

Module Details	
Module Title	Computer Communications and Networks
Module Code	COS5025-B
Academic Year	2024/5
Credits	20
School	School of Computer Science, AI and Electronics
FHEQ Level	FHEQ Level 5

Contact Hours	
Type	Hours
Directed Study	152
Laboratories	24
Lectures	24

Availability	
Occurrence	Location / Period
BDA	University of Bradford / Semester 2

Module Aims
<p>Understanding the fundamental concepts of computer networks, how they are designed and how data communication take place in computer networks will enable students to design computer networks and help them to understand and troubleshoot issues associated with computer networking. This module is part of computer science undergraduate programmes that provide students with a sound grounding in the fundamentals of computer science, software development (programming) and the tools and applications that modern computer scientists use to provide solution to complex problems in diverse application areas.</p> <p>In this module, students will be introduced to the core concepts of computer networking including network architecture and topologies, data communication with computer networks at different levels and applications, and network security. They will be provided with the opportunity to use state-of-the-art tools to develop practical skills in network design and performance evaluation.</p>

Outline Syllabus
(1) Internetworking and the Internet (2) Protocol Architecture (3) Network Topology (4) LAN and W-LAN (5) High-Speed LANs (6) Data Transmission (7) Signal Encoding Techniques (8) Data Link Control (9): Multiple Access Protocols (10) Network Layer (11) Subnetting (12) Routing (13) Transport Layer (14) Application Layer (15) Principles of network security.

Learning Outcomes	
Outcome Number	Description
01	Explain the function of data, signals and the different media used for data communication, signal encoding, and multiplexing; data transmission with data link and transport protocols. Outline the common problems with data transmission. Explain typical computer network topologies and their components by modelling and evaluating their performance in the laboratory. Understand principles of network security.
02	Explain typical computer network topologies and their components by modelling and evaluating their performance in the laboratory.
03	Design, develop, analyse and monitor communication networks.
04	Understand principles of network security, including basic knowledge of the fundamentals of cryptography such as symmetric/asymmetric encryption, digital signatures, hash functions, securing e-mail, and securing TCP connections.
05	Demonstrate analytical and problem-solving skills.

Learning, Teaching and Assessment Strategy
<p>Information outlining the theoretical aspects of computer communication and networking and different underlying technologies will be delivered via lectures.</p> <p>Practical lab sessions will provide them with the opportunity to gain hands-on experience with network design and performance analysis using state-of-the-art tools. During the lab sessions, students will work individually and they will transfer the concepts, principles &amp; theories explored in formal lectures into practically designing computer networks and analysing their performance. Oral feedback will be given during laboratory sessions. Students will also be expected to read and explore a variety of Internet and text resources, together with elementary practical work in directed study hours.</p> <p>Practical understanding and skills to the knowledge base of the module will be tested through a computer-based lab test.</p> <p>Theoretical knowledge of different aspects associated with computer communication and networking will be assessed through a closed book exam.</p>

Mode of Assessment			
Type	Method	Description	Weighting
Summative	Examination - Closed Book	A timed on campus examination (2 Hrs)	50%
Summative	Computerised examination	An on-campus computer-based assessment.	50%

Reading List
To access the reading list for this module, please visit <a href="https://bradford.rl.talis.com/index.html">https://bradford.rl.talis.com/index.html</a>

Please note:

*This module descriptor has been published in advance of the academic year to which it applies. Every effort has been made to ensure that the information is accurate at the time of publication, but minor changes may occur given the interval between publishing and commencement of teaching. Upon commencement of the module, students will receive a handbook with further detail about the module and any changes will be discussed and/or communicated at this point.*

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