



Title:	Networking Fundamentals APPROVED	
Long Title:	Networking Fundamentals	
Module Code:	COMP6027	
Duration:	1 Semester	
Credits:	5	
NFQ Level:	Fundamental	
Field of Study:	Computer Science	
Valid From:	Semester 1 - 2017/18 (September 2017)	
Module Delivered in	6 programme(s)	
Next Review Date:	November 2021	
Module Coordinator:	Sean McSweeney	
Module Author:	Donna OShea	
Module Description:	This module introduces students to the fundamentals of networking. On completion of this module the student will understand how protocols work together to achieve data communications and the lifecycle of a packet as it traverses a computer network. As part of this, a computer network, its architecture, protocol stacks and the process of data segmentation and encapsulation are introduced. In addition, the principles and structure of Internet Protocol (IP) addressing and sub-networking are explored with students building and configuring a basic network as well as utilising common network utilities.	
Learning Outcomes		
<i>On successful completion of this module the learner will be able to:</i>		
LO1	Outline the architecture of a network and how the various components work together to achieve data communications.	
LO2	Describe how protocols handle data communications in a network and verify through the use of network utilities.	
LO3	Explain the role and function of the layers that form part of a specified protocol stack such as TCP/IP and how these layers work together to support applications such as the Web etc.	
LO4	Calculate subnet masks and addresses to fulfil design requirements.	
LO5	Build a simple network using routers and switches and perform basic configuration, verification and troubleshooting.	
Pre-requisite learning		
Module Recommendations		
<i>This is prior learning (or a practical skill) that is strongly recommended before enrolment in this module. You may enrol in this module if you have not acquired the recommended learning but you will have considerable difficulty in passing (i.e. achieving the learning outcomes of) the module. While the prior learning is expressed as named CIT module(s) it also allows for learning (in another module or modules) which is equivalent to the learning specified in the named module(s).</i>		
12702	COMP6027	Networking Fundamentals
Incompatible Modules		
<i>These are modules which have learning outcomes that are too similar to the learning outcomes of this module. You may not earn additional credit for the same learning and therefore you may not enrol in this module if you have successfully completed any modules in the incompatible list.</i>		
12702	COMP6027	Networking Fundamentals
Co-requisite Modules		
No Co-requisite modules listed		

Requirements

This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed. You may not enrol on this module if you have not acquired the learning specified in this section.

No requirements listed

Module Content & Assessment

Indicative Content

Introduction to Networks

Networks – history, architecture, function. Network architecture – hosts, clients, and servers. Network components – routers, switches, bridges. Network Types – LANs, MANs, WLANs and WANs. Internet, Ethernet, Extranet and Intranet.

Network Protocols & Communications

Communication fundamentals -rules, encoding/decoding principles, message formatting, segmentation and encapsulation. Protocols suites – TCP/IP, OSI reference model. Data transfer – data encapsulation and de-encapsulation. Tools, such as Packet Tracer and others to verify operation of communications.

Network Protocol Stack

Physical layer and network media. Data link Protocols – Logical Link Control and Media Access Control. Ethernet - CSMA/CD. Network Layer and routing principles. Transport Layer – TCP and UDP. ARP. ICMP. Application layer protocols and examples – DHCP, DNS, HTTP, SMTP etc

Addressing & Subnetting

IPv4/v6 addressing, gateways, binary, subnet masks, unicast/broadcast/multicast, public/private; representation, types; configuration, verification; ICMP. Designing an addressing scheme including address assignment. Variable Length Subnet Masks (VLSM).

Network Configuration & Troubleshooting

Configuration and testing of a basic network (end user devices, switches and routers). Appropriate use of utilities and commands (ping, tracer, ipconfig, arp) to discover, verify and troubleshoot network configuration and performance.

Assessment Breakdown	%
Course Work	50.00%
End of Module Formal Examination	50.00%

Course Work

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Short Answer Questions	This assessment will evaluate the students knowledge on the basics of networking and the fundamentals of data communication in a network.	1,3	10.0	Week 6
Other	This assessment will evaluate the students ongoing work in the lab using networking tools and equipment.	1,2,3,5	10.0	Every Week
Practical/Skills Evaluation	In this exam the student will be expected to configure hosts in the network and establish basic communications between the hosts.	5	30.0	Week 12

End of Module Formal Examination

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Formal Exam	End of Semester Formal Exam	1,2,3,4,5	50.0	End-of-Semester

Reassessment Requirement

Repeat examination

Reassessment of this module will consist of a repeat examination. It is possible that there will also be a requirement to be reassessed in a coursework element.

The institute reserves the right to alter the nature and timings of assessment

Module Workload

Workload: Full Time				
<i>Workload Type</i>	<i>Workload Description</i>	<i>Hours</i>	<i>Frequency</i>	<i>Average Weekly Learner Workload</i>
Lecture	Lecture underpinning learning outcomes.	2.0	Every Week	2.00
Lab	Lab supporting content delivered in class.	2.0	Every Week	2.00
Independent & Directed Learning (Non-contact)	Independent study.	3.0	Every Week	3.00
Total Hours				7.00
Total Weekly Learner Workload				7.00
Total Weekly Contact Hours				4.00

Workload: Part Time				
<i>Workload Type</i>	<i>Workload Description</i>	<i>Hours</i>	<i>Frequency</i>	<i>Average Weekly Learner Workload</i>
Lecture	Lecture underpinning learning outcomes.	2.0	Every Week	2.00
Lab	Lab supporting content delivered in class.	2.0	Every Week	2.00
Independent & Directed Learning (Non-contact)	Independent Study.	3.0	Every Week	3.00
Total Hours				7.00
Total Weekly Learner Workload				7.00
Total Weekly Contact Hours				4.00

Module Resources

Recommended Book Resources

- Cisco Networking Academy 2016, *Introduction to Networks v6 Companion Guide*, 1st Ed., Cisco Press [ISBN: 9781587133602]
- Jim Kurose and Keith Ross 2013, *Computer Networking: A Top-Down Approach*, 6th Ed., Pearson [ISBN: 9780132856201]

Supplementary Book Resources

- Al Anderson and Ryan Benedetti 2009, *Head First Networking*, O' Reilly Media [ISBN: 9780596521554]

This module does not have any article/paper resources

Other Resources

- Online Curriculum: *Module support material is available on-line for registered students*
<http://www.netacad.com>
- Netlab: *Virtual Environment*
<http://netlab.cit.ie>

Module Delivered in

Programme Code	Programme	Semester	Delivery
CR_KSDEV_8	<u>Bachelor of Science (Honours) in Software Development</u>	2	Mandatory
CR_KDNET_8	<u>Bachelor of Science (Honours) in Computer Systems</u>	2	Mandatory
CR_KITMN_8	<u>Bachelor of Science (Honours) in IT Management</u>	2	Mandatory
CR_KITSP_7	<u>Bachelor of Science in Information Technology</u>	2	Mandatory
CR_KCOMP_7	<u>Bachelor of Science in Software Development</u>	2	Mandatory
CR_KCOME_6	<u>Higher Certificate in Science in Software Development</u>	2	Mandatory