigms, they will take the referral exam in the Semester A exam period in January 2020.

Transitional Arrangements for Taking Outgoing Modules

In the 2019/20 academic year some students may be awarded a module deferral (not just an assessment) for an outgoing module or would like to repeat an outgoing module that they failed in the 2018/19 academic year. In addition, 2019/20 Semester B (January 2019) entry students may need to take the outgoing modules for the first time. The transitional arrangement for these students are made according to the table below.

Deferring or Repeating Outgoing modules from the 2018/19 programme specification	Transitional Arrangements
7COM1023 Programming Paradigms (30 credits, Semester A)	To study 7COM1078 Computational Algorithms and Paradigms (30 credits, Semester A)
7COM1071 Investigative Methods for Computer Science (15 credits, Semester A or B)	To study 7COM1079 Team Research and Development Project (15 credits, Semester A)
7COM1072 Professional Issues (15 credits, Semester A or B)	To study 7COM1080 Legal and Ethical Practice Exercise (15 credits, Semester A)
7COM1035 Software Development Exercise (15 credits, Semester A or Semester B)	To study 7COM1081 Software Development Exercise (30 credits, Semester B). Repeating students will be charged for 15 credit only.
7COM1014 System Modelling (30 credits, Semester B)	To study 7COM1014 System Modelling (30 credits, Semester B)
7COM1037 Computer Networking Principals and Practice Masters Project (60 credits, Semester A or B or C or AB or BC)	To study 7COM1077 Computer Networks and Systems Security Masters Project (60 credits, Semester A or B or C or AB or BC or CA)
7COM1036 Artificial Intelligence with Robotics Masters Project (60 credits, Semester A or B or C or AB or BC)	To study 7COM1086 Artificial Intelligence and Robotics Masters Project (60 credits, Semester A or B or C or AB or BC or CA)

7COM1031 Wireless Mobile and Ad Hoc Networking (15 credits, Semester A) and 7COM1030 Multimedia and Multicast Networking (15 credits, Semester A)	To study 7COM1076 Wireless Mobile and Multimedia Networking (30 credits, Semester A)
7COM1031 Wireless Mobile and Ad Hoc Networking (15 credits, Semester A) but not 7COM1030 Multimedia and Multicast Networking (15 credits, Semester A)	Students will be registered on 7COM1031. Their class timetable will be combined with the incoming 30-credit module 7COM1076 Wireless Mobile and Multimedia Networking (30 credits, Semester A), where appropriate. They will be assessed by the coursework and exam paper written for the module 7COM1031.
7COM1030 Multimedia and Multicast Networking (15 credits, Semester A) but not 7COM1031 Wireless Mobile and Ad Hoc Networking (15 credits, Semester A)	Students will be registered on 7COM10310. Their class timetable will be combined with the incoming 30-credit module 7COM1076 Wireless Mobile and Multimedia Networking (30 credits, Semester A), where appropriate. They will be assessed by the coursework and exam paper written for the module 7COM1030.

Transitional Arrangements for Modules on the New Programme Structure

The following arrangements are made for a smooth transition from the previous structure to the new programme structure for the following entry students.

- Sandwich students who joined the programme in 2017/18 Semester B (January 2018) and are currently on placement and will return in September 2019
- Sandwich students who joined the programme in 2018/19 Semester B (January 2019) and will go for placement from September 2019 and return in September 2020.
- Students who joined the programme in 2018/19 Semester B (January 2019) and are transferred to the second year of the 'with advanced research' awards in 2019/20.

