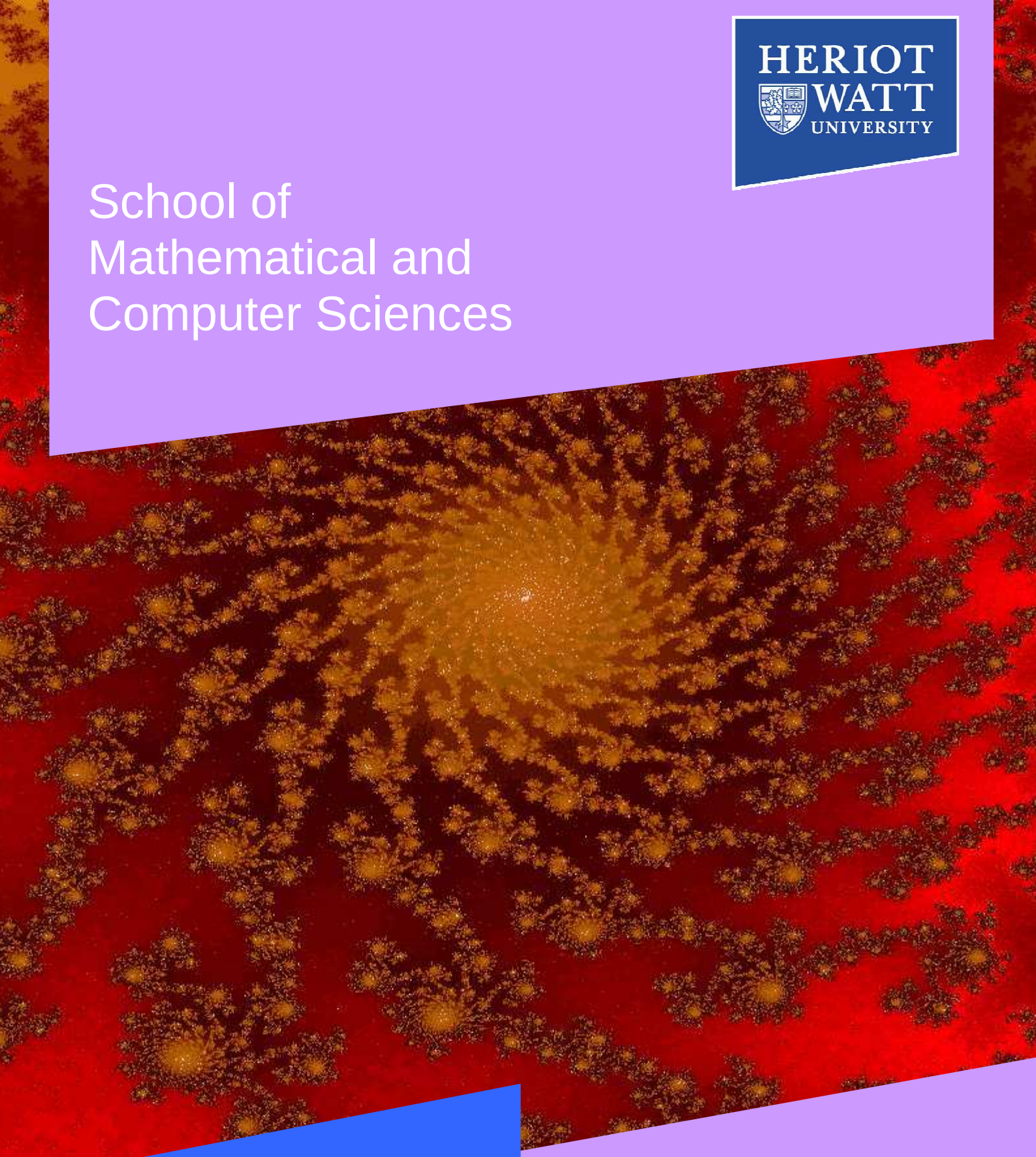
HERIOT WATT UNIVERSITY

School of Mathematical and Computer Sciences



Full-Time / Part-Time

ARTIFICIAL INTELLIGENCE

MSc / PG Diploma

Distinctly Ambitious

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 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, pattern recognition and machine learning.

