



**Introduction to Computer Security &  
Networks  
CN0003**

**STUDENT HANDBOOK**

**2010 - 2011**



## 1 MODULE SUMMARY

Module Title	Introduction to Computer Security & Networks								
Module Leader	Gaurav Malik Room EB1.104, Email: gaurav@uel.ac.uk								
Module Team	Usman Naeem, Room EG.G.21, Email: usman@uel.ac.uk								
Module Value:	(20 Credits)								
Module level:	Level 0								
Pre Requisites	None								
Objectives	To provide fundamental knowledge and practical skills in the principals of Computer Security and Networks . The module will help students gain a sound foundation to build upon.								
Assessment	This unit will be assessed by an exam and lab based TCA.								
Schedule	<table> <tr> <td>Lectures</td> <td>24 hours</td> </tr> <tr> <td>Tutorials/practical/workshop</td> <td>24 hours</td> </tr> <tr> <td>Unsupervised directed study</td> <td>152 hours</td> </tr> <tr> <td>Total</td> <td>200 hours</td> </tr> </table>	Lectures	24 hours	Tutorials/practical/workshop	24 hours	Unsupervised directed study	152 hours	Total	200 hours
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Unsupervised directed study	152 hours								
Total	200 hours								
Essential Text	<p>Pastore, M &amp; Dulaney, E (2006). Security+ Study Guide. Indiana: Wiley Publishing Inc.</p> <p>Ciampa, M (2010), Security Awareness, Course Technology</p> <p>Blundell, B (2007), Computer Systems and Networks, London, Middlesex University Press</p>								



## 2. DESCRIPTION OF UNIT

To provide fundamental knowledge and practical skills in the principals of Computer Security and Networks . The module will help students gain a sound foundation to build upon.

***To achieve this unit a student must:***

- 1 Explore the main elements in a data communications system
- 2 Describe hardware and software used in data communications
- 3 Investigate computer networks and their development
4. Introduction to computer security
5. Role of computer security in a workplace.



### 3 LEARNING OUTCOMES AND ASSESSMENT CRITERIA

**At the end of this Module, students will:**

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**Knowledge**

- 1) *Identify the various parts (software and hardware) of a network system.*
- 2) *Differentiate between different kinds of network, network topologies and network operating systems.*
- 3) *Provide an overview of computer security and its application.*

**Thinking skills**

- 4) *Produce a coherent argument as to the advantages and disadvantages of using networks within an organisation*

**Subject-based practical skills**

- 5) *Install and configure a network card and client software*
- 6) *Use test equipment to troubleshoot network connectivity.*
- 7) *Configure and test a firewall.*

**Skills for life and work (general skills)**

- 8) *Be able to efficiently plan their work, demonstrate good time management.*



## 4. TEACHING AND LEARNING METHODS

This will consist of a mixture of lectures, supported by tutorials and practical sessions where students get the opportunity to put theory into practice.

## 5 ASSESSMENT APPROACH

Exam (LO 1,2,3) 50%

Laboratory Based Practical (LO 4,5,6,7,8) 50%



## 6. MODULE SCHEDULE

<b>Week</b>	<b>Lecture Topic</b>
1	Computing Fundamentals
2	Networking Fundamentals
3	Essential terms and concepts
4	The OSI Model
5	Major Network Operating Systems
6	The Internet and TCP\IP
7	Introduction to Security
8	Systems Threats and Risks
9	Operating Systems and security applications
10	Network Security
11	Environmental control and Disaster Recovery
12	Revision

