

Programme Specification

MSc Artificial Intelligence (2017-18)

This specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if s/he takes full advantage of the learning opportunities that are provided.

Awarding Institution	University of Southampton
Teaching Institution	University of Southampton
Mode of Study	Full Time
Duration in Years	1 year
Accreditation details	Currently Partially Accredited by the BCS
Final award	Master of Science (MSc)
Name of award	MSc in Artificial Intelligence
Interim Exit awards	Postgraduate Diploma (PgDip) Postgraduate Certificate (PgCert)
FHEQ level of final award	FHEQ level 7
UCAS code	N/A
QAA Subject Benchmark or other external reference	QAA Subject Benchmark for Master's degrees in computing
Programme Coordinator	Richard Watson
Date specification was written	10/06/2015
Date Specification last updated	07/12/2017

Programme Overview

Brief outline of the programme

This research-led MSc takes a contemporary approach and covers the fundamental aspects of traditional symbolic and sub-symbolic aspects.

The programme will give you a solid awareness of the key concepts of artificial intelligence. You will also learn the techniques that form the current basis of machine learning and data mining. You will develop a wide-ranging skill set that supports further study or that you can use in application development.

As a result of the leading research being undertaken at Southampton, the course is able to offer a wide range of options that cover state-of-the-art modern techniques, which directly reflect research directions in ECS. These include:

- intelligent agents
- computer vision
- machine learning
- evolutionary algorithms
- robotics
- bio-inspired robotics
- computational biology
- computational finance
- simulation modelling

Please note: As a research-led University, we undertake a continuous review of our programmes to ensure quality enhancement and to manage our resources. As a result, this programme may be revised during a student's period of registration, however, any revision will be balanced against the requirement that the student should

receive the educational service expected. Please read our [Disclaimer](#) to see why, when and how changes may be made to a student's programme.

Programmes and major changes to programmes are approved through the University's programme validation process which is described in the University's Quality handbook.

Learning and teaching

1. Staff-led lectures, demonstrations, and seminars.
2. Directed reading.
3. Student-led seminars and presentations.
4. Technical reports, including literature searches and surveys.
5. Specification, design, analysis, implementation and verification exercises.
6. Group design exercises, presentations and reports.
7. Revision for written examinations.
8. Staff and post-graduate supervision of your research project.

Assessment

Your achievement is assessed via written examinations and technical reports, student led presentations, design exercises and your dissertation.

[This will be used in the 'find a course' entry on the University website for marketing purposes]

Educational Aims of the Programme

The School of Electronics and Computer Science (ECS) has a leading international reputation for its research in Complexity Science, Intelligent Agents, Intelligent Systems and Artificial Intelligence. This MSc programme offers an advanced postgraduate education covering these areas.

The programme aims to:

1. Provide you with advanced knowledge of Artificial Intelligence (AI).
2. Give you the opportunity to work in a research-led environment.
3. Develop your research skills applicable to a career in research and development.
4. Stimulate your interest in the subject using a variety of teaching and learning methods

Programme Learning Outcomes

Knowledge and Understanding

- A. Scientific and technological principles underlying Artificial Intelligence.
- B. Specialist tools and techniques used to design, analyse, implement and verify AI systems.
- C. Current research issues relevant to Artificial Intelligence.

Teaching and Learning Methods

You will have a variety of opportunities to achieve these learning outcomes. Learning and teaching methods include:

1. Staff-led lectures, demonstrations, and seminars.
2. Directed reading.
3. Student-led seminars and presentations.
4. Technical reports, including literature searches and surveys.
5. Specification, design, analysis, implementation and verification exercises.
6. Group design exercises, presentations and reports.
7. Revision for written examinations.
8. Staff and post-graduate supervision of your research project.

Assessment methods

Your achievement is assessed as follows. In the case of staff-led lectures and seminars, your knowledge and understanding (outcomes A-C) is assessed through written examinations and technical reports. Your understanding of research issues, and your ability to locate and present technical information (outcome C) is assessed through student-led presentations, technical reports and written examinations, and additionally your dissertation. The research project (outcome C) is assessed through your dissertation, which must include a significant literature survey to set the context for your work, a review of your progress relative to your initial plan, and a critical evaluation and reflection.

