

<b>Module Title:</b>	Computer Networks II
<b>Language of Instruction:</b>	English
<b>Credits:</b>	5
<b>NFQ Level:</b>	8
<b>Module Delivered In</b>	No Programmes
<b>Teaching &amp; Learning Strategies:</b>	Teaching will take the form of lectures and problem-based learning during tutorials and practical classes where appropriate. Students will be directed to appropriate websites to participate in self assessment examinations.
<b>Module Aim:</b>	This module provides opportunities for students to gain the skills and hands-on experience needed to design, configure and test computer networks in small-to-medium sized businesses, as well as enterprise and service provider environments.

Learning Outcomes	
<i>On successful completion of this module the learner should be able to:</i>	
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 layer 3 devices.
LO4	Use industry standard tools to verify correct operation and/or fault find a network

Pre-requisite learning	
<b>Module Recommendations</b> <i>This is prior learning (or a practical skill) that is recommended before enrolment in this module.</i>	
No recommendations listed	
<b>Incompatible Modules</b> <i>These are modules which have learning outcomes that are too similar to the learning outcomes of this module.</i>	
No incompatible modules listed	
<b>Co-requisite Modules</b>	
No Co-requisite modules listed	
<b>Requirements</b> <i>This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed.</i>	
Computer Networks I year 3 or equivalent.	

## 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 penalties.

#### 2. IEEE 802.11x networks.

Requirement for CSMA/CA. Point Coordination Function (PCF) operation. Distributed Coordination Function (DCF) operation. Securing 802.11.

#### 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.

#### 7. Network Address Translation and Port Address Translation

Configure and test NAT and PAT for given network requirements.

#### 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.

#### 11. Network management

Network management with SNMP, configure SNMP access on a router, enable SNMP traps.

Assessment Breakdown	%
Continuous Assessment	25.00%
Practical	15.00%
End of Module Formal Examination	60.00%

### 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	25.00	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.	1,2,3,4	15.00	n/a

### End of Module Formal Examination

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Formal Exam	A written examination, at the end of the module, will examine the extent of the student's knowledge of the learning outcomes	1,2,3	60.00	End-of-Semester

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

**Module Workload**

<b>Workload: Full Time</b>		
<i>Workload Type</i>	<i>Frequency</i>	<i>Average Weekly Learner Workload</i>
Lecture	Every Week	1.00
Practicals	Every Week	1.00
Tutorial	Every Week	0.50
Independent Learning Time	Every Week	1.50
Total Hours		4.00