## 7. LABS

**Labs are available at:**

<https://itacademy.microsoftlearning.com/>

**You need to enter the access code: 7315-CN0003-3599 (You only need this the first time.)**



## 8. LECTURE CONTENT

### Topic 1

Subject	Computing Fundamentals
Aims	To introduce students to the module and the concepts of computer systems.
Lecture Content	<ul style="list-style-type: none"><li>• What is a computer?</li><li>• The stored program model.</li><li>• Forms of computer hardware</li><li>• Basic computer operation.</li></ul>
Tutorial	Questions to test initial understanding of computer systems.
Lab Topic	<ul style="list-style-type: none"><li>• Course 5348: Installing Windows Vista on a New Computer</li></ul> <p>In this online course, you install and troubleshoot a clean installation of Windows Vista. In addition, you install and configure Windows Vista drivers.</p>
Learning Outcomes	On completion of this topic, students will be able to: <ul style="list-style-type: none"><li>• Identify the various parts (software and hardware) of a network system</li></ul>
Reading	Computer Systems and Networks, Blundell et al., Chapter 1  Computer System Architecture, Newman et al. Chapter 3



## Topic 2

Subject	Networking Fundamentals
Aims	To provide an introduction to computer communications & networking
Lecture Content	<ul style="list-style-type: none"><li>• Networking Elements</li><li>• Physical Topologies</li><li>• Physical Media</li></ul>
Tutorial	Questions to establish understanding of Computer Communications & Networking
Lab Topic	<ul style="list-style-type: none"><li>• Course 5353: Fundamentals of Windows Vista File Systems Process</li></ul> <p>In this online course, you explore the fundamentals of the Windows file systems including disks, partitions, and file system features. It also includes a treatment of NTFS security (SACLS, DACLS), compression, encryption, and attribute behavior. These fundamental concepts are reinforced in a virtual machine-based lab where you convert a disk from basic to dynamic, create and manage partitions, secure and compress NTFS files, and enable Windows BitLocker Drive Encryption.</p>
Learning Outcomes	On completion of this topic, students will be able to: <ul style="list-style-type: none"><li>• Identify the various parts (software and hardware) of a network system</li></ul>
Reading	Computer Systems and Networks, Blundell et al., Chapter 9, 10



**Topic 3**

Subject	Essential terms and concepts
Aims	To introduce the students to network applications and application protocols
Lecture Content	<ul style="list-style-type: none"><li>• Computer communications and networking models</li><li>• Communication service methods and data transmission modes</li><li>• Analog and digital communications</li><li>• Speed and capacity of a communications channel</li><li>• Multiplexing and switching</li></ul>
Tutorial	Discussion based tutorial on network applications and application protocols
Lab Topic	<ul style="list-style-type: none"><li>• Course 5358: Configuring and Troubleshooting Windows Vista Networking</li></ul> <p>In this online course, you build upon your fundamental knowledge of networking to configure and troubleshoot networking in Windows Vista including DHCP, VPN, and wireless networking. In addition, you learn public to private network switching, and Remote Desktop.</p>
Learning Outcomes	On completion of this topic, students will be able to: <ul style="list-style-type: none"><li>• Identify the various parts (software and hardware) of a network system</li></ul>
Reading	Computer Systems and Networks, Blundell et al., Chapter 9, 10



**Topic 4**

Subject	Introducing the OSI Model
Aims	To introduce students to the OSI model.
Lecture Content	<ul style="list-style-type: none"><li>• The OSI Lower Layers</li><li>• The OSI Middle Layers</li><li>• The OSI Upper Layers</li></ul>
Tutorial	Questions to test understanding of the OSI model..
Lab Topic	<ul style="list-style-type: none"><li>• Course 5382: Troubleshooting Networking Problems in Windows Vista</li></ul> <p>In this online course, you troubleshoot home networking issues in Windows Vista. This includes Internet connectivity, wireless networking, connection sharing, and small computer networks.</p>
Learning Outcomes	On completion of this topic, students will be able to: <ul style="list-style-type: none"><li>• Identify the various parts (software and hardware) of a network system</li></ul>
Reading	Computer Systems and Networks, Blundell et al., Chapter 9, 10