Subject Specific Intellectual and Research Skills

- D. Use specialist tools and techniques to specify, design, implement and verify AI systems.
- E. Model, simulate and analyse the behaviour of (sub-)systems at an appropriate level of detail.
- F. Acquire new knowledge and understanding through critical reading of research material.
- G. Apply such knowledge and understanding to specialist design problems.

Teaching and Learning Methods

1. Staff-led lectures, demonstrations, and seminars.
2. Directed reading.
3. Student-led seminars and presentations.
4. Technical reports, including literature searches and surveys.
5. Specification, design, analysis, implementation and verification exercises.
6. Group design exercises, presentations and reports.
7. Revision for written examinations.
8. Staff and post-graduate supervision of your research project.

Assessment methods

Your achievement is assessed as follows. Your understanding of research issues, and your ability to locate and present technical information (outcome F) is assessed through student-led presentations, technical reports and written examinations, and additionally your dissertation. Your ability to design and implement AI systems, perhaps using novel techniques, (outcomes D, E, G) is developed through design exercises, and additionally your research project, and assessed through technical reports and your dissertation. These reports are expected to include a rationale for your design and implementation decisions and evidence of verification activities. The research project (outcomes F, G) is assessed through your dissertation, which must include a significant literature survey to set the context for your work, a review of your progress relative to your initial plan, and a critical evaluation and reflection.

Transferable and Generic Skills

- H. Use printed and on-line catalogues and databases to locate relevant technical information.
- I. Present specialist technical information in written and verbal forms.
- J. Work efficiently and effectively as a member of a project team.
- K. Work independently on a significant research project.

Teaching and Learning Methods

1. Directed reading.
2. Student-led seminars and presentations.
3. Technical reports, including literature searches and surveys.
4. Specification, design, analysis, implementation and verification exercises.
5. Group design exercises, presentations and reports.
6. Staff and post-graduate supervision of your research project.

Assessment methods

Your achievement is assessed as follows. Your understanding of research issues, and your ability to locate and present technical information (outcomes H, I) is assessed through student-led presentations, technical reports and written examinations, and additionally your dissertation. Students are expected to maintain log-books that demonstrate their contribution to group projects (outcome J), and these may also be assessed. The research project (outcomes H, I, K) is assessed through your dissertation, which must include a significant literature survey to set the context for your work, a review of your progress relative to your initial plan, and a critical evaluation and reflection

Subject Specific Practical Skills

The exact subject specific practical skills developed by the programme depend upon the optional modules that you choose.

Programme Structure

The programme follows the University's regulations for Stand-alone Masters programmes as set out in the University Calendar, and the ECS specific regulations which supplement these. See sections IV and XII of <http://www.calendar.soton.ac.uk/>. The pass mark for MSc modules is 50%, and the regulations cover the progression criteria, referral, repeat and resubmission arrangements, together with degree classification.

Typical course content

The programme has a number of compulsory and optional taught modules. Each successfully completed module is worth 7.5 ECTS. The MSc requires you to complete 60 ECTS of taught modules. You then undertake a research project leading to a dissertation worth a further 30 ECTS.

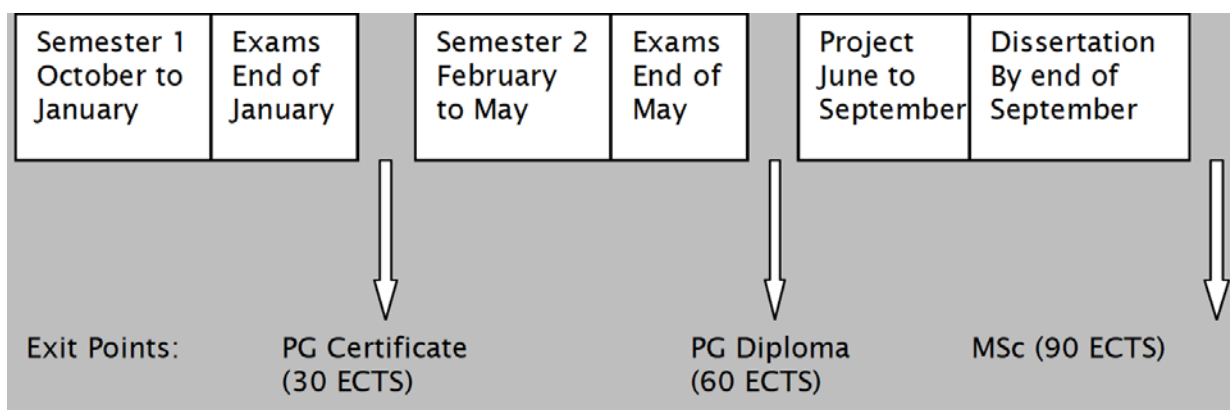
Appendix 1 shows the compulsory and optional taught modules for the programme. Most of these modules are also available to students on other Masters programmes. All MSc modules are at level 6 or 7. At most 15 ECTS can be at level 6. Each module typically has 30–36 lectures or other timetabled activities. The remaining study time consists of directed and background reading, coursework assignments, and preparation for examinations.

