



**UNIVERSITY OF LONDON**  
External System

ACADEMIC EXCELLENCE SINCE 1858

**2010–2011**

MSc and Postgraduate Diploma in

# **Information Security**

by distance learning

[www.londonexternal.ac.uk/infosec](http://www.londonexternal.ac.uk/infosec)

Academic direction by:



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## Key dates

<b>Application deadline:</b>	31 May
<b>Registration deadline:</b>	31 July
<b>Course starts:</b>	September
<b>Examinations take place:</b>	May



## The award you receive

As an External student, you register with the University of London for a University of London award. The academic direction of your programme – including the syllabus, assessment, learning resources and, where given, academic support – is the responsibility of a particular College, or consortium of Colleges, of the University of London, known as the 'Lead College'. Royal Holloway is the 'Lead College' for the programmes in this prospectus.

When you graduate with a degree, diploma or certificate from the University of London you will be sent two documents – a final diploma (i.e. the parchment you receive on graduation) and a Diploma Supplement.

The final diploma will indicate that you were registered with the University of London and awarded a University of London degree, and give the name of the Lead College which conducted the examinations. The University of London logo and signature of the Vice-Chancellor of the University of London are incorporated. The Diploma Supplement will describe the nature, level and content of the programme you successfully completed and include a transcript of courses taken and marks achieved, as well as the overall classification. It also provides further information about the role of the Lead College and method of study. It explains that there is no difference between the standards of awards, whether they are obtained by External study, or face-to-face at a College of the University of London.

# The University of London and the External System

**Welcome** from Professor Jonathan Kydd, Dean, University of London External System and Sir Graeme Davies, Vice-Chancellor, University of London

For more than 150 years, the University through its External System has been offering degree programmes to students all over the world. It has always prided itself on being an international institution and its External System demonstrates this inclusive outlook. Today, it has 45,000 students in over 180 countries, bringing the University to you through flexible and distance learning.

As a family of world-class institutions, the University has a reputation for academic distinction in teaching and research, both in the UK and internationally. All programmes offered through the External System are developed by academics within the Colleges of the University. This ensures that our awards are recognised worldwide for their quality and value, and that students benefit from the academic



rigour and cutting-edge research undertaken within the Colleges.

Studying with the University of London is one of the greatest investments you can make in yourself. We look forward to welcoming you into our global community of students and wish you every success.

**The University of London** is one of the leading universities in Europe. Its world-class federation of 19 Colleges and a number of smaller specialist Institutes provides an unrivalled range of education opportunities of outstanding breadth and quality. Unique in its size, the federation includes specialised Colleges such as LSE, while others such as UCL are multi-faculty.

In 1858, with the establishment of its External System, the University

broke new ground by opening up its awards to those who either could not or did not wish to come to London to study. Academics who teach and assess campus-based students develop and write the study materials for all our programmes. They also set the exam papers and are responsible for marking the scripts.

Robust quality assurance mechanisms have been endorsed by the Quality Assurance Agency – the UK's independent body

for safeguarding the quality and standards of Higher Education. External students are examined to exactly the same standard as that required of students enrolled at the University's constituent Colleges. This principle of equivalency is enshrined in our Regulations: 'Candidates granted degrees and other awards shall have attained the same academic standard irrespective of mode or place of study or examination'.

# Academic direction: Royal Holloway, University of London

## A history of academic excellence

Royal Holloway enjoys an international reputation for the highest quality teaching and research across the sciences, arts and humanities.

The famous Founder's Building (pictured right) was officially opened by Queen Victoria in 1886. Since then, Royal Holloway has continued to grow in size and status, building on the excellence of its scholarship and the talents of its students.

Today, a combination of distinctive character, academic vision and membership of the University of London has established Royal Holloway among the top research-led university institutions in the country.



### **Royal Holloway Information Security Group (ISG)**

Royal Holloway, University of London, is home to the ISG, one of the largest academic security groups in the world. It brings together in a single institution expertise in

education, research and practice in the field of Information Security.

The ISG offers an active research environment. It has a thriving PhD community and offers world-leading Masters and Postgraduate Diploma programmes (campus-based and

online). The ISG also includes the Smart Card Centre of Excellence which it founded with Vodafone and Giesecke & Devrient. In recognition of its work, the ISG received a prestigious Queen's Anniversary Prize for Higher and Further Education.

