INFORMATION TECHNOLOGY (SOFTWARE SYSTEMS)  
MSc / PG Diploma

Full-Time / Part-Time

Distinctly Ambitious  
www.hw.ac.uk
Programme Structure

The first two semesters (September-May) are spent studying taught courses in IT and software systems. At the same time research skills are developed to prepare for the MSc project. Exams happen 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 the subject area.

The project is carried out under the supervision of a Computer Science academic. In some cases it can be carried out in collaboration with an outside organisation.

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

<table>
<thead>
<tr>
<th>Semester 1</th>
<th>Semester 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>F21DF Database and Information Systems</td>
<td>F21NA Network Applications</td>
</tr>
<tr>
<td></td>
<td>F21RP Research Methods and Project Planning</td>
</tr>
<tr>
<td><strong>Options:</strong></td>
<td><strong>Options:</strong></td>
</tr>
<tr>
<td>F21GA 3D Graphics and Animation</td>
<td>F21AD Advanced Interaction Design</td>
</tr>
<tr>
<td>F21CN Computer Network Security</td>
<td>F21AS Advanced Software Engineering</td>
</tr>
<tr>
<td>F21SC Industrial Programming</td>
<td>F21GP Computer Games Programming</td>
</tr>
<tr>
<td>F21RO Intelligent Robotics</td>
<td>F21DE Digital and Knowledge Economy</td>
</tr>
<tr>
<td>F21SF Software Engineering Foundations</td>
<td>F21EC e-Commerce Technology</td>
</tr>
</tbody>
</table>

Aim of Programme

The aim of this MSc programme is to impart the understanding and skills to develop advanced software systems to professional standards. It has a flexible structure to suit applicants from different academic backgrounds. It covers core skills in IT at MSc level while also allowing study of some specialist advanced topics.

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.
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.

F21CN Computer Network Security
- To impart critical understanding of key concepts, issues, theories and principles of computer network security.
- To develop detailed theoretical and practical knowledge of foundational issues in computer network security.
- To provide detailed understanding and practical experience with key services and tools for computer network security.
- To give practical experience of analysing requirements, designing, implementing and testing security solutions for network applications.

F21DF Database and Information Systems
- To develop understanding of the processes and methodologies required for analysing, specifying and designing databases and information systems.
- To develop understanding of the relationships among organisations, human activity systems and information systems, and between the information systems and software development life cycles, and to use it in systems design.
- To give practical experience in designing, building and using databases and information systems, simple database programming and developing and deploying databases and information systems in organisations.

F21SC Industrial Programming
- To develop proficiency in modern industrial programming languages such as C#, C++11, Python, PHP.
- To enable the elaboration and combination of components in different languages;
- To enable an agile and flexible response to changes in industrial practices;
- To enable participation by industrial practitioners to provide context and applicability.

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 design within it.
- To support the development of object oriented programs in Java.
- To carry out object oriented design from specification, document it using apt techniques, implement the design in Java and evaluate the results.
- To develop an understanding of developing window-based systems.

SEMESTER 2 COURSES

F21AD Advanced Interaction Design
- To develop extensive, detailed and critical knowledge of requirements gathering, design and evaluation techniques in interaction design.
- To develop awareness of current research and emerging issues in the field of interaction design.
- To impart specialised skills, and research methods involved in working with users.

F21AS Advanced Software Engineering
- To enhance skills in concurrent, procedural and team software development.
- To develop further object oriented programming and design methods.
- To impart the role of patterns and UML in software engineering.
- To instil the concepts and benefits of advanced software engineering methods.

F21GP Computer Games Programming
- To instil a grasp of design, history and theory of computer games.
- To give understanding of physics, obstacle avoidance, path planning, group movement and learning and adaptation in games.
- To impart knowledge of computer games tools and environments.
- To develop programming skills and techniques in 2D and 3D games.

F21DE Digital and Knowledge Economy
- To consider the impact of deploying new technologies and emerging knowledge in developed economies.
- To discuss e-Business, as a modern business model for advanced economies.
- To introduce relevant models, analytical techniques, technologies and methodologies including business, organisation, knowledge and technology.
- To impart how to map between computing and business requirements.

F21EC e-Commerce Technology
- To review the IT issues raised by electronic business and commerce.
- To survey the techniques and technologies to design and implement e-commerce applications.
- To provide first hand experience of web-based tools and services to help design e-commerce solutions.

F21NA Network Applications
- To impart knowledge and understanding of the theories, principles and protocols underlying network applications on the Internet.
- To develop skills in a range of network technologies, enable a grasp of the main design and practical issues faced in their application, and apply relevant techniques for a given network application problem.
- To give experience of creatively developing in teams a substantial network application involving web and application server technologies.

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 impart skills in project planning and give an awareness of legal, social, ethical and professional issues relevant for IT professionals.
- To enhance students' employability by development of job seeking and career planning skills.
Entry Requirements

Applicants require a first or second class honours degree or its equivalent in a numerate, science, engineering or technology discipline. 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.

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, an ECCE certificate, Pearson Test of Academic English 58, Cambridge First Certificate in English A or B, level C in academic English from our own English language teachers or by proving they have studied wholly in English at university level. A full range of English language training courses can be taken at Heriot-Watt University before starting a programme.

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

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

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

Career Prospects

Graduates from the programme can expect to be able to get employment with 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.

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

Scottish and EU citizens can apply for SAAS loans covering most of the fees. Please visit www.saas.gov.uk

Other scholarships may be available from the university. Please visit www.hw.ac.uk/study/scholarships/postgraduate-taught.htm

Cost

The Scots/UK/EU fee for this one year full time MSc programme at Heriot-Watt university in Edinburgh starting in September 2019 is £7168. The oversea fee is £18680. The cost of living during one year of study in Edinburgh is estimated at £10800. The Dubai campus fee is AED 81900 for 2019/20.

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

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

Career Prospects

Graduates from the programme can expect to be able to get employment with 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.

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

Scottish and EU citizens can apply for SAAS loans covering most of the fees. Please visit www.saas.gov.uk

Other scholarships may be available from the university. Please visit www.hw.ac.uk/study/scholarships/postgraduate-taught.htm

Cost

The Scots/UK/EU fee for this one year full time MSc programme at Heriot-Watt university in Edinburgh starting in September 2019 is £7168. The oversea fee is £18680. The cost of living during one year of study in Edinburgh is estimated at £10800. The Dubai campus fee is AED 81900 for 2019/20.