<b>Topic 5</b>
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Subject	Introduction to Network Operating Systems
Aims	To introduce students to network operating systems.
Lecture Content	<ul style="list-style-type: none"><li>• Novell NetWare</li><li>• Windows Networks</li><li>• Other Operating Systems</li><li>• Client-server computing</li><li>• Network Attached Storage</li></ul>
Tutorial	Questions to test understanding of network operating systems.
Lab Topic	<ul style="list-style-type: none"><li>• Introduction to Linux</li></ul>
Learning Outcomes	On completion of this topic, students will be able to: <ul style="list-style-type: none"><li>• Identify the various parts (software and hardware) of a network system</li></ul>
Reading	Computer Systems and Networks, Blundell et al., Chapter 8



<b>Topic 6</b>
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Subject	The Internet and TCP/IP
Aims	To enable the student to appreciate the role of The Internet and TCP/IP
Lecture Content	<ul style="list-style-type: none"> <li>• What is the Internet</li> <li>• Internet History</li> <li>• Internet Administration</li> <li>• What is TCP/IP</li> <li>• TCP/IP's Transport and Network layer protocols</li> <li>• IP Addresses</li> <li>• IP v6</li> <li>• TCP/IP Application Level Protocols</li> </ul>
Tutorial	Discussion based tutorial on the Internet and TCP/IP
Lab Topics	<ul style="list-style-type: none"> <li>• Course 5355: Fundamentals of Windows Vista TCP/IP Connectivity</li> </ul> <p>In this online course, you explore the fundamentals of TCP/IP connectivity from a Windows Vista client perspective. You learn the basics of LAN/WAN, routing, and network connectivity. These basics are strengthened with technical depth on MAC address, ARP, IP unicast/broadcast/multicast, class and classless IP addresses, public/private addresses, default gateway, and routing tables. It also includes a treatment of Wireless, DHCP, and IPv6. These fundamental concepts are reinforced in a virtual lab where you capture a network trace and analyze the packets, use utilities including ARP, ping, ipconfig, and netstat, and configure a client IP address.</p>
Learning Outcomes	On completion of this topic, students will be able to:



	<ul style="list-style-type: none"><li>• Differentiate between different kinds of network, network topologies and network operating systems.</li><li>• Install and configure a network card and client software</li></ul>
Reading	Computer Systems and Networks, Blundell et al., Chapter 11



**Topic 7**

Subject	Introduction to Security
Aims	To provide an overview of computer security and its application.
Lecture Content	<ul style="list-style-type: none"><li>• Challenges of securing information</li><li>• The importance of information security</li><li>• Types of attackers that are common today</li><li>• The five steps in a defence</li></ul>
Tutorial	Discussion based tutorial on security issues
Labs	<ul style="list-style-type: none"><li>• Course 5357: Fundamentals of Windows Vista Security</li></ul> <p>In this online course, you explore the fundamentals of security in Windows Vista. You learn the basics of authentication, authorization, securing objects, and setting permissions. These basics are strengthened with technical depth on Kerberos, split access tokens, Access Control Lists, elevated privileges, and User Account Control. It also includes a treatment of NTFS and share permissions, certificates, and user rights. These fundamental concepts are reinforced in a virtual lab where you use icacls to verify and modify DACLs, use RunAs for elevated privileges, and use Kerbtray to view Kerberos tickets and troubleshoot access issues.</p>
Learning Outcomes	On completion of this topic, students will be able to: <ul style="list-style-type: none"><li>• Define information security and explain why it is important</li><li>• Describe the five steps in a defence</li></ul>
Reading	Security Awareness, Chapter 1