# Welcome to a world-renowned programme



## An introduction from Professor Fred Piper

Director of External Relations, Information Security Group

Launched in 1992, Royal Holloway's MSc in Information Security was the first of its kind in the world. Since then, the number of degree programmes has grown rapidly, concentrating either on academic research or specific topics such as forensics. From the start, the Royal Holloway programme has covered the entire breadth of the subject: from the management of security, to computer crime, to cryptographic mechanisms and how they are used in the protection of computers and their networks.

Given our strength in depth across the programme and the active contribution of security professionals to its continuing review and development, we are uniquely well placed to maintain the programme's relevance within a fast-moving industry.

The content of the distance learning MSc, launched in 2003, is identical to that for campus-based students at Royal Holloway. Delivered online, you are fully supported by a Virtual Learning Environment through which you can interact with tutors

and fellow students worldwide. We look forward to welcoming you to our online security community.

**In acknowledgement of his major contributions to Information Security, Professor Fred Piper was elected to the InfoSecurity Europe 'Hall of Fame' in 2008. He has also been recognised as a Fellow of (ISC)<sup>2</sup>, the elite network of certified information security professionals.**

**'The online programme provided a means by which I could achieve my desire to study a subject of interest without having to give up my job. Not only have I been able to obtain an academic award of reputable standing, I've also been able to broaden my career prospects.'**

**Edem Okon, MSc Information Security graduate, Nigeria**



## Profile: Stuart Woolman | MSc Information Security, USA

'I have been working in the information systems world for around 12 years in a specialist area and I chose to study for the MSc in Information Security as I wanted to broaden my education base to provide some risk management against an unknown future.

It was important to me that the institution I was studying with was recognized as one of the best, and Royal Holloway University of London is recognized as one of the leading institutions in Information Security.

Juggling the family, work and study routine is a challenge, no question about it. My advice for anybody considering this route is to spend most of your energy focused on "this year" i.e. what you need to do now. If you think about the whole picture it is very easy to feel overwhelmed with the task at hand.

My only exposure to the information security area has been through the MSc, rather than my job, and I have just now attended my first Information Security supplier event. It made me realise just

how much I had learnt over the course of the MSc and how broad and relevant the subject material was. It had enabled me to understand in detail the technology that each vendor was showcasing and the pros and cons of each solution.'

**Stuart works as a Business Development Director in the USA.**



# Why study with us?



**'The subject areas [of the MSc dissertations] are amazing – ranging from security awareness and behaviour, fuzzy logic and resilient systems and testing, legal and law enforcement concerns, the behaviour and motivation of attackers, deep network security such as BGP-4, security architectures, poor coding and vulnerabilities etc. I am going to be busy for weeks giving justice to all the good work'.**

**Paul Dorey, Chairman of the Institute of Information Security Professionals and Visiting Professor, ISG**

## **Is the programme for you?**

Our students come from a variety of backgrounds, ranging from new graduates through to senior security managers seeking a formal qualification in Information Security. Graduates of the programme can be found in a range of organisations working as security professionals, from large financial institutions to technology and research-oriented organisations.

To ensure that the programme is completely up to date, several modules involve substantial input from internationally recognised information security experts. Furthermore, all academic staff have links with external organisations that are involved with information security and secure digital business.

In addition to the distance learning version, the programme is also available directly through Royal Holloway (full/part time, block mode, or as short courses for continuing professional development).

## **Flexible study**

Studying at a distance allows you a high degree of flexibility. Generally, you can study whenever, wherever and however you choose.

### **■ Fits your continuing professional development needs**

You can study for either a full MSc or Postgraduate Diploma, or choose to take any core modules for your continuing professional development.

### **■ Fits your lifestyle**

You can fit your study around family and work commitments.

### **■ Fits your finances**

Your overall costs are substantially lower than if you came to London to study full time. You will have no travel, relocation or accommodation costs.

### **■ Fits with your location**

You can study anywhere and choose where you sit your exams.

# Programme structure

## Structure

The **MSc** consists of **six modules** and a **Project**. The **Postgraduate Diploma** consists of **six modules**. The structure for each is shown below.

### Four compulsory core modules

- Security management
- An introduction to cryptography and security mechanisms
- Network security
- Computer security

### PLUS two optional modules chosen from:

- Secure electronic commerce and other applications
- Standards and evaluation criteria
- Advanced cryptography
- Database security
- Information crime
- Smart cards/tokens security and applications

### PLUS (MSc only)

- Project

There is an induction module for this programme available through our website. You are strongly advised to look at this for further details about learning materials and online support. Please visit: [http://bit.ly/infosec\\_induction](http://bit.ly/infosec_induction)

## Assessment

You do not have to come to London to sit your exams, as we have exam centres in more than 180 countries worldwide.