The normal pattern of study is as follows:

- Semester 1: Four modules, including Foundations of AI, Intelligent Agents and Machine Learning. Assessment is through a mixture of coursework and written examinations.
- Semester 2: Four modules. Assessment is through a mixture of coursework and written examinations.
- Summer/Semester 3: Following the successful completion of the taught component of the programme, you will undertake a research project lasting 3 to 4 months, which is assessed by a 15,000 word dissertation. Compulsory.

Examinations are held at the end of Semester 1 (January) and at the end of Semester 2 (May).

Your research project will enable you to explore in depth some aspect of artificial intelligence: for example you might investigate and evaluate a new AI method, technique or tool, or some key technology underpinning an AI application. During semester 2, in the project preparation module, you will be allocated a project supervisor with whom you will meet and agree a project brief and plan. These must be submitted to, and agreed by, the project coordinator. During the summer you will have weekly meetings with your supervisor or, if your supervisor is unavailable, a delegated deputy. Your dissertation is due by the end of September and late submissions will be penalised, unless an extension to this deadline has been agreed beforehand in writing by the project coordinator.



Programme details

Modules given in a regular font are compulsory. Modules given in italics are optional. Exceptionally well-prepared students may take a relevant option instead of a compulsory module; this requires written permission from their tutor and course leader.

Please note that the exact list of options on offer will vary from year to year in minor ways depending on student numbers and staff availability. It may not be possible to run some optional modules if the number of students registered on a module is very small. It should also be noted that optional module choice can be restricted by the University Timetable, which varies from year to year: some optional modules may clash with other optional or compulsory modules. Please be aware that many modules are shared between different cohorts; the class size depends on cohort size, which varies from year to year.

Pre-requisites and co-requisites

Compulsory modules – no pre-requisites as satisfied by entry requirements.

Optional modules – pre-requisites met by taking compulsory modules.

Semester 1

Module Code	Module Title	Credits (ECTS)	Level
COMP6231	Foundations of Artificial Intelligence	7.5	7
COMP6203	Intelligent Agents	7.5	7
COMP6229	Machine Learning (MSc)	7.5	7
COMP6202	<i>Evolution of Complexity</i>	7.5	7
COMP6223	<i>Computer Vision A</i>	7.5	7
ELEC3201	<i>Robotic Systems</i>	7.5	6

Students must take the 3 compulsory modules (**regular bold font**), and one of the options (*italic font*), giving a total of 30 credits in Semester 1.

Semester 2

Module Code	Module Title	Credits (ECTS)	Level
ELEC6211	Project Preparation	7.5	7
COMP6206	<i>Advanced Computer Vision</i>	7.5	7
ELEC6212	<i>Biologically Inspired Robotics</i>	7.5	7
COMP6212	<i>Computational Finance</i>	7.5	7
COMP3212	<i>Computational Biology</i>	7.5	6
COMP6208	<i>Advanced Machine Learning</i>	7.5	7
COMP6207	<i>Advanced Intelligent Agents</i>	7.5	7
COMP6215	<i>Semantic Web Technologies</i>	7.5	7
ELEC6213	<i>Image Processing</i>	7.5	7
COMP6216	<i>Simulation Modelling for Computer Science</i>	7.5	7
COMP6211	<i>Biometrics</i>	7.5	7

Students must take the compulsory modules (**regular bold font**), and three of the options (*italic font*), giving a total of 30 credits in Semester 2.

