Aim of Programme

The aim of this MSc programme is to impart the understanding and skills to develop intelligent software applications, such as those involving evolutionary computation and learning. Students will develop skills in specialist areas with clear applications in industry - including data mining, machine learning, and pattern recognition.

Duration of Programme

The full-time MSc programme starts in mid September and lasts 1 year. The Postgraduate Diploma starts at the same time but only lasts 8 months. Students completing the PG Diploma at MSc level may transfer to the MSc.

Part-time study for the MSc over 2 years is also possible by special arrangement with the programme director.

Programme Structure

The first two semesters (September-May) are spent studying taught courses in artificial intelligence. At the same time research skills are developed as a preliminary for work on an MSc project. Exams take place at the end of each semester.

In the third semester (May-August) students undertake a specialist project which is written up as a dissertation. It enables further development and consolidation of skills introduced in the taught courses, applying them to a challenging practical problem in AI.

The project is carried out under the supervision of an academic who is an expert in the field. In some cases the project can be carried out in collaboration with an outside industrial or academic organisation.

The table shows the essential and optional courses in the first 2 semesters. Full time students must study 4 courses each semester.
SEMESTER 1 COURSES

F21GA 3D Graphics and Animation
- To investigate 2D and 3D graphics concepts including lighting, materials, modelling, occlusions, projections, reflections, rendering, scene graphs, shading, texture mapping, transformations, viewpoints.
- To explore animation including blending, clipping, poses, skeletons and skinning.
- To develop programming skills in 2D/3D graphics and animation.

F29A1 Artificial Intelligence and Intelligent Agents
- To introduce the main concepts and techniques of AI, including planning, search and knowledge representation.
- To introduce the scope, subfields and applications of AI, topics to be taken from a list including natural language processing, expert systems, robots and autonomous agents, machine learning and neural networks, and vision.
- To develop skills in AI programming in appropriate languages.

SEMESTER 2 COURSES

F21RO Intelligent Robotics
- To introduce concepts and techniques used in robotics and applications ranging from industrial automation to robotic companions.
- To impart understanding of the basic concepts used in evolutionary, swarm and other bio-inspired robotics.
- To impart understanding of the basic concepts used in developmental robotics and human-robot interaction.
- To give exposure to the main issues involved in building intelligent robot controllers.

F21SF Software Engineering Foundations
- To impart understanding of the object oriented paradigm and the process of object oriented design.
- To support the development of object oriented programs in Java.
- To convey object oriented design from specification, document the design using appropriate techniques, implement the design in Java and evaluate the results.
- To develop an understanding of windows-based systems and their development.

F21BD Big Data Management
- To review principal abstractions, methods and techniques for the management of large and complex data sets (“Big Data”).
- To develop an understanding of the foundations and tools of the Semantic Web.
- To impart the ability to appreciate critically a range of data integration solutions.

F21GP Computer Games Programming
- To develop appreciation of the history and types of computer games and the elements of game design and theory.
- To give an understanding of games physics, obstacle avoidance, path planning, group movement and learning and adaptation in games.
- To impart knowledge of current computer games tools and environments.
- To develop programming skills and techniques specific to the area of 2D and 3D computer games.

F21CA Conversational Agents and Spoken Language Processing
- To impart extensive, detailed and critical knowledge of the design, implementation and evaluation techniques for conversational agents and spoken language processing.
- To develop an awareness of current research and emerging issues in the field of conversational agents and spoken language processing.
- To introduce a range of interdisciplinary research methods and specialised practical skills involved in building working conversational interfaces.

F21RP Research Methods and Project Planning
- To enable students to develop skills in critical thinking, research planning, academic writing and experimental design appropriate for a post-graduate programme.
- To enable students to gain skills in project planning and an awareness of legal, social and professional issues relevant for IT professionals.
- To enhance students’ employability by development of job seeking and career planning skills.
**Post-Study Work Opportunities in Scotland**

Opportunities exist for students who graduate in a specialism in demand in the Scottish economy to get employment here. The Scottish government is keen to help talented individuals from around the world come to study, work and live here. More information can be found at [www.talentscotland.com](http://www.talentscotland.com)

**Career Prospects**

Graduates from this programme can expect to get employment with AI businesses, software houses, IT companies, research and development divisions of companies, financial services organisations, defence contractors or government IT agencies and as researchers or research students within universities.

**Professional Accreditation**

This MSc programme is accredited by the Chartered Institute of IT or BCS and should fulfil its further education requirements for a Chartered IT Professional. It also partially fulfils membership requirements for the CEng and CSci professional bodies.

**Scholarships and Awards**

International students can apply for a variety of scholarships from the Scottish executive, other bodies and our school. Please visit [www.macs.hw.ac.uk/cs/pgcourses/finance.htm#international](http://www.macs.hw.ac.uk/cs/pgcourses/finance.htm#international)

Scottish and EU citizens can apply for SAAS loans covering most of the fees. Please visit [www.saas.gov.uk](http://www.saas.gov.uk)

Other scholarships may be available from the university. Please visit [www.hw.ac.uk/study/scholarships/postgraduate-taught.htm](http://www.hw.ac.uk/study/scholarships/postgraduate-taught.htm)

**Employment**

First destinations of some of our recent MSc graduates:

- Software Engineer, Ion Concept Systems
- Software Engineer, Logica
- PhD Computer Science, Heriot-Watt University
- IT Manager, NCS
- Database Administrator, Pension Fund Commission
- System Specialist, UBS AG (Bank)
- Test Engineer, IBM
- Systems Engineer, GEC Marconi Avionics
- Graduate Software Engineering, Thomson Marconi Sonar Ltd
- Computer Programmer, Bull Europe
- Software Consultant, Absoft
- Software Engineer, Thales (UK)

**Cost**

The Scots/other UK/EU fee for this one year full time MSc programme at Heriot-Watt university in Edinburgh starting in September 2018 is £5360. The overseas fee is £18120. The cost of living during one year of study in Edinburgh is estimated at £10500. The Dubai campus fee is AED 81900 for 2018/19.

**Entry Requirements**

Applicants require a 1st or 2nd class honours degree or its overseas equivalent with a substantial academic component of computing or IT. Graduates with a little less than this may sometimes be admitted to the Postgraduate Diploma programme. If their exam and coursework performance is MSc level by May, they may then be recommended for transfer to the MSc.

Honours graduates without relevant computing knowledge, who wish to retrain and become AI professionals, may like to consider doing our 2 year MSc in AI instead.

Non-native English speakers must also satisfy the university’s requirements for competency in English. This can be done with an IELTS score of 6.5 and in other ways. English language training can also be undertaken at Heriot-Watt University before starting the MSc.

Applicants requiring sponsorship for a tier 4 visa to study in the UK via a CAS letter must satisfy the UK Borders Agency’s minimum English language requirements. They are IELTS 5.5 in reading, writing, speaking and listening.

**How to apply**

Apply online at [www.hw.ac.uk/study/apply/uk/postgraduate.htm](http://www.hw.ac.uk/study/apply/uk/postgraduate.htm)

Supporting documents including 2 academic references, degree certificates, transcripts of marks and English test results can be uploaded digitally to the online application facility.

**Contact information**

Postgraduate Admissions
Room 1.24
Earl Mountbatten Building
School of Mathematical & Computer Sciences
Heriot-Watt University,
Riccarton, Edinburgh EH14 4AS
SCOTLAND

+44 (0) 131 451 8444
+44 (0) 131 451 3327
MACSpgenquiries@hw.ac.uk
[www.macs.hw.ac.uk/cs/pgcourses](http://www.macs.hw.ac.uk/cs/pgcourses)