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	Semester 2
Essential: F21DL Data Mining and Machine Learning	**Essential**: F21BC Biologically Inspired Computing F21RP Research Methods & Project Planning
Optional: F29AI Artificial Intelligence and Intelligent Agents F21RS Rigorous Methods for Software Engineering F21RO Robotics and Automation F21SF Software Engineering Foundations F21MA 3D Modelling and Animation F21WI Web Intelligence	**Optional**: F21GP Computer Games Programming F21SI Software Simulation & Modelling F21VE Virtual Environments

SEMESTER 1 COURSES

F29AI Artificial Intelligence & Intelligent Agents

- To introduce the fundamental 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 an appropriate language.

F21DL Data Mining & Machine Learning

- To introduce the fundamental concepts & techniques used in machine learning.
- To develop a critical awareness of the appropriateness of different methods.
- To provide familiarity with common applications such as data mining.

F21RS Rigorous Methods for Software Engineering

- To address the challenges of developing high quality software including specification, static analysis, formal verification and abstract interpretation.
- To provide knowledge and understanding of the software processes, standards and quality measures which support rigorous software engineering.

F21RO Robotics & Automation

- To introduce concepts & techniques used in robotics and automation.
- To introduce applications of these such as autonomous guided vehicles and industrial manipulators.

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 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.

F21WI Web Intelligence

- To provide critical and applied understanding of technologies and standards enabling reasoning over and intelligent access to information on the World Wide Web.
- To provide a critical and applied understanding of the structure and properties of the web as a complex system, and how this impacts on the growth and use of the web.

F21MA 3D Modelling & Animation

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

SEMESTER 2 COURSES

F21BC Biologically Inspired Computing

- To impart an appreciation of why traditional computation finds it difficult or impossible to perform certain key tasks in pattern recognition, problem solving and autonomous intelligence.
- To show how a range of natural, mainly biological, systems approach these tasks.
- To introduce the main biologically-inspired algorithms and techniques which are now commonly researched and applied.
- To establish a practical understanding of the real-world problems to which these techniques may be fruitfully applied.

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.

F21GP Computer Games Programming

- To develop appreciation of 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.

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.

F21SI Software Simulation & Modelling

- To develop understanding of the problems and issues arising from software simulations and modelling.
- To impart knowledge of tools and techniques to tackle problems present in software simulations and create awareness of different types of modelling platforms.
- To give experience with use of different modelling platforms on a broad range of phenomena.

F21VE Virtual Environments

- To enable participants to understand concepts and benefits of Virtual Environments (VEs) with respect to various applications.
- To equip participants with the skills to create a skeleton Virtual Environment using state-of-the-art VE software toolkits.

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

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.

Professional Accreditation

This MSc programme is accredited by the British Computer Society 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

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

Other scholarships may be available from the university. Please visit

www.scholarships.hw.ac.uk/postgraduate.jsp

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

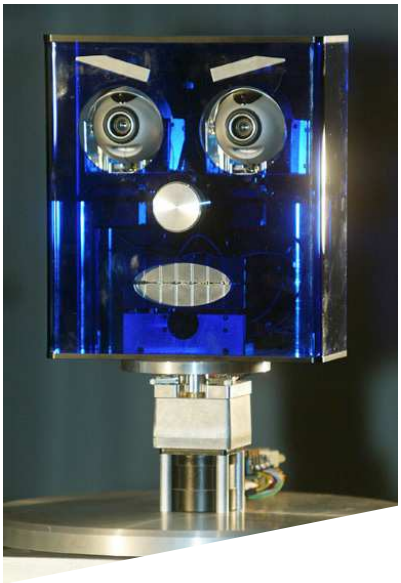
Systems Engineer, GEC Marconi Avionics

Graduate Software Engineering, Thomson Marconi Sonar Ltd

Computer Programmer, Bull Europe

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.



Entry Requirements

Applicants require a 1st or 2nd class honours degree in Computer Science or its equivalent. Candidate not holding 1st or 2nd class honours degrees may, under certain circumstances, be admitted to the Postgraduate Diploma. If their 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

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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