Semester 3 (Summer)

Module Code	Module Title	Credits (ECTS)	Level
COMP6200	MSc Project	30	7

MSc Project is compulsory and core.

Additional Costs

Students are responsible for meeting the cost of essential textbooks, and of producing such essays, assignments, laboratory reports and dissertations as are required to fulfil the academic requirements for each programme of study. Costs that students registered for this programme typically also have to pay for are included in Appendix 2:

Progression Requirements

The programme follows the University's regulations for [Standalone Masters](#) as set out in the University Calendar Section IV.

Intermediate exit points (where available)

You will be eligible for an interim exit award if you complete part of the programme but not all of it, as follows:

Qualification	Minimum overall credit in ECTS credits	Minimum ECTS credits required at level of award
Postgraduate Diploma	at least 60	45
Postgraduate Certificate	at least 30	20

Support for student learning

There are facilities and services to support your learning some of which are accessible to students across the University and some of which will be geared more particularly to students in your particular Faculty or discipline area.

The University provides:

- library resources, including e-books, on-line journals and databases, which are comprehensive and up-to-date; together with assistance from Library staff to enable you to make the best use of these resources
- high speed access to online electronic learning resources on the Internet from dedicated PC Workstations onsite and from your own devices; laptops, smartphones and tablet PCs via the Eduroam wireless network. There is a wide range of application software available from the Student Public Workstations. Students can also access SVE (Southampton Virtual Environment), a virtual Windows University of Southampton desktop that can be accessed from personal devices such as PCs, Macs, tablets and smartphones from any location.
- computer accounts which will connect you to a number of learning technologies for example, the Blackboard virtual learning environment (which facilitates online learning and access to specific learning resources)
- standard ICT tools such as Email, secure filestore and calendars.
- access to key information through the MySouthampton Student Mobile Portal which delivers timetables, Module information, Locations, Tutor details, Library account, bus timetables etc. while you are on the move.
- Central IT support is provided through a comprehensive website, telephone and online ticketed support and a dedicated helpdesk in the Hartley Library foyer
- Enabling Services offering assessment and support (including specialist IT support) facilities if you have a disability, dyslexia, mental health issue or specific learning difficulties

- the Student Services Centre (SSC) to assist you with a range of general enquiries including financial matters, accommodation, exams, graduation, student visas, ID cards
- Career Destinations, advising on job search, applications, interviews, paid work, volunteering and internship opportunities and getting the most out of your extra-curricular activities alongside your degree programme when writing your CV
- a range of personal support services : mentoring, counselling, residence support service, chaplaincy, health service
- a Centre for Language Study, providing assistance in the development of English language and study skills for non-native speakers.

The Students' Union provides

- an academic student representation system, consisting of Course Representatives, Academic Presidents, Faculty Officers and the Vice-President Education; SUSU provides training and support for all these representatives, whose role is to represent students' views to the University.
- opportunities for extracurricular activities and volunteering
- an Advice Centre offering free and confidential advice including support if you need to make an academic appeal
- Support for student peer-to-peer groups, such as Nightline.

Associated with your programme you will be able to access:

In the School you will be able to access:

- The tutorial system – you will have a personal tutor whom you can meet on request for advice on your programme and choice of options, or for pastoral support
- A mentor (usually a postgraduate student who has previously taken the course) that sees you weekly
- The ECS senior tutor who provides additional pastoral support
- ECS computer workstations, with a range of manuals and books
- Specialist project laboratories
- Personal email account and web access, including use of on-line collaboration tools
- Helpdesk (programming advisory)
- There are systems for the support of student learning in ECS as well as available from demonstrators who provide additional support for your design projects
- A web-site for each taught module, typically with teaching materials

Methods for evaluating the quality of teaching and learning

You will have the opportunity to have your say on the quality of the programme in the following ways:

- Completing student evaluation questionnaires for each module of the programme
- Acting as a student representative on various committees, e.g. Staff: Student Liaison Committees, Faculty Programmes Committee OR providing comments to your student representative to feedback on your behalf.
- Serving as a student representative on Faculty Scrutiny Groups for programme validation
- Taking part in programme validation meetings by joining a panel of students to meet with the Faculty Scrutiny Group

The ways in which the quality of your programme is checked, both inside and outside the University, are:

- Regular module and programme reports which are monitored by the Faculty.
- Programme validation, normally every five years.
- External examiners, who produce an annual report.
- Professional body accreditation/inspection (when applicable)
- A national evaluation of research – which is relevant since our research activity contributes directly to the quality of your learning experience.
- Higher Education Review by the Quality Assurance Agency.

