NETWORK SECURITY
MSc / PG Diploma

Full-Time / Part-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.

**Aim of Programme**

The aim of this MSc programme is to teach graduates with an IT background the theory, methods and tools of the art of computer network security. Students will acquire the principles and skills needed to elicit security requirements, analyse threats, formulate security policies, devise security regimes of mechanisms and services, deploy computer network security solutions and validate their effectiveness. They will also acquire detailed understanding and knowledge of contemporary issues in computer network security research areas.

**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.

Programme Structure

The first two semesters (September-May) are spent studying taught courses in computer network security and related subjects. 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 and write it up as a dissertation. The project enables further development and consolidation of skills introduced in taught courses, applying them to a challenging practical problem in computer network security.

The project is carried out under the supervision of an individual academic with expertise in the field. In some cases the project can be carried out in collaboration with an outside industrial or academic organisation.

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

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**SEMESTER 1 COURSES**

**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 tools and services for computer network security purposes.
- To give practical experience of analysing requirements, design, implementation and testing of security solutions for computer network applications.

**F29DC Data Communications and Networking**
- To provide core knowledge in data communications and computer networking.
- To understand the principles of the structure of the Internet.
- To study communications, protocols and services at various layers for computer networks.

**F21DL Data Mining and Machine Learning**
- To introduce the fundamental concepts and techniques used in machine learning.
- To develop a critical awareness of the appropriateness of different methods of machine learning.
- To provide familiarity with common applications such as data mining.

**F21SC Industrial Programming**
- To develop proficiency in the modern industrial programming languages C# and Python.
- To enable the elaboration and combination of system components in different languages.
- To enable flexible responses to changes in industrial practices.
- To enable participation by industrial practitioners to provide context and applicability.

**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 impart understanding of processes, standards and quality metrics supporting rigorous software engineering.

**B31TF Sensors, Actuators and IoT**
- To develop skills and knowledge of principles, practices and techniques related to sensing and actuation devices.
- To impart knowledge of theory and related techniques with Internet of Things technology and its applications.
- To develop understanding and skills in integrating such devices and their networking in the smart systems engineering of IoT applications.

**SEMESTER 2 COURSES**

**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 window-based systems and their development.

**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 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.

**F21BD Big Data Management**
- To review abstractions, methods and techniques for the management of large and complex data sets (“Big Data”).
- To develop an understanding of the foundations and tools of Semantic Web.
- To impart ability to appreciate critically a range of data integration solutions.

**F21DP Distributed and Parallel Technologies**
- To explore technologies and techniques underlying advanced distributed and parallel software development including distribution technologies, parallel program design and performance analysis.

**C11PA Project Management**
- To impart the knowledge and skills needed by a professional project manager.
- To develop competence in using quantitative and qualitative project planning and control tools and techniques.
- To enable recognition of the limitations and appropriateness of approaches to project management.
- To study project progression from strategy formulation to execution.
- To define the role and current issues faced by managers in project control.

**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 employability by development of job seeking and career planning skills.
Entry Requirements

Applicants require a first or second class honours degree or its overseas equivalent with a substantial academic component of computing or IT. 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.

Applicants needing sponsorship for a tier 4 visa to study in the UK via a CAS letter must satisfy the UK Borders Agency’s minimum English requirements. They are IELTS 5.5 in reading, writing, speaking and listening from an approved test centre.

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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