Module Title:	Computer Networks 2
Language of Instruction:	English

Credits:	5

NFQ Level:	7

Module Delivered In	3 programme(s)

Teaching & Learning Strategies:	The module will be delivered using lectures, tutorials and laboratory sessions to illustrate the concepts under study. The Institutes VLE will be used to evaluate the students understanding of these concepts at the end of each section using multiple choice questions. Self test question sheets will be issued to the students at the end of each section.

Module Aim:	To provide a study of Local Area Networks (LANs) and Wide Area Networks (WANs) in an IPv6 environment. This module provides opportunities for students to gain the skills and hands-on experience needed to design and test enterprise LANs and WANs using copper, fibre and wireless media.

Learning Outcomes	
On successful completion of this module the learner should be able to:	
LO1	Terminate, test and perform energy budget calculations for fibre optic communication links
LO2	Configure and secure 802.11x wireless networks.
LO3	Configure, test and secure industry standard enterprise layer 2 and layer 3 devices in both IPv4 and IPv6 enviromnents.
LO4	Use industry standard tools to verify correct operation and/or fault find a network

Pre-requisite learning
Module Recommendations   *This is prior learning (or a practical skill) that is recommended before enrolment in this module.*
No recommendations listed
Incompatible Modules   *These are modules which have learning outcomes that are too similar to the learning outcomes of this module.*
No incompatible modules listed
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.*
No requirements listed

Module Content & Assessment

Indicative Content

1. Fibre optic communication links
Types of fibre optic cable. Transmitter and Receiver types. Terminating and splicing fibres. Calculating the link budget to include dispersion penalities.

2. IEEE 802.11x networks.
Requirement for CSMA/CA. Point Coordination Function (PCF) operation. Distributed Coordination Function (DCF) operation. Securing 802.11. Operation of 802.11ac and 802.11ax

3. IPv6
Structure and operation of IPv6. Configure an industry standard router to use IPv6. IPv4 to IPv6 transition strategies.

4. Routers
Configure LAN and WAN interfaces. Use HDLC and PPP encapsulation on WAN interfaces. Password recovery. Debug HDLC and PPP operation.

5. Routing Protocols
Describe and contrast RIP, OSPF and EIGRP routing protocols. Configure, verify and trouble shoot RIP, OSPF and EIGRP.

6. Congestion control and Quality of service (QoS)
Describe and contrast open and closed loop congestion control mechanisms. Describe and contrast Differentiated Services (DiffServ) and Integrated Services (IntServ) Quality of Service architectures.

8. Access Control Lists (ACL's)
Configure, apply and test standard and extended ACL's based on the networks filtering requirements.

9. Dynamic Host Configuration (DHCP)
Configure and trouble shoot a DHCP server on a layer 3 device for IPv4 and IPv6 operation.

10. Virtual Private Networks (VPN's)
IPSec: Encapsulating Security Payload (ESP), Authentication Header (AH), Internet Key Exchange (IKE). Configure and test IPSec VPN's.

Assessment Breakdown	%
Continuous Assessment	40.00%
Practical	20.00%
End of Module Formal Examination	40.00%

Continuous Assessment

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Examination	Students will sit a written examination or complete MCQ's at the end of each major section during the module.	1,2,3,4	40.00	n/a

No Project

Practical

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Practical/Skills Evaluation	Students will complete practical assignments and practical exams. Students will submit written reports on assignments.	1,2,3,4	20.00	n/a

End of Module Formal Examination

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Formal Exam	A written examination or a MCQ examination at the end of the module will examine the extent of the student's knowledge of the learning outcomes	1,2,3,4	40.00	End-of-Semester

SETU Carlow Campus reserves the right to alter the nature and timings of assessment

Module Workload

Workload: Full Time		
Workload Type	*Frequency*	*Average Weekly Learner Workload*
Lecture	Every Week	3.00
Practicals	Every Week	2.00
Independent Learning Time	Every Week	2.00
	Total Hours	7.00

Module Delivered In

Programme Code	Programme	Semester	Delivery
CW_EESYS_B	Bachelor of Engineering (Honours) in Electronic Engineering	6	Elective
CW_EEROB_B	Bachelor of Engineering (Honours) in Robotics and Automated Systems	6	Elective
CW_EEROO_D	Bachelor of Engineering in Robotics and Automated Systems	6	Mandatory

Programme Code	Programme	Semester	Delivery
	Bachelor of Engineering (Honours) in Electronic Engineering	6	
	Bachelor of Engineering (Honours) in Robotics and Automated Systems	6	