Modules are assessed by unseen written examinations in May each year. The assessment of the project will also include the submission of a written dissertation.

## David Lindsay Prize

The British Computer Society Information Security Specialist Group awards the David Lindsay Prize for the dissertation that best addresses innovative applications of Information Security. All MSc projects in the area of Information Security are eligible for the prize. The final decision is made by the British Computer Society Information Security Specialist Group.



## Time commitment

For individual modules, a reasonable expectation for study and exam preparation would be around 200 hours. For most students a reasonable expectation for completion of the programme in the minimum period would be to study 20 hours per week during the academic session (September-April). You have between 2-4 years to complete the MSc, and between 1-4 years to complete the Postgraduate Diploma.

# An innovative approach to learning

The programme is offered online and is fully supported by a Virtual Learning Environment (VLE). The VLE is like a virtual classroom that the University uses to deliver the content of the programme via the Internet. The VLE will allow you to:

- access your study materials
- take part in discussions/seminars with your tutor and other students
- receive notices, seminar dates, project support and other programme-related information
- ask questions regarding the administration of the programme
- seek help for technical problems that you may encounter.

## Study materials

When you register we will send you:

- a Student Handbook
- a copy of the Regulations
- a copy of *The Sciences Good Study Guide*
- Textbooks (for certain modules)
- CD-ROMs
- Password and username to allow you to log on to the VLE.

## Study support

The VLE enables you to communicate with tutors and other students from around the world, share insights and support each other in the distance learning process.

You will discuss topics in tutored groups. You will also be able to contribute to the conferencing 'discussion' at the times that suit you best. All contributions are stored so that you can make reflective and considered contributions. You are also able to print out a permanent record of all discussions on a particular topic within your tutor group.

Most subjects will include a variety of non-assessed coursework and you will be expected to participate in all the virtual seminars.

## Continuing Professional Education (CPE)

CPE credits are earned through activities related to the information security profession, including the completion of higher academic courses. All of the compulsory core modules are also available on a stand-alone basis for the purposes of CPE. On the successful completion of each module you will receive a University of London certificate.

Students who have completed the Postgraduate Diploma or MSc degree in Information Security may also register for any optional modules offered by the programme.

If you meet all the necessary entrance requirements you may later apply to register for the MSc and gain credits for the modules you have already passed.

**'A pioneering course that continues to provide students with the essential knowledge and understanding of information security, with many graduates going on to fill senior roles'.**

**Malcolm Marshall, Partner, KPMG**

# Module outlines

## **Security management**

This module will emphasise the need for good security management. Its aims are to identify the problems associated with security management and to show how various (major) organisations solve those problems.

## **An introduction to cryptography and security mechanisms**

The approach of this module is non-technical. The main objective is to introduce the students to the main types of cryptographic mechanism, to the security services which they can provide, and to their management, including key management. The mathematical content of this module is minimal. Support materials for the elementary mathematics needed for this module will be provided.

## **Network security**

This module is concerned with the protection of data transferred over commercial information networks, including computer and

telecommunications networks. After an initial brief study of current networking concepts, a variety of generic security technologies relevant to networks is studied, including user identification techniques, authentication protocols and key distribution mechanisms. This leads naturally to consideration of security solutions for a variety of types of practical networks, including LANs, WANs, proprietary computer networks, mobile networks and electronic mail.

## **Computer security**

This course deals with the more technical means of making a computing system secure. This process starts with defining the proper security requirements, which are usually stated as a security policy. Security models formalise those policies and may serve as a reference to check the correctness of an implementation. The main security features and mechanisms in operating systems will be examined as well as security-related issues of computer architecture. Specific well-known operating systems are then studied as

case studies. Other areas investigated include the security of middleware, software protection and web security.

## **Secure electronic commerce and other applications**

This module aims to put the role of security into perspective and demonstrate how it forms part of a security system within an application. The aim is to illustrate, usually by the use of case studies, how a particular situation may make certain aspects of security important and how an entire system might fit together.

## **Standards and evaluation criteria**

Over the last few years, a variety of security-related standards has been produced by international standards bodies. This module examines some of the most important of these standards in detail. In doing so it illustrates how international standards now cover many aspects of the analysis and design of secure systems. The material covered also puts certain other aspects of the

# Module outlines

degree course in a more structured setting. The module also covers existing security evaluation criteria, the current process for evaluating secure systems, and guidelines for managing IT security.

