UNIVERSITY OF LONDON | INTERNATIONAL PROGRAMMES

Royal Holloway University of London

University of London International Academy
MSc/PG Dip in Information Security
Lead College – Royal Holloway

Network Security IYM003 (Core)

Aims

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 are 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.

Pre-requisites

None

Essential Reading

- Network Security Essentials: Applications and Standards (Stallings)
- Computer Networks & Internets (Comer).

Both included as study materials once registered on the course.

Assessment

This module is assessed by a two hour unseen written examination.

Learning Outcomes

At the end of the module students should have gained an understanding of the fundamentals of the provision of security in information networks, as well as an appreciation of some of the problems that arise in devising practical solutions to network security requirements.

Syllabus

Unit 1. Introductory Network Concepts and ISO 7498

This is the unit that provides the overview of the protocols that are used to communicate on computer networks. The second part of the unit focuses on ISO 7498-2, which defines standard security terminology and standard descriptions for security services and mechanisms

Unit 2. Introductory Network Security Concepts

This unit examines some common networking technologies. It also looks at network cabling, network hubs and switches, as well as some aspects of the TCP/IP protocol stack. It discusses the threats and possible safeguards associated with all of the above.

Unit 3. Biometric Technologies

This unit covers biometric technologies and their use as a generic mechanism for the verification of identity which is important for access control.

Unit 4. Introduction to Secure Protocols
This is the unit that introduces secure protocols and serves as a preliminary to the more complex protocols studied later in the module.

Unit 5. Secure Protocols and VPNs: IPSEC
In the first part of this unit we take a general look at Virtual Private Networks (VPNs); and in the rest of this unit we see how they can be implemented using IPSEC.

Unit 6. Secure Protocols and VPNs:TLS and SSH
We continue our study of secure protocols and implementing VPNs in this unit by looking at the TLS Transport Layer Security) and SSH (Secure Shell) protocols.

Unit 7. E-mail Security
This unit studies e-mail from the point of view of security. We first look at how e-mail works, then move on to the threats associated with and resulting from the use of e-mail. Finally, we compare and contrast two different technical "solutions" to the problem, as well as further measures that may be needed.

Unit 8. Wireless Networking
Wireless networks pose particular security problems of their own. In this unit we discuss the specific threats to wireless local area networks and consider the security services in the 802.11 suite of standards. Bluetooth personal wireless networking is also studied with respect to potential threats and safeguards

Unit 9. Firewalls
This unit is devoted to a discussion of one of the major items commonly used to implement a degree of network security - the firewall. There are several different types of firewall, and we examine their strengths and weaknesses, the ways in which they can be integrated into a network system, and some of the additional problems they can introduce.

Unit 10. Mobile Security: GSM
In this unit we discuss the security of mobile telecommunications in terms of GSM.

Unit 11. Intrusion Detection Systems
The final unit considers systems for the detection of intruders in network systems