Modules in the 2019/20 programme structure	Transitional Arrangements
7COM1029 Network System Administration (15 credits, Semester B)	To run in Semester B and Semester A for the 2019/20 and 2020/21 academic years
7COM1025 Programming for Software Engineers (30 credits, Semester B)	To run in Semester B and Semester A for the 2019/20 and 2020/21 academic years
7COM1078 Computational Algorithms and Paradigms (30 credits, Semester B)	To run in Semester B and Semester A for the 2019/20 and 2020/21 academic years
7COM1013 Computer Architecture (15 credits, Semester B)	To run in Semester B and Semester A for the 2019/20 and 2020/21 academic years

Transitional Arrangements for Sandwich Students who Joined the Programme in the 2018/19 Academic Year

Sandwich students who joined the programme in 2018/19 Semester A (September 2018) or B (January 2019), their study pattern will be changed to the corresponding 'with advanced research' course in September 2019, if they fail to meet the academic requirements to stay on the sandwich route or if they are unsuccessful in securing a placement within the defined deadline associated with their entry point into the programme. The taught modules in the second year of study on the 'with advanced research' awards, i.e., 7COM1084 Advanced Research Topics in Computer Science (30 credits) and 7COM1085 Research Methods (30 credits), are offered free of charge in such transitional arrangement. However, if a student fails any of the other taught modules (120 credits in total) or masters project (60 credits) that are defined in the standard MSc, they are liable for the fee shall they decide to repeat the failed modules.

When completing their study, students will be awarded the MSc 'with advanced research' award if they meet the requirements for the MSc 'with advanced research' award (see the above section on [Eligibility for Specific Awards](#)). If a student is not eligible for the MSc 'with advanced research' award, the Board of Examiners may

offer the standard 1-year MSc award shall the student be eligible for the corresponding standard MSc award (see the above section on [Eligibility for Specific Awards](#)).

If you would like this information in an alternative format please contact:
csreception@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

Table 2: Development of Intended 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.

MSc Artificial Intelligence and Robotics

		Programme Learning Outcomes (as identified in section 1 and the following page)													
		Knowledge & Understanding				Intellectual Skills	Practical Skills	Transferable Skills							
Module Title	Module Code	A1	A16	A19	A20	B1	C1	D1	D2	D3	D4	D5	D6	D7	
Theory and Practice of Artificial Intelligence	7COM1034	x	x			x			x	x	x		x		
Artificial Life with Robotics	7COM1032	x	x			x			x	x	x		x		
Neural Networks and Machine Learning	7COM1033	x	x			x			x	x	x		x		
Team Research and Development Project	7COM1079		x						x	x	x	x	x		
Legal and Ethical Practice Exercise	7COM1080			x					x	x	x	x			
Preparation for Project	7COM1083	This module will prepare students for undertaking a complex individual masters through supporting them in developing a project proposal, identifying a significant body of work that fulfil the requirements of a master's project and constructing an appropriate project plan.													
Artificial Intelligence and Robotics Masters Project	7COM1086	x	x			x	x	x	x	x	x	x	x		
And for the MSc Artificial Intelligence and Robotics (sandwich)															
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				x					x					
And for the MSc Artificial Intelligence and Robotics with Advanced Research															
Advanced Research Topics in Computer Science	7COM1084	x	x						x		x			x	
Research Methods	7COM1085	x	x						x		x			x	

MSc Computer Networks and Systems Security

		Programme Learning Outcomes (as identified in section 1 and the following page)																	
		Knowledge & Understanding				Intellectual Skills		Practical Skills		Transferable Skills									
Module Title	Module Code	A2	A3	A4	A5	A16	A19	A20	B1	B2	C1	C2	D1	D2	D3	D4	D5	D6	D7
Wireless Mobile and Multimedia Networking	7COM1076	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	
Distributed Systems Security	7COM1027	x	x	x	x	x			x	x	x			x	x	x		x	
Team Research and Development Project	7COM1079					x								x	x	x	x	x	
Legal and Ethical Practice Exercise	7COM1080						x							x	x	x	x		
Preparation for Project	7COM1083	This module will prepare students for undertaking a complex individual masters through supporting them in developing a project proposal, identifying a significant body of work that fulfil the requirements of a master's project and constructing an appropriate project plan.																	
Computer Networks and Systems Security Masters Project	7COM1077	x	x	x	x	x			x	x	x	x	x	x	x	x	x	x	x
And for the MSc Computer Networks and Systems Security (sandwich)																			
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							x							x				
And for the MSc Computer Networks and Systems Security with Advanced Research																			
Advanced Research Topics in Computer Science	7COM1084	x				x								x		x			x
Research Methods	7COM1085	x				x								x		x			x

