

Module Code:	COM436
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Module Title:	Fundamentals of Networks and Security
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Level:	4	Credit Value:	20
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Cost Centre(s):	GACP	<u>JACS3</u> code:	I120
		<u>HECoS</u> code:	100365

Faculty:	Arts, Science and Technology	Module Leader:	Dr. Paul Comerford
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Scheduled learning and teaching hours	36 hrs
Guided independent study	164 hrs
Placement	0 hrs
Module duration (total hours)	200 hrs

Programme(s) in which to be offered (not including exit awards)	Core	Option
BSc (Hons) Computer Networks and Security	✓	<input type="checkbox"/>
BSc (Hons) Computer Networks and Security (with industrial placement)	✓	<input type="checkbox"/>
BSc (Hons) Cyber Security	✓	<input type="checkbox"/>
BSc (Hons) Cyber Security (with industrial placement)	✓	<input type="checkbox"/>

Pre-requisites
None

Office use only

Initial approval: 30/08/2018

Version no:1

With effect from: 01/09/2018

Date and details of revision: APSC approved 03/04/19 revision to programmes list

Version no:2

Module Aims

This module introduces the architecture, structure, functions, components, and models of the Internet and other computer networks. It uses the OSI and TCP layered models to examine the nature and roles of protocols and services at the application, network, data link, and physical layers. The principles and structure of ipv4 and ipv6 addressing and the fundamentals of Ethernet concepts, media, and operations are introduced to provide a foundation for the curriculum. Routing protocols are used to introduce the concept of internet routing. Labs use a “model Internet” to allow students to analyse real data without affecting production networks. Packet Tracer (PT) activities help students analyse protocol and network operation and build small networks in a simulated environment. At the end of the module, students build simple LAN topologies by applying basic principles of cabling; performing basic configurations of network devices, including routers and switches; and implementing IP addressing schemes.

Intended Learning Outcomes

Key skills for employability

- KS1 Written, oral and media communication skills
- KS2 Leadership, team working and networking skills
- KS3 Opportunity, creativity and problem solving skills
- KS4 Information technology skills and digital literacy
- KS5 Information management skills
- KS6 Research skills
- KS7 Intercultural and sustainability skills
- KS8 Career management skills
- KS9 Learning to learn (managing personal and professional development, self-management)
- KS10 Numeracy

At the end of this module, students will be able to		Key Skills	
1	Describe the principles of Open Systems networking	KS1	KS4
		KS5	KS6
2	Analyse the operations and features of the protocols and services used in modern computer networking	KS1	KS3
		KS4	KS5
		KS6	
3	Calculate and apply ipv4 and ipv6 addresses in a small network	KS3	KS4
		KS10	
4	Explain the role of technologies utilised in the infrastructure of the internet	KS1	KS2
		KS3	KS4
		KS5	KS6
5	Design, plan and build a simple network involving LAN and WAN technologies	KS2	KS3
		KS4	KS10

Transferable skills and other attributes

- Personal motivation, organisation and time management
- Ability to collaborate and plan
- Written and verbal communication skills
- Research and analytical skills

Derogations

N/A

Assessment:**Indicative Assessment Tasks:**

Assignment 1 requires students to investigate a topic relevant to the fundamentals of computer networks and security and demonstrate their knowledge and understanding. This will require them to conduct their own information finding, management and self-learning skills, with the support from the module tutor(s).

The in-class test will be a time-constrained, practical test, where students will be typically required to configure a small-scale computer network in response to a brief or scenario. They will be expected to test it to ensure its functionality meets the specification.

Assessment number	Learning Outcomes to be met	Type of assessment	Weighting (%)	Duration (if exam)	Word count (or equivalent if appropriate)
1	2, 3, 4, 5	Coursework	50%	N/A	2,000
2	1, 2, 4	In-class test	50%	N/A	2 hours

Learning and Teaching Strategies:

The module will be delivered through a combination of formal lectures, tutorials, practical demonstrations and labs. Students will have access to lecture materials, and ancillary resources, via the University's VLE platform.

Syllabus outline:

OSI Network Protocols and Communications in particular the TCP/IP model
Physical network design including Ethernet and Wan technologies
IP Networks Addressing including ipv4 & ipv6
Introduction to Switched Networks
Basic Switching Concepts and Configuration
Static Routing and Dynamic Routing within a single domain
Single-Area OSPF
Convergence to IP networking

Indicative Bibliography:
Essential reading
Irving, P. (2010), <i>Computer Networks</i> . 3rd ed. Colchester: Lexden Publishing Odom, W. (2016), <i>CCNA Routing and Switching 200-125 Official Cert Guide</i> . Indianapolis: Cisco Press. Stallings, W. (2015), <i>Computer Organization and Architecture: Designing for Performance</i> . 10th ed. Boston: Pearson.
Other indicative reading
N/A