

MASTER OF SCIENCE IN COMPUTER SECURITY



MSc in Computer Security

The MSc in Computer Security provides a comprehensive approach to this growing field. Using a detailed, interdisciplinary approach, it examines the global threats to electronically stored and transmitted information, and the countermeasures that can be used against them.

Programme outline

Our MSc in Computer Security equips you with the depth of knowledge and range of skills required to handle the challenges of this fast-expanding area. It encompasses a wide variety of technologies and disciplines, including cryptography, forensics, network design and programming the internet, along with an examination of commercial and legal considerations that influence security policy.

Our international virtual classroom provides an ideal perspective from which to consider the global nature of security and confidentiality issues, offering a unique insight into threats and solutions across the world.

Core modules cover computer structures, professional issues, communication and networks, security engineering, computer forensics and programming the internet. You can then personalise your degree with two elective modules chosen from database analysis, software engineering, QA and testing, operating systems, Java programming, XML applications and e-commerce. You complete your degree with an original dissertation.

You should emerge with the technical and commercial expertise that will be increasingly in demand in today's information-dependent world. Your advanced, specialist qualification should provide the foundation for a senior career as a computer security expert in a dynamic global organisation.

Programme structure

The programme comprises eight modules (six required modules plus two electives chosen from six options), culminating in a dissertation.

The first module lasts nine weeks and incorporates a week-long introduction to both the programme and our online learning platform. Each of the other modules are eight weeks long.

Personalised study

Students can customise their degree according to their individual requirements.

A Core modules

- Computer structures
- Professional issues in computing
- Computer communications and networks
- Security engineering
- Computer forensics
- Programming the internet

B Elective modules

- Databases
- Software engineering
- Management of QA and software testing
- Object-oriented programming in Java
- Web XML applications
- E-commerce

C Dissertation

Students refine their dissertation topic in conjunction with their Personal Dissertation Advisor, an academic supervisor who will provide support throughout the study and writing process.

Programme duration

The programme takes, on average, 30 months to complete. However, since students progress at their own pace, you may choose to complete your studies in as little as 18 months or spread them over the six-year maximum.

MSc Modules

Core modules:

Computer structures

Aim: To provide a comprehensive overview of core software and hardware technologies.

This module covers everything from computer architecture to databases, algorithms, languages, operating systems, communications, computer networks, artificial intelligence and the theoretical foundations of computation. It will give you a sound theoretical and practical grounding on which to build your understanding of future technical developments.

Professional issues in computing

Aim: To provide a broad understanding of the social and legal context in which information technology operates.

This module examines the relationship between IT, society and the law. It helps develop an understanding of external matters affecting computer systems and organisations, provides an overview of professional and ethical issues and develops the skills required to manage systems in a way that is both effective and sensitive to their operating environment.

Computer communications and networks

Aim: To familiarise you with the principles and techniques of computer networks.

As the development of computer communications accelerates with the exponential growth of the internet, this module examines a growing range of hardware technology protocols and network applications. You will learn the principles of communication networks and protocol architectures, assessing the suitability of different switching and multiplexing techniques for carrying a variety of distributed systems.

Security engineering

Aim: To provide a grounding in the principles and practice of building secure distributed systems.

This module provides a foundation in the principles and practice of building secure distributed systems. You will discover how to protect systems against malicious attacks, using your understanding of technologies such as cryptology, software reliability, secure message transmission, tamper resistance, secure printing and auditing.

Computer forensics

Aim: To provide an extensive range of forensic techniques to determine the root causes of breaches in computer security.

As concern grows over identity theft and information security, this module explains how to identify, extract, document, interpret and preserve computer media as digital evidence and how to analyse the root cause of security breaches. It will give you an understanding of electronic media, crypto-literacy, data hiding, hostile code, and Windows™ and/or UNIX system forensics in the digital environment.

Programming the internet

Aim: To give you the theoretical and practical tools necessary for building advanced, content-rich internet sites.

This module covers markup languages and advanced technologies, including HTML, JavaScript, DHTML, CSS, XML and CGI. On completion, you will be able to design and create an advanced website and will be equipped to undertake complex internet projects.

Elective modules:

Databases

Aim: To equip you with a thorough understanding of the fundamental principles of database construction.

As already dominant database technology develops even further, you will analyse how data is stored, manipulated, queried (with an emphasis on relational databases) and backed up. You will also become acquainted with various paradigms and technologies (parallel as well as distributed) related to database design, implementation and maintenance.

Software engineering

Aim: To provide a firm theoretical foundation and practical skills in software engineering.

This module encompasses the theoretical foundation and practice of the three key phases of problem definition, software development and maintenance. It covers identification, definition, design, analysis, verification and management of basic requirements, coding, testing, evaluation and quality assurance. You will emerge equipped to lead a programming project and deliver products on time and within budget.

Management of QA and software testing

Aim: To provide an extensive understanding of how to guarantee software quality, including testing, maintenance and effective management.

This module provides the techniques you need to design and implement tests, conduct inspections and employ release and maintenance procedures. It also addresses key management aspects of the quality assurance process.

Object-oriented programming in Java

Aim: To provide a theoretical and practical understanding of object-oriented programming and design using Java.

This module develops the essential problem-solving and programming skills you need to write well structured object-oriented programs in Java. On the way you will explore many other important techniques (such as modern distributed systems and component technology) based on the concepts that have made object-oriented programming today's predominant software development method.

Web XML applications

Aim: To offer an overview of the uses of the XML language and its role in the next generation of e-business applications.

This module provides an understanding of core XML technologies, the standardised development environment they provide and their implications on future developments with internet applications. You will study XSL, databases and the information discovery and exchange standards, SOAP, WDSL, UDDI, and the use of XML for structuring data on the semantic web.

E-commerce

Aim: To provide an overview of key e-commerce issues.

This is an introduction to the fundamentals of e-commerce, from business models through technical infrastructure and implementation to social, legal and ethical considerations. You will act as a CIO/CEO working on an e-commerce business proposal, with evaluations from a peer review group. Learning to build an e-business holistically in a risk-free environment will help you become a more effective and successful manager.

Dissertation

Aim: To undertake a piece of original research to demonstrate your mastery and integration of knowledge you have acquired during the programme.

You choose your dissertation topic in conjunction with your personal dissertation advisor, an academic supervisor, who will provide support throughout the study and writing process. Your dissertation will apply your new knowledge and work experience and must have merit beyond the narrower scope of your particular need.