MODULE **DESCRIPTOR**

MODULE TITLE	Introduction to Networking		
MODULE CODE	CO1507 (L4)	**CREDIT VALUE**	20 credits / 10 ECTS
SCHOOL	SCHOOL OF SCIENCE		

MODULE **AIMS**

Networks are a key part of most computer systems. This module will introduce students to the fundamentals of networking and networked systems and develop the understanding they need to investigate relevant computer network standards and protocols. Both practical skills and knowledge of theory are required to create a network for a particular business scenario. Students will apply the appropriate theory through practical work on setting up and configuring a computer network.

The module aims are:

1. To enable students to gain knowledge and understanding of the fundamentals of data communications and computer networks.
2. To provide students with the necessary skills and experience to set-up and configure a Local Area Network
3. To equip students with knowledge necessary to choose the right media and connectivity devices for a particular network situation.
4. To foster problem-solving skills through hands-on experience in a laboratory environment that mimics real life scenarios.

MODULE **CONTENT**

Numbering System
Binary, hex, and decimal conversion

Networking Media
Twisted pair UTP, fibre optic, wireless

Networking devices
Network Interface Card NIC, switch, router, wireless AP

Network addressing
IP address, subnet mask, default gateway

Error Control
CRC

Network standards and protocols
OSI model, TCP/IP model, IP, TCP, UDP protocols
Address resolution Protocol ARP

Local Area Networks LANs
Topology, Access methods, Ethernet, CSMA/CD
Peer-to-peer networking and client/server model

Wide Area Networks WANs
Coverage, Internet

Network Address Translation NAT
Private IP addressing
Home networking
Networking over power

Proxy/VPN/Tor
P2P filesharing

Introduction to Linux operating systems
Linux commands, Linux/ Windows communication

Switching methods
Circuit switching, packet switching

Wireless communication
Standards, IEEE802.11a/b/g/n/ac
Wired vs. wireless
Challenges – interference, limitations, speed, security, site survey

INTENDED **LEARNING OUTCOMES**

On successful completion of this module a student will be able to:

1. Justify the choice of appropriate hardware and software for a local area network for a particular scenario
2. Use appropriate network addressing to setup a local network
3. Explain the various components of the TCP/IP protocol suite and its associated utilities.
4. Use and compare Windows and Linux in the context of computer networks
5 Explain a range of networking concepts, problems and solutions

TEACHING METHODS

This module will provide students with necessary theoretical knowledge through lecture sessions. Tutorials will be used as 'question and answer' sessions to expand on the lectures and provide help on a group or a one-to-one basis. Practical sessions will be used to complement the lectures and tutorials by carrying out relevant practical exercises. Students will be encouraged to make full use of external learning resources, such as the Web, magazines, and other published materials.

The intention is that the module will give the students the practical and theoretical knowledge they need to select the appropriate hardware and software to setup a local area network that is suitable for a particular scenario. Make use of Windows and Linux operating systems to setup a local area network.

Students will take a practical assessment, which consists of hands on practical element followed by written questions that are relevant to the practical part.

A final written examination that covers all the material taught during the year.

There will be a series of lab worksheets and tutorial sessions that will re-enforce the theoretical material presented in lectures.

ASSESSMENT METHODS

This module is assessed through a Practical activity (50%) and a written examination (50%).