HUMAN ROBOT INTERACTION
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 technological innovation 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. A third 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 Human Robot Interaction is a 2 year postgraduate degree. The first year imparts the knowledge and skills needed to study HRI at Masters level in the second year.

It teaches the understanding and skills to engineer robots that can assist human beings while having their behaviour controlled and shaped by human interaction. Students learn the principles of interactive robotics while developing skills in designing, building and evaluating them.

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 topics in Computer Science:

<table>
<thead>
<tr>
<th>Semester 1</th>
<th>Semester 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>F29AI  AI and Intelligent Agents</td>
<td>F20AD  Advanced Interaction Design</td>
</tr>
<tr>
<td>F27ID  Introduction to Interaction Design</td>
<td>F21AS  Advanced Software Engineering</td>
</tr>
<tr>
<td>F21SF  Software Engineering Foundations</td>
<td>F21SF  Software Engineering Foundations</td>
</tr>
<tr>
<td>1 option:</td>
<td>2 options:</td>
</tr>
<tr>
<td>F29DC  Data Communications and Networking</td>
<td>F29OC  Operating Systems and Concurrency</td>
</tr>
<tr>
<td>F21DF  Database and Information Systems</td>
<td>C69RQ  Research Preparation in English II</td>
</tr>
<tr>
<td>C69RP  Research Preparation in English I</td>
<td>B59RM  Robotic Mechanical Systems</td>
</tr>
<tr>
<td></td>
<td>F21SM  Software Engineering Master Class</td>
</tr>
</tbody>
</table>

**Year 2** teaches Human Robot Interaction at Masters level:

<table>
<thead>
<tr>
<th>Semester 1</th>
<th>Semester 2</th>
<th>Semester 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>F21HR  Human Robot Interaction</td>
<td>F21CA  Conversational Agents and Spoken Language Processing</td>
<td>F21MP  Masters Project</td>
</tr>
<tr>
<td>F21RO  Intelligent Robotics</td>
<td>F21RP  Research Methods and Project Planning</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 options:</td>
<td>2 options:</td>
<td></td>
</tr>
<tr>
<td>F21GA  3D Graphics and Animation</td>
<td>F21BD  Big Data Management</td>
<td></td>
</tr>
<tr>
<td>F21DL  Data Mining and Machine Learning</td>
<td>F21GP  Computer Games Programming</td>
<td></td>
</tr>
<tr>
<td>B31TF  Sensors, Actuators and IoT</td>
<td>B31SE  Image Processing</td>
<td></td>
</tr>
<tr>
<td>F21SA  Statistical Modelling and Analysis</td>
<td>C11PA  Project Management</td>
<td></td>
</tr>
</tbody>
</table>
YEAR 1 COURSES

F20AD Advanced Interaction Design covers the principles, organisation 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.

F29DC Data Communications and Networking introduces the principles of computer and data communications with a focus on the Internet’s TCP/IP protocols.

F21DF Database and Information Systems covers the principles of database systems, information systems methodologies and interactive and programmed 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.

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.

YEAR 2 COURSES

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.

B59RM Robotic Mechanical Systems introduces computer integrated manufacturing, computer numerical control and robot kinematics and provides training in mobile robot mechanical design.

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

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.

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.

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.

F21CA Conversational Agents and Spoken Language Processing covers theory and current practices in the design, implementation and evaluation of conversational agents and speech processing applications.

F21DL Data Mining and Machine Learning covers DM and ML concepts and techniques, teaches critical awareness of their relative merits and introduces common application types.

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

B31SE Image Processing introduces the theory and concepts of image analysis, modelling, enhancement and coding and applies them to a range of digital images and video sequences.

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.

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.

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.

B31TF Sensors, Actuators and IoT explores the principles and hardware for sensing and actuating devices in use by current AI systems. It also explores the techniques, practices and challenges of the Internet of Things providing skills in using such devices and networking for smart systems development.

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

---

**Post-Study Work Opportunities in Scotland**

Good 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 one of our MSc programmes can expect to be able to gain employment with robotics companies, software houses, IT organisations, research and development divisions of businesses, financial services operations, defence contractors or government IT agencies and as researchers or research students within universities.

**Fees**

The fee for this 2 year MSc programme at Heriot-Watt University in Edinburgh starting in September 2019 is £7168 in both years for UK and EU students. Overseas students pay £13200 in the first year and £18680 in the second. The cost of living during one year of study in Edinburgh is estimated at £10800.

**English Study**

Non-native English speakers with less than IELTS 6.0 may take 6, 10 or 14 weeks of English study with our English Language Department before starting.

**Scholarships and Awards**

Students can apply for a variety of scholarships from the Scottish executive, other bodies and our school. 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)

---

**Post-Study Work Opportunities in Scotland**

Good 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 one of our MSc programmes can expect to be able to gain employment with robotics companies, software houses, IT organisations, research and development divisions of businesses, financial services operations, defence contractors or government IT agencies and as researchers or research students within universities.

**Fees**

The fee for this 2 year MSc programme at Heriot-Watt University in Edinburgh starting in September 2019 is £7168 in both years for UK and EU students. Overseas students pay £13200 in the first year and £18680 in the second. The cost of living during one year of study in Edinburgh is estimated at £10800.

**English Study**

Non-native English speakers with less than IELTS 6.0 may take 6, 10 or 14 weeks of English study with our English Language Department before starting.

**Scholarships and Awards**

Students can apply for a variety of scholarships from the Scottish executive, other bodies and our school. Please visit [www.hw.ac.uk/study/scholarships/postgraduate-taught.htm](http://www.hw.ac.uk/study/scholarships/postgraduate-taught.htm)