Criteria for admission

University Commitment

The University's Admissions Policy applies equally to all programmes of study. The following are the typical entry criteria to be used for selecting candidates for admission. The University's approved equivalencies for the requirements listed below will also be acceptable.

Undergraduate programmes

Qualification	Grades	Subjects required	Subjects not accepted	EPQ Alternative offer (if applicable)	Contextual Alternative offer (if applicable)
GCE A level					
GCSE					
BTEC					
International Baccalaureate					
European Baccalaureate					

Postgraduate programmes

Qualification	Grade/GPA	Subjects requirements	Specific requirements
Bachelor's degree	2:1 Honours	High level Linear Algebra or other maths modules, high in programming language, good spread of computing modules. Some electronics also advantage.	
Master's degree			

Mature applicants

Applications from mature students (over 21 years in the October of the year of entry) are welcome. Applications will be considered on an individual basis.

English Language Proficiency

Overall	Reading	Writing	Speaking	Listening
6.5	6.0	6.0	6.0	6.0

Career Opportunities

Graduates from our MSc programme are employed worldwide in development and consultancy roles in a number of leading companies at the forefront of information technology; and some have gone on to doctoral study and University careers, while others have been involved in IT start-ups. ECS runs a dedicated careers hub which is affiliated with over 100 renowned companies like IBM, ARM, Microsoft Research, Imagination Technologies, Nvidia, Samsung and Google to name a few. [Visit our careers hub](#) for more information.

External Examiner(s) for the programme

Name Prof. George Coghill

Institution. University of Aberdeen

Students must not contact External Examiner(s) directly, and external examiners have been advised to refer any such communications back to the University. Students should raise any general queries about the assessment and examination process for the programme with their Course Representative, for consideration through Staff: Student Liaison Committee in the first instance, and Student representatives on Staff: Student Liaison Committees will have the opportunity to consider external examiners' reports as part of the University's quality assurance process.

External examiners do not have a direct role in determining results for individual students, and students wishing to discuss their own performance in assessment should contact their personal tutor in the first instance.

Please note: This specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if s/he takes full advantage of the learning opportunities that are provided. More detailed information can be found in the Faculty Student Handbook: http://www.fpse.soton.ac.uk/student_handbook

Appendix: 1

Learning outcomes and Assessment Mapping document template

The A-K refer to the learning outcomes detailed above repeated below for convenience.

Knowledge and Understanding

A. Scientific and technological principles underlying Artificial Intelligence.

B. Specialist tools and techniques used to design, analyse, implement and verify AI systems.

C. Current research issues relevant to Artificial Intelligence.

Subject Specific Intellectual and Research Skills

D. Use specialist tools and techniques to specify, design, implement and verify AI systems.

E. Model, simulate and analyse the behaviour of (sub-)systems at an appropriate level of detail.

F. Acquire new knowledge and understanding through critical reading of research material.

G. Apply such knowledge and understanding to specialist design problems.

Transferable and Generic Skills

H. Use printed and on-line catalogues and databases to locate relevant technical information.

I. Present specialist technical information in written and verbal forms.

J. Work efficiently and effectively as a member of a project team.

K. Work independently on a significant research project.

[illegible]

Appendix 2:

Additional Costs

Students are responsible for meeting the cost of essential textbooks, and of producing such essays, assignments, laboratory reports and dissertations as are required to fulfil the academic requirements for each programme of study. In addition to this, students registered for this programme typically also have to pay for the items listed in the table below.