## Advanced cryptography

This module follows on from the introductory cryptography module. In that module cryptographic algorithms were introduced according to the properties they possessed and how they might fit into a larger security architecture. In this unit we look inside some of the most popular and widely deployed algorithms and we highlight design and cryptanalytic trends over the past twenty years. This course is, by necessity, somewhat mathematical and some basic mathematical techniques will be used. However, despite this reliance on mathematical techniques, the emphasis of the module is on understanding the more practical aspects of the performance and security of some of the most widely used cryptographic algorithms.

## Database security

This module covers several aspects of database security and the related subject of concurrency control in distributed databases. We will discuss methods for concurrency control and failure recovery in distributed databases and the interaction between those methods and security requirements. We will also examine how access control policies can be adapted to relational and object-oriented databases.

## Information crime

This module complements other modules by examining the subject from the criminal angle and presenting a study of computer crime and the computer criminal. We will discuss its history, causes, development and repression through studies of surveys, types of crime, legal measures, and system and human vulnerabilities. We will also examine the effects of computer crime through the experiences of victims and law enforcement and look at the motives and attitudes of hackers and other computer criminals.

## Smart cards/tokens security and application

This course will:

- provide an overview of smart cards/tokens and their properties
- introduce various applications that exploit smart cards/tokens
- examine benefits, threats and attacks
- consider systems for the development, manufacture and management of smart cards/tokens
- review smart card standards and security evaluation methodologies.

## Project (MSc only)

The project is a major individual piece of work. It can be of academic nature and aim at acquiring and demonstrating understanding and the ability to reason about some specific area of Information Security. Alternatively, the project work may document the ability to deal with a practical aspect of Information Security.

# Entrance requirements

## Academic

A second class honours degree or the equivalent, in a relevant discipline (eg. computer science, electronics, information systems, and mathematics) from a university or other institution acceptable to the University.

Alternatively, mature students with industrial experience will be considered and are encouraged to apply.

## AND

## English language

A high level of competence in English. You may be required to pass, or to have passed within the last three years, at the appropriate level, a test of proficiency in English acceptable to the University.

## Short courses

Students applying for Short courses should *normally* satisfy the entrance requirements for the MSc/Postgraduate Diploma. However, if you do not hold such qualifications, the University will still consider your application. Upon successful completion of two short courses, you will then be considered for entry to the Postgraduate Diploma or MSc degree programmes.



## Minimum PC specification

### Hardware requirement:

- Processor: Pentium 500
- Memory (RAM): 128Mb
- Operating System: Microsoft Windows 98 or above
- Free space on hard disk: 100Mb
- Screen resolution: 800x600, 16 bit colour
- CD/DVD-ROM drive: CD-ROM
- Graphics card: 4Mb
- Sound card and speakers

### Internet requirement:

- Modem speed: 56kbps
- Connection to ISP and email account
- Browser: Internet Explorer 6+ or Firefox 2+

### Software requirement:

- Adobe Acrobat Reader (download latest version free from [www.adobe.com](http://www.adobe.com))
- Flash Plug-in: Adobe Flash Player (download latest version free from [www.adobe.com/products/flashplayer](http://www.adobe.com/products/flashplayer))
- Real Player: RealOne Player (Basic) (download latest version free from: [www.uk.real.com](http://www.uk.real.com))
- A recent version of Microsoft Office or any compatible product such as Open Office (Word, PowerPoint, Excel and Access).

# Application and registration process

## How to apply and register

### Getting started

- For the **MSc and Postgraduate Diploma**, you can either apply online ([www.londonexternal.ac.uk/onlineapps/](http://www.londonexternal.ac.uk/onlineapps/)) or by post, using the application form which can be downloaded from the Information Security web pages ([www.londonexternal.ac.uk/forms/application\\_forms/info\\_security\\_af.pdf](http://www.londonexternal.ac.uk/forms/application_forms/info_security_af.pdf)). Please do NOT submit an online application and one by post. If you do, this will inevitably delay **both** applications.
- If you decide to apply online, please ensure you print off or refer to the 'Guidance notes for applications (Postgraduate)' ([www.londonexternal.ac.uk/forms/online\\_application\\_forms/guidance\\_notes.pdf](http://www.londonexternal.ac.uk/forms/online_application_forms/guidance_notes.pdf)) **before** you complete the online application.

\* **Please note:** as there is a limit to the number of students who can be registered each year, applicants who meet the entrance requirements will be given a conditional offer of registration. Registration will then only be confirmed on payment of the appropriate fee and if there is still a place available for that study year. A student whose registration is not confirmed will be made a conditional offer of registration for the following year.

