

MODULE 15	NETWORKS AND DATA COMMUNICATIONS	
COURSE CODE	BSCH-3-1-09	
STATUS	Core	
ASSESSMENT	Continuous Assessment	40%
	Examination	60%

Aims

This module provides you with an understanding and appreciation of the concepts involved in communications techniques and provides you with an in-depth understanding of computer networking. It also provides you with an understanding of different networking standards. The module will cover some of the protocols commonly found in modern networks and how their operation relates to the OSI and TCP/IP model.

Learning Outcomes

Upon successful completion of this module, you should be able to:

1. compare and contrast digital and analogue signalling
2. explain how data may be modulated using different modulation techniques
3. discuss the synchronisation methods of data transmission
4. evaluate and select appropriate network topologies and communication's media
5. identify and explain the operation of network devices
6. describe the main communications principles
7. explain the operation of network hardware and network protocols and how they relate to the OSI and TCP/IP models
8. install and configure a Local Area Network and successfully administer said LAN.

Indicative Content

Topic	Description
Introduction to Networks and Communications	<p>Communications model.</p> <p>Network definition: Goals and applications;</p> <p>Classification of Networks: WAN's & LAN's</p> <p>Circuit & Packet switching techniques.</p>
Network Standard Models	<p>Standards Organisations.</p> <p>ISO/OSI Reference Model. Overview of services and function of each layer;</p> <p>TCP/IP model overview;</p>
Data Transmission	<p>Terminology & periodic signals.</p> <p>Frequency Domain concepts.</p> <p>Signal strength: power & Decibels.</p> <p>Analogue & digital signals.</p> <p>Transmission impairments.</p> <p>Modulation techniques.</p>
Data Communications Interface	<p>Synchronous vs. Asynchronous</p> <p>Simplex / Half Duplex / Full Duplex</p>
Transmission Media	<p>Guided: Twisted pair, coaxial, fibre optic</p> <p>Unguided: Wireless, Infrared</p>
Local Area Networks	<p>Network topologies.</p> <p>Media access control: TDM, Polling, Token passing & CSMA/CD.</p> <p>LAN devices- Repeaters, Hubs, Bridges & Switches.</p> <p>LAN protocols: IEEE 802 series: 802.3 and 802.5;</p> <p>Types of servers: File, print, database, web servers;</p> <p>Network models: Peer to Peer and Client/Server models;</p>

Introduction to Internetwork Protocols	Data Link Layer: Framing, MAC addressing, error and flow control; Basic IP addressing and basic IP fragmentation. Routing concepts: Static & dynamic Transport protocols: TCP & UDP
Wireless Networks and Security	Basic wireless propagation; antennas, modulation, cellular and other wireless networks. Access; Measurements; Security and Privacy
Practical Case Studies	Practical hands on the job installation and configuration a one or more class of a LAN.