

School of  
Mathematical and  
Computer Sciences



INFORMATION TECHNOLOGY  
(SOFTWARE SYSTEMS)

MSc / PG Diploma

Full-Time / Part-Time

Distinctly Ambitious  
[www.hw.ac.uk](http://www.hw.ac.uk)

Heriot-Watt University offers a superb environment for postgraduate study. We are one of the UK's leading universities, recognized internationally for excellent teaching and research in our specialist areas of science, engineering, business management, languages and textile design.

Heriot-Watt became a university in 1966 and its 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 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.

## 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.

## 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.



Semester 1	Semester 2
<b>Essential:</b>	<b>Essential:</b> F21NA Network Applications F21RP Research Methods & Project Planning
<b>Optional:</b> F21MA 3D Modelling and Animation F21CN Computer Network Security F21DF Databases & Information Systems F21IF Information Systems Methodologies F21MC Mobile Communications & Programming F21SF Software Engineering Foundations	<b>Optional:</b> F21AS Advanced Software Engineering F21GP Computer Games Programming F21IE Internet Engineering F21SE Systems Management & Security

## SEMESTER 1 COURSES

### F21MA 3D Modelling & Animation

- To introduce the basic concepts, techniques and skills of 3D modelling and its computer based applications.
- To impart critical understanding of principles and range of animation types and their computer based exploitation.
- To develop understanding of how to animate speech, express behaviour, create character and evince emotion within a wider narrative.

### 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 used for computer network security purposes.
- To give practical experience of analysing requirements, designing, implementing and testing security solutions for network applications.

### F21DF Databases & 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.

### F21IF Information Systems Methodologies

- To explore a range of issues concerning advanced contemporary methodological approaches to information systems development.
- To enable students to develop critical faculties and techniques in relation to the selection and application of these methodological approaches.

### F21MC Mobile Communications & Programming

- To introduce the main problems of building networks with mobile computing devices and explain how current technology overcomes them.
- To introduce ad hoc networking and give an understanding of how its issues can be addressed.
- To introduce programmable mobile and handheld devices and develop skills in creating their applications.

### 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 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

### F21AS Advanced Software Engineering

- To consolidate proficiency in imperative programming and software development.
- To develop further object oriented programming and design methods.
- To introduce concurrent programming techniques and the deployment of patterns and UML in software engineering.
- To instil understanding of the concepts and benefits of advanced software engineering methods.
- To give practical experience of a large software engineering project.

### F21GP Computer Games Programming

- To develop appreciation of history and types of computer games and elements of their design and theory.
- To give understanding of games 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.

### F21IE Internet Engineering

- To investigate advanced topics in communications networks including routing, congestion control, TCP, real-time and security.

### 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 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.

### F21SE Systems Management and Security

- To develop expertise in identifying, deploying and managing common computer system services.
- To appreciate threats to system integrity and security, and how they may be combated.

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.

## 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/Students.aspx](http://www.talentscotland.com/Students.aspx)

## 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](http://www.macs.hw.ac.uk/cs/pgcourses/finance.htm#international)

Scottish and EU citizens can apply for SAAS grants covering most of the fees. Please visit

[www.macs.hw.ac.uk/cs/pgcourses/finance.htm#soed](http://www.macs.hw.ac.uk/cs/pgcourses/finance.htm#soed)

Other scholarships may be available from the university. Please visit

[www.scholarships.hw.ac.uk/postgraduate.jsp](http://www.scholarships.hw.ac.uk/postgraduate.jsp)

## Cost

The Home/EU fee for this one year full time MSc programme at Heriot-Watt university in Edinburgh starting in September 2011 is £4100. The overseas fee is £13280. The cost of living during one year of study in Edinburgh is estimated at £8000.

## Employment

First destinations of some of our recent MSc graduates:

Software Engineer,  
Graham Technology

Software Developer, Deutsche  
Borse Systems AG

PhD Computer Science,  
Heriot-Watt University

IT Specialist,  
IBM Helix SA

Database Administrator,  
Pension Fund Commission

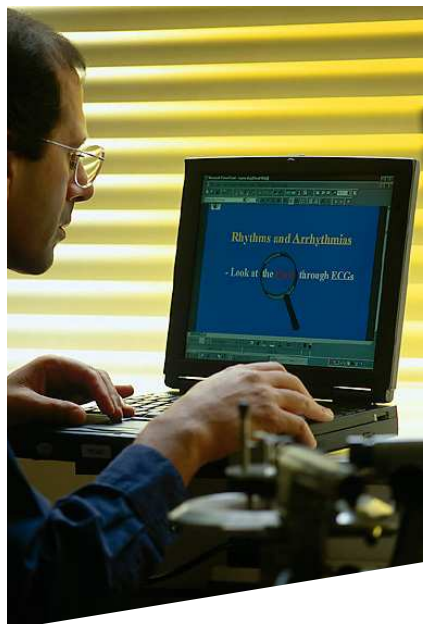
System Specialist,  
UBS AG (Bank)

IT Consultant,  
Logica

Systems Engineer,  
GEC Marconi Avionics

Graduate Software Engineering,  
Thomson Marconi Sonar Ltd

Computer Programmer,  
Bull Europe



## Entry Requirements

Applicants require a first or second class honours degree or its equivalent in a numerate, science, engineering or technology discipline. Candidate not holding first or second class honours degrees may, under certain circumstances, be admitted to the Postgraduate Diploma programme. If their examination performance is satisfactory, they may then be recommended for transfer to the MSc.

Non-native English speakers must also satisfy the university requirements for competency in English. This can be done in several ways including achieving a TOEFL score of either 80 (Internet based) or 213 (computer based) or 550 (paper based), IELTS at grade 6.0, Cambridge Proficiency Certificate of English at grade C, 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 postgraduate programme.

## How to apply


Apply online or using the printed form at

[www.postgraduate.hw.ac.uk/apply](http://www.postgraduate.hw.ac.uk/apply)

Supporting documents including 2 academic reference letters, copies of degree certificates, transcripts of marks and English test results can be sent to us by post or as colour scanned documents attached to an email.

## Contact information

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