In some cases you'll be able to choose modules (which may have different costs associated with that module) which will change the overall cost of a programme to you. Details of such costs will be listed in the Module Profile. Please also ensure you read the section on additional costs in the University's Fees, Charges and Expenses Regulations in the University Calendar available at www.calendar.soton.ac.uk.

Main Item	Sub-section	PROGRAMME SPECIFIC COSTS
Approved Calculators		Candidates may use calculators in the examination room only as specified by the University and as permitted by the rubric of individual examination papers. The University approved models are Casio FX-570 and Casio FX-85GT Plus. These may be purchased from any source and no longer need to carry the University logo.
Stationery		You will be expected to provide your own day-to-day stationary items, e.g. pens, pencils, notebooks, etc). Any specialist stationery items will be specified under the Additional Costs tab of the relevant module profile.
Textbooks		Where a module specifies core texts these should generally be available on the reserve list in the library. However due to demand, students may prefer to buy their own copies. These can be purchased from any source. Some modules suggest reading texts as optional background reading. The library may hold copies of such texts, or alternatively you may wish to purchase your own copies. Although not essential reading, you may benefit from the additional reading materials for the module.
Equipment and Materials Equipment	Art Equipment and Materials: Drawing paper; painting materials; sketchbooks	
	Art Equipment and Materials: Fabric, Thread, Wool	
	Design equipment and materials:	
	Excavation equipment and materials:	
	Field Equipment and Materials:	
	Laboratory Equipment	

Main Item	Sub-section	PROGRAMME SPECIFIC COSTS
	and Materials:	
	Medical Equipment and Materials: Fobwatch; stethoscopes;	
	Music Equipment and Materials	
	Photography:	
	Recording Equipment:	
IT	Computer Discs	
	Software Licenses	
	Hardware	
Clothing	Lab Coats	
	Protective Clothing: Hard hat; safety boots; hi-viz vest/jackets;	
	Fieldcourse clothing:	
	Wet Suits?	
	Uniforms?	
Printing and Photocopying Costs		In the majority of cases, coursework such as essays; projects; dissertations is likely to be submitted on line. However, there are some items where it is not possible to submit on line and students will be asked to provide a printed copy.
Fieldwork: logistical costs	Accommodation:	
	Insurance	
	Travel costs	
	Immunisation/vaccination costs	
	Other:	
Placements (including Study Abroad Programmes)	Accommodation	
	Insurance	
	Medical Insurance	
	Travel costs	
	Immunisation/vaccination costs	
	Disclosure and Barring Certificates or Clearance	
	Translation of birth certificates	
	Other	
Conference expenses	Accommodation	
	Travel	
Optional Visits (e.g. museums, galleries)		
Professional Exams		
Parking Costs		
Anything else not covered elsewhere		

Revision History

1. New Brand added July 2008
2. Updated to reflect University restructuring June 2011 AB.
3. Revisions approved by Senate 19 June 2013 as part of new programme validation process
4. Minor changes made to form guidance on completion of Intended Learning Outcomes, and Learning outcomes and Assessment Mapping document template, for clarity; and changes to wording of support for student learning section, altering to second person throughout – agreed with the Chair and to be reported to UPC October 2013
5. New module structure conformant with new 15-credit modules – March 2014 (raw)
6. Updated to reflect formal CRG review 28/3/2014 (MCF) and comments from AMG 30/3/2014 (raw)
7. Minor mods by Luke Brooks 7/10/2014 (inc. progression requirements)
8. Changed Machine learning (comp3206) to Machine learning (MSc) (comp6229) - raw 7/10/2015
9. BCS accreditation added. External examiner updated to Josh Knowles. raw 20/6/2015
10. Update to Support and Student Learning, IT Services - June 2015
11. Update to Language Requirements - June 2015
12. Approved by ECS Education Committee - 10 June 2015
13. Update to Programme Overview (CMA Changes) – 24 August 2015
14. Update to Programme Overview (CMA Changes) – 14 September 2015
15. 2016-17 FPC Approval – 24 February 2016
16. Optional Module Viability added – 06 December 2016
17. Roll-over to 2017-18; new external examiner added – 07 March 2017
18. FPC approval for 17/18 – 08 March 2017
19. FPC approval of optional module size caveat – CQA team, 07 December 2017