### Stage 1

Complete and submit your application form by post as soon as possible, but no later than **31 May**, together with the accompanying documentation listed on the form, to:

The Postgraduate Admissions Office  
University of London  
External System  
Ground floor, Stewart House  
32 Russell Square  
London WC1B 5DN  
United Kingdom  
Tel: +44 (0)20 7664 4808  
Email: [postgraduate\\_admissions@london.ac.uk](mailto:postgraduate_admissions@london.ac.uk)

**Please note:** faxed applications will not be accepted.

### Stage 2

When we have received your application form, we will send you an acknowledgement and a student number. Please note that we allocate a student number to everyone who applies – it does not mean that you have been accepted onto the MSc degree, Postgraduate Diploma, or for a Short course. If you have not received an acknowledgement **within three weeks** of sending in your form, please contact the Postgraduate Admissions office with details of your full name, the programme for which you have applied and the date you posted your form.

### Stage 3

We will notify you whether or not you have been accepted.  
Note: applications will only be considered when we have received all the necessary documentation, including the references, where applicable.

### Stage 4

If you are accepted, you will be sent:

- an offer of registration
- a fee slip
- a registration form
- a copy of the Regulations.

### Stage 5

If you decide to register, you will need to complete your registration form and fee slip and return these, along with the appropriate fee, no later than **31 July\***.

### Stage 6

Study for the MSc degree and Postgraduate Diploma will commence in **September**.

# Fees and further information

The fees given below refer to the 2010-2011 academic year only and are subject to annual review. Fees may be paid in one of two ways:

## EITHER

On registration, a single payment covering the registration fee and all module fees:

**Total MSc degree** £13,687

**Total Postgraduate Diploma** £10,579

## OR

Pay the registration fee, plus the fee for each module you are taking in your first year. Then, in subsequent years, you pay the fee for each new module you take.

Registration fee	£1,207
Fee per module	£1,562
Project (MSc only)	£3,108

## Short courses

The cost of registering for an individual module of the degree is:

Per module: £1,769

**Please note:** If you are taking exams outside London you will have an additional fee to pay to your local examination centre (this fee will vary).

## Further information

For further information about the programmes listed in this leaflet, or any other programmes we offer, please contact us at:

The Information Centre  
University of London  
Stewart House  
32 Russell Square  
London WC1B 5DN  
United Kingdom

Tel: +44 (0)20 7862 8360/1/2  
Fax: +44 (0)20 7862 8358  
Email: [enquiries@london.ac.uk](mailto:enquiries@london.ac.uk)



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[www.facebook.com/uolexternalsystem](http://www.facebook.com/uolexternalsystem)



<http://twitter.com/londonu>



<http://londonexternal.wordpress.com/>  
(Student blog)



# UNIVERSITY OF LONDON

## External System

ACADEMIC EXCELLENCE SINCE 1858

The University of London offers a wide range of subjects for study at a distance; from full degree programmes to certificates and short courses. For further information on each programme please visit: [www.londonexternal.ac.uk/prospective\\_students](http://www.londonexternal.ac.uk/prospective_students)

### Undergraduate

- Accounting
- Accounting and Finance
- Accounting with Law
- Banking
- Banking and Finance
- Business
- Business Administration
- Classical Studies
- Computing and Information Systems
- Common Law
- Creative Computing
- Development and Economics
- Divinity
- Economics
- Economics and Finance
- Economics and Management
- English
- Finance
- Geography and Environment
- History
- Information Systems
- Information Systems and Management
- International Development
- International Relations
- Law
- Management
- Management with Law
- Mathematics
- Mathematics and Economics
- Philosophy
- Philosophy, Religion and Ethics
- Politics and International Relations
- Social Sciences
- Sociology
- Sociology with Law
- Theology

### Postgraduate

- Agricultural Economics
- Applied Educational Leadership and Management
- Applied Environmental Economics
- Banking
- Citizenship and History Education
- Clinical Trials
- Economic Policy
- Educational and Social Research
- Environmental Management
- Epidemiology
- Finance
- Finance and Financial Law
- Financial Sector Management
- Human Resource Management
- Infectious Diseases
- Information Security
- International Business
- International Management
- International Management (China)
- International Primary Health Care
- Law
- Livestock Health and Production
- Managing Rural Development
- Organizational Psychology
- Petroleum Geoscience
- Policy Studies
- Poverty Reduction: Policy and Practice
- Public Financial Management
- Public Health
- Public Management
- Public Policy and Management
- Quantitative Finance
- Sustainable Development
- Veterinary Epidemiology and Public Health