MSc Cyber Security

Programme Learning Outcomes (as identified in section 1 and the following page)																				
		Knowledge & Understanding						Intellectual Skills			Practical Skills		Transferable Skills							
Module Title	Module Code	A6	A7	A8	A16	A19	A20	B4	B5	C4	C5	D1	D2	D3	D4	D5	D6	D7		
Distributed Systems Security	7COM1027	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										
Information Security Management and Compliance	7COM1066	x	x	x	x			x	x	x										
Digital Forensics	7COM1067	x	x	x	x			x	x	x			x	x	x		x			
Team Research and Development Project	7COM1079				x								x	x	x	x	x			
Legal and Ethical Practice Exercise	7COM1080					x							x	x	x	x				
Preparation for Project	7COM1083	This module will prepare students for undertaking a complex individual masters through supporting them in developing a project proposal, identifying a significant body of work that fulfil the requirements of a master's project and constructing an appropriate project plan.																		
Cyber Security Masters Project	7COM1070	x	x	x	x			x	x	x	x	x	x	x	x	x	x			
And for the MSc Cyber Security (sandwich)																				
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						x							x						
And for the MSc Cyber Security with Advanced Research																				
Advanced Research Topics in Computer Science	7COM1084	x			x								x		x			x		
Research Methods	7COM1085	x			x								x		x			x		

MSc Data Science and Analytics

		Programme Learning Outcomes (as identified in section 1 and the following page)															
		Knowledge & Understanding						Intellectual Skills			Practical Skills			Transferable Skills			
Module Title	Module Code	A9	A10	A11	A16	A19	A20	B6	C6	C7	D1	D2	D3	D4	D5	D6	D7
Neural Networks and Machine Learning	7COM1033	x	x	x	x			x	x								
Data Mining	7COM1018	x	x	x	x			x	x								
Foundations of Data Science	7COM1073	x	x	x	x			x	x								
Applied Data Science and Analytics	7COM1074	x	x	x	x			x	x								
Team Research and Development Project	7COM1079				x							x	x	x	x	x	
Legal and Ethical Practice Exercise	7COM1080						x					x	x	x	x		
Preparation for Project	7COM1083	This module will prepare students for undertaking a complex individual masters through supporting them in developing a project proposal, identifying a significant body of work that fulfil the requirements of a master's project and constructing an appropriate project plan.															
Data Science and Analytics Masters Project	7COM1075	x	x	x	x			x	x	x	x	x	x	x	x	x	
And for the MSc Data Science and Analytics (sandwich)																	
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						x						x				
And for the MSc Data Science and Analytics with Advanced Research																	
Advanced Research Topics in Computer Science	7COM1084	x			x							x		x			x
Research Methods	7COM1085	x			x							x		x			x

MSc Software Engineering

		Programme Learning Outcomes (as identified in section 1 and the following page)																
		Knowledge & Understanding						Intellectual Skills		Practical Skills		Transferable Skills						
Module Title	Module Code	A12	A13	A14	A16	A19	A20	B6	B7	C8	C9	D1	D2	D3	D4	D5	D6	D7
Software Engineering Practice & Experience	7COM1026	x	x	x	x			x	x	x								
Programming for Software Engineers	7COM1025	x	x	x	x			x	x	x								
Measures & Models for Software Engineering	7COM1024	x	x	x	x			x	x	x								
Team Research and Development Project	7COM1079				x								x	x	x	x	x	
Legal and Ethical Practice Exercise	7COM1080					x							x	x	x	x		
Preparation for Project	7COM1083	This module will prepare students for undertaking a complex individual masters through supporting them in developing a project proposal, identifying a significant body of work that fulfil the requirements of a master's project and constructing an appropriate project plan.																
Software Engineering Masters Project	7COM1075	x	x	x	x			x		x	x	x	x	x	x	x	x	
And for the MSc Software Engineering (sandwich)																		
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						x							x				
And for the MSc Software Engineering with Advanced Research																		
Advanced Research Topics in Computer Science	7COM1084	x			x								x		x			x
Research Methods	7COM1085	x			x								x		x			x

