MODULE 25	ADVANCED NETWORK THEORY	
CREDIT POINTS	7.5	
STATUS	Core	
ASSESSMENT	Continuous Assessment	40%
	Examination	60 %
TOTAL CONTACT HOURS: 60		
Lecture: 36	Practical: 24	
Tutorial:	Other:	
TOTAL STUDENT EFFORT: 150		

Aims

This module provides you with a detailed understanding and appreciation of the different networking standards and protocols. The module will cover the different protocols commonly found and will focus on available WAN technologies. The module will also cover network management and security issues.

Learning Outcomes

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

1. present a technical description of the networking infrastructure and protocols upon which modern computing systems depend
2. technically describe the range of WAN technologies available
3. understand the detailed error detection techniques used in communication systems
4. understand the detailed routing techniques for data through data networks
5. recognize congestion problems and implement congestion controls
6. implement through programming a simple communication system functionality or protocol
7. make informed decisions on the construction and development of computer communication systems, networks and internets

Indicative Content

Topic	Description
Introduction to Networks	ISO/OSI Reference Model and the TCP/IP standard.

	LAN review : Topologies and media. Network devices: Repeaters, Hubs, Bridges, Switches, Routers and Front gates.
LAN Protocols	Ethernet 802.3/u/z, 802.5 Token Ring Wireless: 802.11a/b/g
WAN switching	Communication Switching techniques in data networks.
WAN Protocols overview	PPP, ISDN, X.25, xDSL, Frame Relay & ATM
TCP/IP	Services, Handshaking and Flow control.
Internetworking Protocols	ARP, RARP, ICMP & DNS
Routing	Addressing, subnetting & Routers Static/dynamic routing. Routing algorithms: Distance Vector routing and Link state routing algorithms. Dijkstra's Algorithm. Real routing examples: RIP, OSPF, BGP
Applications	FTP, TFTP, Telnet, HTTP, SMTP & POP3
Network Management	MIB, SNMP, SMI. ASN overview.
Introduction to Network Security	Access Control: Firewalls: Packet Filters & Application gateways. Tunnelling concepts Attacks & Counter measures Security Examples: SSL & IPSec. Encryption systems.
Future	IP v6, VOIP & Bluetooth.

Developments	