<b>Topic 8</b>
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Subject	Systems Threats and Risks
Aims	To examine the threats and risks that a computer system faces today.
Lecture Content	<ul style="list-style-type: none"><li>• Software based attacks</li><li>• Hardware based attacks</li><li>• Attacks on Virtualised Systems</li></ul>
Tutorial	Discussion based tutorial on systems threats and risks
Labs	<ul style="list-style-type: none"><li>• Course 5359: Configuring and Troubleshooting Windows Vista Security</li></ul> <p>In this online course, you build upon your fundamental knowledge of security to configure and troubleshoot security in Windows Vista including User Account Control, Windows Defender, and Windows Firewall. In addition, you configure certificates and public and private network settings, and secure the desktop.</p>
Learning Outcomes	On completion of this topic, students will be able to: <ul style="list-style-type: none"><li>• Describe the different types of software-based attacks and hardware attacks</li><li>• Define virtualization and explain how attackers are targeting virtual systems</li></ul>
Reading	Security Awareness, Chapter 2 and additional resources



## Topic 9

Subject	Operating Systems and security applications
Aims	To examine the steps for protecting systems.
Lecture Content	<ul style="list-style-type: none"><li>• Operating systems Features</li><li>• Hardening the operating systems</li><li>• Preventing attacks that target the Web Browser</li><li>• Applying software security applications</li></ul>
Tutorial	Discussion based tutorial
Labs	<ul style="list-style-type: none"><li>• Lab9 CN0003 Worksheet: Research Firewalls</li></ul>
Learning Outcomes	On completion of this topic, students will be able to: <ul style="list-style-type: none"><li>• Explain how to harden operating systems</li><li>• List ways to prevent attacks through a Web browser</li><li>• Describe various software security applications</li></ul>
Reading	Recommended Web Sites



**Topic 10**

Subject	Network Security
Aims	To give students an overview of network security
Lecture Content	<ul style="list-style-type: none"><li>• Network vulnerabilities</li><li>• Categories of network attacks</li><li>• Methods of network attacks</li><li>• Crafting a Secure Network</li><li>• Network Security devices</li></ul>
Tutorial	Questions to test understanding of Network security requirements.
Labs	<ul style="list-style-type: none"><li>• Course 5383: Fundamentals of Windows Vista Security Attacks</li></ul> <p>In this online course, you learn, in depth, the fundamentals of security attacks in relation to Windows Vista. This includes attacks from viruses, worms, trojans, root kits, spyware, and phishing. This also helps prepare you for certification exam 70-623</p>
Learning Outcomes	On completion of this topic, students will be able to: <ul style="list-style-type: none"><li>• Explain the types of network vulnerabilities</li><li>• List categories of network attacks</li><li>• Explain how to enhance security through network design</li><li>• Explain how network Security devices can be used</li></ul>
Reading	Security Awareness, Chapter 3 and 4 and additional resources



**Topic 11**

Subject	Environmental control and Disaster Recovery
Aims	To introduce students to the concepts of Enterprise Security
Lecture Content	<ul style="list-style-type: none"><li>• Environmental controls</li><li>• Disaster recovery procedures</li><li>• Incident response procedures</li><li>• Organizational Security Policies</li></ul>
Tutorial	Questions to test initial understanding of Enterprise security.
Labs	<ul style="list-style-type: none"><li>• Course 5384: Protecting Against and Removing Malicious Software on Windows Vista</li></ul> <p>In this online course, you protect against and remove malicious software on Windows Vista. This includes advanced techniques for detecting and removing malicious software. This also helps prepare you for certification exam 70-623.</p>
Learning Outcomes	On completion of this topic, students will be able to: <ul style="list-style-type: none"><li>• Explain critical importance of business continuity and Produce a coherent argument as to the advantages and disadvantages of using networks within an organisation</li></ul>
Reading	<ul style="list-style-type: none"><li>• Security Awareness, Chapter 6</li></ul>



<b>Topic 12</b>
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Subject	Revision lecture
Aims	To prepare students for exam
Lecture Content	<ul style="list-style-type: none"><li>• Important topics</li><li>• Exam techniques.</li></ul>
Tutorial	N/A
Labs	<ul style="list-style-type: none"><li>• Assessment</li></ul>