MSc Advanced Computer Science

Programme Learning Outcomes (as identified in section 1 and the following page)														
		Knowledge & Understanding				Intellectual Skills		Practical Skills		Transferable Skills				
Module Title	Module Code	A15	A16	A19	A20	B9	C10	D1	D2	D3	D4	D5	D6	D7
Theory and Practice of Artificial Intelligence	7COM1034		x			x			x	x	x		x	
Artificial Life with Robotics	7COM1032		x			x			x	x	x		x	
Neural Networks and Machine Learning	7COM1033		x			x			x	x	x		x	
Data Mining	7COM1018		x			x			x	x	x		x	
Foundations of Data Science	7COM1073		x			x			x	x	x		x	
Applied Data Science and Analytics	7COM1074		x			x			x	x	x		x	
Wireless Mobile and Multimedia Networking	7COM1076		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	
Distributed Systems Security	7COM1027		x			x			x	x	x		x	
Cyber Operations	7COM1069		x			x			x	x	x		x	
Penetration Testing	7COM1068		x			x			x	x	x		x	
Information Security Management and Compliance	7COM1066		x			x			x	x	x		x	
Digital Forensics	7COM1067		x			x			x	x	x		x	
Software Engineering Practice & Experience	7COM1026		x			x			x	x	x		x	
Programming for Software Engineers	7COM1025		x			x			x	x	x		x	
Measures & Models for Software Engineering	7COM1024		x			x			x	x	x		x	
Computational Algorithms and Paradigms	7COM1078	x	x			x			x	x	x		x	
Team Research and Development Project	7COM1079		x						x	x	x	x	x	
Legal and Ethical Practice Exercise	7COM1080			x					x	x	x	x		
Preparation for Project	7COM1083	This module will prepare students for undertaking a complex individual masters through supporting them in developing a project proposal, identifying a significant body of work that fulfil the requirements of a master's project and constructing an appropriate project plan.												

Advanced Computer Science Masters Project	7COM1039	x	x			x		x	x	x	x	x	x	
And for the MSc Advanced Computer Science (sandwich)														
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				x					x				
And for the MSc Advanced Computer Science with Research														
Advanced Research Topics in Computer Science	7COM1084	x	x						x		x			x
Research Methods	7COM1085	x	x						x		x			x

MSc Computer Science

Programme Learning Outcomes (as identified in section 1 and the following page)														
Knowledge & Understanding					Intellectual Skills		Practical Skills			Transferable Skills				

Module Title	Module Code	A16	A17	A18	A19	A20	B10	C11	D1	D2	D3	D4	D5	D6
Programming and Program Design	7COM1015		x	x			x							
Computer Architectures	7COM1013		x				x							
Operating Systems and Networks	7COM1012		x				x		x	x	x			x
Software Development Exercise	7COM1081		x	x			x		x	x	x			x
Multi-User Database Systems	7COM1082	x	x	x			x		x	x	x			x
Legal and Ethical Practice Exercise	7COM1080			x	x				x	x	x	x		
Preparation for Project	7COM1083	This module will prepare students for undertaking a complex individual masters through supporting them in developing a project proposal, identifying a significant body of work that fulfil the requirements of a master's project and constructing an appropriate project plan.												
Computer Science Masters Project	7COM1040	x	x				x	x	x	x	x	x	x	x
And for the MSc Software Engineering (sandwich)														
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					x					x			

KEY TO PROGRAMME LEARNING OUTCOMES

Knowledge and Understanding

MSc Artificial Intelligence and Robotics

- 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

MSc Computer Networks and Systems Security

- 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

MSc Cyber Security

- 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 Data Science and Analytics

- A9. The fundamental mathematical ideas behind data science and relevant computational algorithms and the fundamentals of probability, information and statistical methods

Practical Skills

MSc Artificial Intelligence and Robotics

- C1. Carry out a significant independent investigation as part of their project, typically including software development.

