

Module Code	Pre-requisite Module codes	Co-Requisite Modules code(s)	ISCED Code	Subject Code	ECTS Credits	NFQ Level (CPD)#
CMPU 2002	CMPU1109				10	6
Module Title	Computer Communications and Networking					

Computer Communications and Networking

School Responsible:	School of Computing
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Module Overview:

This module extends the student's understanding of the internal architecture of a computer and examines the interaction between standalone computers and between computers and communications systems. It introduces the student to the various layers of the ISO OSI and TCP/IP reference models, the concepts of switching networks and a

variety of network topologies. This provides the basis for introducing internetworking and the associated technologies. Essentially the course extends from basic computer interconnectivity at a local level through to interconnectivity at a global level. At each level the concepts and standards behind the predominant technologies are examined.

The aims of this module are to:

- Provide students with an understanding of transmission signals, transmission media and their characteristics, system and signal bandwidth, channel capacity, data encoding techniques, communication system interfaces and the problems associated with computer-to-computer communications and how they are addressed.
- Provide students with an understanding of circuit and packet switched networks, Local Area Network (LAN) and Wide Area Network (WAN) technologies including wired and wireless networks, network interconnection with repeaters, bridges, and switches, internetworking architecture and associated communication protocols and protocol suites.

Learning Outcomes (LO):

On Completion of this module, the learner will be able to

1	Describe the different types of transmissions signals used for computer communications.
2	Explain the difference between system and signal bandwidth.
3	Describe the physical properties and performance characteristics of a variety of communication media.
4	Describe and evaluate digital and analogue data encoding techniques.

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5	Describe the basic building blocks associated with communications systems and their associated tasks.
6	Describe the concepts behind switching networks.
7	Describe and evaluate the predominant LAN and WAN technologies.
8	Describe network extendibility and interconnection technologies.
9	Describe the components associated with internetworking architectures.
10	Describe and evaluate routing concepts and techniques.
11	Describe protocol addressing, error handling and congestion control on an internetwork.
12	Describe the functionality associated with the upper layers (above the Physical and Data Link layers) of the ISO OSI and TCP/IP Reference Model

Indicative Syllabus:

Transmission Signals and Systems

- Signalling concepts
- Bandwidth concepts
- The relationship between bandwidth and data rates

Transmission Media

- Characteristics of guided and unguided transmission media
- Transmission impairments and how they are addressed
- Channel Capacity

Data encoding

- Digital and analogue signals and systems
- Digital and analogue encoding techniques

Synchronous/Asynchronous Transmission

- Timing problems
- Framing

Data Link Tasks

- Flow Control techniques
- Error Detection and Error Control techniques
- Predominant data link protocols

Communication Systems architecture

- Multiplexing concepts
- Carrier systems

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<ul style="list-style-type: none"> • Communication system building blocks • System interface concepts and standards • Fixed and wireless communications systems <p>Switching Networks</p> <ul style="list-style-type: none"> • Circuit switching concepts, operation and routing • Packet switching concepts, operation and routing <p>LAN and WAN</p> <ul style="list-style-type: none"> • Concepts, topologies and operation • Protocol architecture • Medium Access Control techniques • Extending and interconnecting LANs • Wireless technologies • Addressing <p>Internetworking</p> <ul style="list-style-type: none"> • Universal interconnection • Architecture components • Protocol addressing • Datagram encapsulation and fragmentation • Congestion control and error handling • The TCP/IP internet protocol suite • Internet application programs • The ISO OSI and TCP/IP models in context

Learning and Teaching Methods:	
The course delivery involves a combination of lectures and labs which may incorporate the use of blended learning techniques as appropriate throughout the delivery.	
Total Teaching Contact Hours	39
Total Self-Directed Learning Hours	148

Module Delivery Duration:
This module is delivered over one semester

Assessment

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Assessment Type	Weighting (%)	LO Assessment (No.)
Final Exam	70	1-12
In class examination	30	1-12
Module Specific Assessment Arrangements (if applicable)		
(a) Derogations from General Assessment Regulations		
(b) Module Assessment Thresholds		
(c) Special Repeat Assessment Arrangements		

Essential Reading: (author, date, title, publisher)
<ul style="list-style-type: none"> • Data Communications and Networking,(2012) 5th edition, Behrouz A. Forouzan. McGraw-Hill International Edition. • Data and Computer Communications, 8th edition. William Stallings. Prentice Hall • Computer Networks, 5th edition, Andrew Tanenbaum. Prentice Hall

Version No:		Amended By	
Commencement Date		Associated Programme Codes	

Modules that are to be offered as Stand-Alone CPD Programmes must have an NFQ level assigned

*Details of the assessment schedule should be contained in the student handbook for the programme stage.

Date of Academic Council approval

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