ARTIFICIAL INTELLIGENCE
MSc (2 years)

Full-Time

Distinctly Ambitious

www.hw.ac.uk
Heriot-Watt University offers a first-rate environment for postgraduate study and research. We are one of the UK’s leading universities, recognized internationally for excellent teaching and innovative technology in our specialist areas of science, engineering, business management, languages and textile design.

Heriot-Watt became a university in 1966 and our origins go back to the foundation of the School of Arts in Edinburgh in 1821. We are Scotland’s most international university. Over 30% of our students come from outside the UK.

We introduced the first Computer Science degree in Scotland in 1966, have taught MSc degrees in this subject from 1970 and are part of the world class SICSA research cluster that aims to sustain and expand Scotland’s research excellence in Informatics and Computer Science.

This MSc in Artificial Intelligence is a 2 year postgraduate degree. The first year imparts the knowledge and skills needed to study AI at Masters level in the second.

Students acquire the understanding and know-how to develop intelligent software applications, such as those involving evolutionary computation and learning. Students gain knowledge and experience of data mining, machine learning and human machine interaction.

Graduates from any discipline start with an introduction to AI, study the art of software engineering, and learn relevant topics in computing. Those who need to may also enhance their technical English and research skills.

Admission in September requires a good honours degree, numeracy and some prior ability at programming. The English level required is IELTS 6.0.

**Year 1** introduces AI and teaches software engineering, interaction design and relevant topics in Computer Science:

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<th>Semester 1</th>
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<tr>
<td>F29AI AI and Intelligent Agents</td>
<td>F21AS Advanced Software Engineering</td>
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<tr>
<td>F27ID Introduction to Interaction Design</td>
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<tr>
<td>F21SF Software Engineering Foundations</td>
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<td><strong>1 option:</strong></td>
<td><strong>3 options:</strong></td>
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<tr>
<td>F21DF Database and Information Systems</td>
<td>F20AD Advanced Interaction Design</td>
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<td>C69RP Research Preparation in English I</td>
<td>F29OC Operating Systems and Concurrency</td>
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<td>F21SA Statistical Modelling and Analysis</td>
<td>C11PA Project Management</td>
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<td>C69RQ Research Preparation in English II</td>
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<td>F21SM Software Engineering Master Class</td>
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**Year 2** teaches Artificial Intelligence at Masters level:

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<tr>
<td>F21BC Biologically Inspired Computation</td>
<td>F21RP Research Methods and Project Planning</td>
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<td>F21DL Data Mining and Machine Learning</td>
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<td><strong>2 options:</strong></td>
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<td>F21GA 3D Graphics and Animation</td>
<td>F21BD Big Data Management</td>
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<td>F21HR Human Robot Interaction</td>
<td>F21GP Computer Games Programming</td>
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<td>F21SC Industrial Programming</td>
<td>F21CA Conversational Agents and Spoken Language Processing</td>
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<td>F21RO Intelligent Robotics</td>
<td>F21DV Data Visualisation and Analytics</td>
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<td>F21EC e-Commerce Technology</td>
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YEAR 1 COURSES

F20AD Advanced Interaction Design covers the principles, research and good practice in requirements capture, design and evaluation in interacting with computer based systems. It also introduces some research.

F21AS Advanced Software Engineering covers advanced Java programming, the design of algorithms for key types of data and thread management, as well as advanced techniques in software project management.

F29AI AI and Intelligent Agents covers fundamental concepts and techniques in AI including planning, search and knowledge representation as well as the use of some AI programming languages.

F21DF Database and Information Systems covers the principles of modern database systems, information systems methodologies and interactive and program use of SQL and NoSQL databases.

F27ID Introduction to Interaction Design explores requirements gathering, design theory and techniques in interaction design. It covers common design methods and patterns and imparts key skills and methods in working with users.

F29OC Operating Systems and Concurrency introduces operating systems, their basic principles and shell programming as well as the theory and practice of concurrent hardware and software systems.

C11PA Project Management teaches the knowledge and skills of a professional project manager including quantitative and qualitative techniques and tools, strategy formulation and project scheduling.

C69RP Research Preparation in English I covers Computer Science literature search and its summarisation, research planning and assessing research impact. It also enhances technical English skills in Computer Science.

C69RQ Research Preparation in English II continues the themes of C69RP and also covers critically appraising Computer Science research, evaluating such research and presenting it with posters.

F21SF Software Engineering Foundations covers the principles and practice of object-oriented programming in Java as well as introducing the art of software engineering.

F21SA Statistical Modelling and Analysis covers statistical modelling and analysis techniques for data review and presentation and demonstrates their practical application.

F21SM Software Engineering Master Class is an academically supervised exercise in researching, developing and presenting two master classes in a technical topic in Computer Science.

YEAR 2 COURSES

F21GA 3D Graphics and Animation introduces 3D computer graphics concepts, algorithms and processing and applies them to physical and behavioural animation.

F21BD Big Data Management covers the storage and handling of complex and large data sets, the semantic web and data integration issues with relational and NoSQL databases.

F21BC Biologically Inspired Computation covers limitations of traditional approaches to computation that are addressed within and among biological organisms by means such as evolutionary algorithms, swarm intelligence, neural networks and cellular automata.

F21GP Computer Games Programming covers computer game concepts, design, modelling techniques, principles and implementation techniques. It includes 2D and 3D tools and AI and graphics programming.

F21DV Data Visualisation and Analytics covers intuitive graphical and interactive applications that allow users to search, explore, reveal, partition, understand, discover and communicate the structure and information in large data sets.

F21EC e-Commerce Technology explores key services, techniques and tools for realising e-business systems and puts their operations and strategies in an information systems framework.

F21HR Human Robot Interaction imparts the understanding and skills needed to build intelligent robots for HRI through a supervised group project in making a talking robot.

F21SC Industrial Programming develops advanced skills in two programming languages in widespread practical use in industry. One is C# and the other is Python. It also covers relevant tools and development environments.

F21RO Intelligent Robotics covers the fundamentals of manipulators, the basics of mobile robots, sensing techniques, behaviour based robotics and cognitive robotics.

F21MP MSc Project is a 15 week full-time exercise in applying knowledge acquired in the MSc. It is academically supervised and assessed by a 15000 word dissertation. Students prepare for it in F21RP.

F21RP Research Methods and Project Planning prepares students for their MSc project. It covers research planning, literature review and critique, requirements analysis, evaluation design and professional and normative issues raised.

We may alter the courses offered at any time. Some courses may not run every year. Not every course combination may be possible to take. Students must satisfy each course’s prerequisites and their course choice must be agreed with the programme’s director.
**Entry Requirements**

Applicants require a good honours degree or its equivalent, numeracy and some knowledge of programming. They must also have a minimum English level of IELTS 6.0.

Suitable applicants include UK honours graduates or EU or overseas graduates from 4 year programmes in any degree area that wish to retrain as AI professionals.

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

**How to apply**

Apply online at

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**

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