MSc Computer Networks and Systems Security

- C2. Apply the methods of computer science to various aspects of the analysis, design, implementation and evaluation of a range of networking technologies.
- C3. Individually pursue an investigation into an agreed area of study relating to networking, distributed systems, or system security

MSc Cyber Security

- C4. 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
- C5. Individually pursue an investigation into an agreed area of study relating to cyber security such as security analysis, risk assessment, or cyber operations

MSc Data Science and Analytics

- C6. Apply a commonly used data science software framework that provides the essential algorithms for data visualisation and analytics for various use cases

A10. The principles and practice of obtaining data from various sources, the essential methods for data pre-processing and cleaning, and data visualisation.

A11. The underlying ethical and legal issues and constraints on the holding and the use of data.

MSc Software Engineering

A12. The complex relationships between models of software engineering processes and the artefacts produced by such processes.

A13. The role of estimation and measurement in making effective technical decisions in the software engineering process.

A14. The leading-edge technical practices implemented within software engineering processes.

MSc Advanced Computer Science

A15. The relationships between computational problems and the choice of programming paradigm to solve them.

A16. At least two specialist topics of computer science to advanced depth.

MSc Computer Science

A17. Fundamental computer science concepts and how they may be applied to the solution of complex problems from within and outside computer science.

A18. Principles and practices of software development methodologies.

For all MSc Awards

A19. Critically evaluate and reflect on professional, social, legal and ethical issues related to contemporary practices in computer science

For all Sandwich Awards

A20. Build contextual knowledge of practical and operational aspects of a CS or IT related role through a substantive work placement experience

C7. Individually pursue an investigation into an agreed area of study relating to data science and analytics

MSc Software Engineering

C8. Apply and critically evaluate appropriate software engineering practices with account taken of the contextual limitations of specific software development environments

C9. Individually pursue an investigation into an agreed area of study relating to software engineering, typically including software development.

MSc Advanced Computer Science

C10. 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

C11. Plan, execute, monitor and reflect upon a substantial piece of independent development work or experimentation solving problems from within or without computer science

Intellectual Skills

MSc Artificial Intelligence and Robotics

- 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.

MSc Computer Networks and Systems Security

- B2. Use and critically evaluate a range of tools in designing and managing networks.
B3. Critically evaluate the implications of different design and configuration decisions for particular scenarios.

MSc Cyber Security

- B4. Identify and critically evaluate vulnerabilities of and threats to the security and integrity of distributed systems
B5. Conduct and manage a comprehensive risk assessment of the distributed systems in a complex and unpredictable environment.

MSc Data Science and Analytics

- B6. Apply mathematical skills to simple data science problems, implement algorithms and programs to analyse a given dataset, and make sensible recommendations of the nature of the data analysed

MSc Software Engineering

- B7. Produce models of software engineering processes and artefacts using appropriate modelling techniques.
B8. Apply measures to software engineering processes and artefacts and use the data produced to evaluate software engineering activities.

MSc Advanced Computer Science

- B9. Use and critically evaluate a range of methods and tools currently employed in at least two specialist topics of computer science to advanced depth.

MSc Computer Science

- B10. 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.

Transferable Skills

For all MSc Awards

- D1. Undertake a substantial piece of practical work at postgraduate level, independent of close supervision.
D2. Evaluate and make critical use of relevant academic and technical literature
D3. Utilise their knowledge in practical applications.
D4. Build upon and extend their knowledge with a minimum of guidance.
D5. Express themselves knowledgably and coherently, both in writing and orally.
D6. Explain, justify and otherwise defend their work and ideas, both in its specific details and within a broader context.

For all Advanced Research Awards

- D7. Examine and apply advanced skills in computer science research

Section 2

Programme management

Relevant QAA subject benchmarking statements	Masters in Computing
Type of programme	Taught postgraduate
Date of validation/last periodic review	November 18
Date of production/ last revision of PS	April 2019
Relevant to level/cohort	Level 7 entering September 2019
Administrative School	School of Computer Science

Table 3 Course structure

Course details		
Course code	Course description	JACS
CMCSM	Modular Masters Programme in Computer Science	I100/100366
CMCSMARM	Modular Masters Programme in Computer Science with Advanced Research	I100/100366