Unit Outline (Higher Education)

Institute / School:	Institute of Innovation, Science & Sustainability
Unit Title:	NETWORK ARCHITECTURE AND DESIGN
Unit ID:	ITECH2301
Credit Points:	15.00
Prerequisite(s):	(ITECH1102)
Co-requisite(s):	Nil
Exclusion(s):	Nil
ASCED:	020103

Description of the Unit:

This unit will provide students with an understanding of the network technologies and protocols for distributed computing environments and equip them with skills necessary for computer network design. The unit covers computer communications and networking incorporating Local Area Networks (LANs), Metropolitan Area Networks (MANs) and Wide Area Networks (WANs) together with the underlying network protocols that form the backbone of todays Internet. It also covers the Quality of Service (QoS) requirements of different types of applications and how network protocols handle QoS issues.

Grade Scheme: Graded (HD, D, C, P, MF, F, XF)

Work Experience:

No work experience: Student is not undertaking work experience in industry.

Placement Component: No

Supplementary Assessment: Yes

Where supplementary assessment is available a student must have failed overall in the Unit but gained a final mark of 45 per cent or above, has completed all major assessment tasks (including all sub-components where a task has multiple parts) as specified in the Unit Description and is not eligible for any other form of supplementary assessment

Course Level:

Level of Unit in Course	AQF Level of Course					
	5	**6**	**7**	**8**	**9**	**10**
Introductory	☐	☐	☐	☐	☐	☐
Intermediate	☐	☐	✔	☐	☐	☐
Advanced	☐	☐	☐	☐	☐	☐

Learning Outcomes:

Knowledge:

K1. Illustrate the network architecture for open systems interconnection.

K2. Present the operation of the TCP/IP architecture and software defined network architecture.

K3. Explain the technologies and protocols of network and transport layers.

K4. Examine the technologies and architecture of LANs, Wireless LANs and WANs.

K5. Determine the principles of LAN design and software defined WAN.

Skills:

S1. Analyse data communication and networking technologies in today's Internet.

S2. Analyse the Quality of Service (QoS) requirements of applications and identify protocols supporting them.

Application of knowledge and skills:

A1. Analyse and design LAN architecture and software defined WAN for organisational requirements.

A2. Apply the knowledge acquired in this unit to improve networking performance of an organisation.

Unit Content:

Topics may include:

- Introduction to the Open System Interconnection (OSI) reference model and TCP/IP protocol architecture;

- Local Area Network overview - topologies, components and Ethernet architecture;

- Wireless LAN operation and standards;

- LAN design issues and practical considerations;

- Network layer protocols - IP operation and internetworking;

- Transport layer protocols - process to process delivery, UDP and TCP;

- QoS requirements for applications - resource reservation protocols and differentiated services in IP.

- Software Defined Network (SDN) architecture - netorking planes, SDN environments and ecosystems and OpenFlow.

- Software Defined WAN (SD-WAN) - Architecture, solutions, SD-WAN cloud and AI-driven SD-WAN.

FEDTASKS

Federation University Federation recognises that students require key transferable employability skills to prepare them for their future workplace and society. FEDTASKS (**T**ransferable **A**ttributes **S**kills and **K**nowledge) provide a targeted focus on five key transferable Attributes, Skills, and Knowledge that are be embedded within curriculum, developed gradually towards successful measures and interlinked with cross-discipline and Co-operative Learning opportunities. *One or more FEDTASK, transferable Attributes, Skills or Knowledge must be evident in the specified learning outcomes and assessment for each FedUni Unit, and all must be directly assessed in each Course.*

FEDTASK attribute and descriptor		Development and acquisition of FEDTASKS in the Unit	
		Learning Outcomes (KSA)	Assessment task (AT#)
FEDTASK 1 Interpersonal	Students will demonstrate the ability to effectively communicate, interact and work with others both individually and in groups. Students will be required to display skills in-person and/or online in: • Using effective verbal and non-verbal communication • Listening for meaning and influencing via active listening • Showing empathy for others • Negotiating and demonstrating conflict resolution skills • Working respectfully in cross-cultural and diverse teams.	Not applicable	Not applicable
FEDTASK 2 Leadership	Students will demonstrate the ability to apply professional skills and behaviours in leading others. Students will be required to display skills in: • Creating a collegial environment • Showing self -awareness and the ability to self-reflect • Inspiring and convincing others • Making informed decisions • Displaying initiative	Not applicable	Not applicable
FEDTASK 3 Critical Thinking and Creativity	Students will demonstrate an ability to work in complexity and ambiguity using the imagination to create new ideas. Students will be required to display skills in: • Reflecting critically • Evaluating ideas, concepts and information • Considering alternative perspectives to refine ideas • Challenging conventional thinking to clarify concepts • Forming creative solutions in problem solving	A1, A2	AT2
FEDTASK 4 Digital Literacy	Students will demonstrate the ability to work fluently across a range of tools, platforms and applications to achieve a range of tasks. Students will be required to display skills in: • Finding, evaluating, managing, curating, organising and sharing digital information • Collating, managing, accessing and using digital data securely • Receiving and responding to messages in a range of digital media • Contributing actively to digital teams and working groups • Participating in and benefiting from digital learning opportunities	K3, K4, K5, S1, A1, A2	AT1, AT2

FEDTASK attribute and descriptor		Development and acquisition of FEDTASKS in the Unit	
		Learning Outcomes (KSA)	Assessment task (AT#)
FEDTASK 5 Sustainable and Ethical Mindset	Students will demonstrate the ability to consider and assess the consequences and impact of ideas and actions in enacting ethical and sustainable decisions. Students will be required to display skills in: • Making informed judgments that consider the impact of devising solutions in global economic environmental and societal contexts • Committing to social responsibility as a professional and a citizen • Evaluating ethical, socially responsible and/or sustainable challenges and generating and articulating responses • Embracing lifelong, life-wide and life-deep learning to be open to diverse others • Implementing required actions to foster sustainability in their professional and personal life.	Not applicable	Not applicable

Learning Task and Assessment:

Learning Outcomes Assessed	Assessment Tasks	Assessment Type	Weighting
K1, K2, K3, K4, K5, S1, S2	Engage with tutorial and laboratory exercises to scaffold assignment work.	Demonstration of completion	10 - 20%
A1, A2	Conduct analysis and propose solutions to business problems using networking technologies. Design Local Area Networks (LAN)/Software Defined WAN architectures..	Assignments	50 - 70%
K1, K2, K3, K4, S2, A2	Assessment tasks will test students' understanding and knowledge of the fundamental of networking, industry standards and best practice.	Examination / Tests	10 - 30%

Adopted Reference Style:

APA

Refer to the library website for more information

Fed Cite - referencing tool