

# Unit Outline (Higher Education)

**Institute / School:** Institute of Innovation, Science & Sustainability

**Unit Title:** Connected Systems

**Unit ID:** ITECH1504

**Credit Points:** 15.00

**Prerequisite(s):** Nil

**Co-requisite(s):** Nil

**Exclusion(s):** (GPSIT1104 and ITECH1104 and ITECH2201)

**ASCED:** 029999

**Description of the Unit:**

This unit provides a comprehensive understanding of computer networking principles through analysis of the Open System Interconnection (OSI) and Internet networking models, essential cloud technologies, and Internet of Things (IoT) concepts. Students will learn about network architectures, protocols, and devices alongside an introduction to cloud computing and its integration with IoT systems. Through theoretical lectures, hands-on labs, and real-world case studies, students will develop the necessary skills to design, simulate, implement, and manage basic interconnected systems in the digital age.

**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	<input type="checkbox"/>	<input type="checkbox"/>	✓	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Intermediate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Advanced	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### Learning Outcomes:

#### Knowledge:

- K1.** Explain the components of network architecture including infrastructure, frameworks, protocols, and topologies.
- K2.** Describe the functionality and role of different operating systems contributing to interconnected systems communications.
- K3.** Explain cloud computing concepts, including cloud infrastructure components, service and deployment models, and visualisation technologies.
- K4.** Describe IoT architecture, components, communication protocols and applications.
- K5.** Identify the role of mobile networks, sensor networks and data acquisition in connected systems.

#### Skills:

- S1.** Examine and configure network settings on various network devices and operating systems.
- S2.** Provision and manage cloud environments including servicing, resourcing, and infrastructure.
- S3.** Undertake simulation IoT systems using open-source software tools.

#### Application of knowledge and skills:

- A1.** Analyse the networking architecture needs of a business or an organisation.
- A2.** Applying cloud computing and IoT skills to provision resources, deploy applications, test and manage data storage in line with industry needs.

#### Unit Content:

Topics may include:

- Introduction to data communications networks, network models and protocol architecture.
- IP addresses, subnet masks and the number systems used to describe them.
- Fundamentals of TCP/IP layer architectures and common Internet-based applications.
- Functions of data link layer, media access control, data link layer addressing, flow and error control mechanisms, and data link protocols.
- Network layer protocols: Internet Protocol (IP), assigning IP addresses, address resolution, and routing protocols.
- Transport layer protocols: Transmission Control Protocol (TCP) and User Datagram Protocol (UDP) transport layer functions, reliable and unreliable services, ports, linking to the application layer, segmentation, and session management.
- Transmission media and their characteristics, guided and wireless media, media selection, digital and analog transmission of digital and analog data.
- Introduction to Local Area Networks (LAN), LAN components, Ethernet and Token Ring, LAN design consideration, Wireless LAN, and Wide Area Networks (WAN).
- Definition and characteristics of cloud computing
- Cloud service models: Infrastructure as a Service (IaaS), Platform as a Service (PaaS), Software as a Service (SaaS)
- Cloud deployment models: Public, private, hybrid, community clouds

- IoT architecture and components overview
- IoT communication protocols: MQTT and CoAP
- Sensor networks and data acquisition in IoT systems
- Cloud-based IoT platforms and services
- Data storage and processing in cloud environments
- IT and related industry activity and research developments in the local community and around the globe; ACS's CBOK and SFIA and their relationship with the networking industry; and career pathways.

## 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**tttributes **S**kills and **K**nowledge) provide a targeted focus on five key transferable Attributes, Skills, and Knowledge that are 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	<p>Students will demonstrate the ability to effectively communicate, inter-act and work with others both individually and in groups. Students will be required to display skills in-person and/or online in:</p> <ul style="list-style-type: none"> <li>• Using effective verbal and non-verbal communication</li> <li>• Listening for meaning and influencing via active listening</li> <li>• Showing empathy for others</li> <li>• Negotiating and demonstrating conflict resolution skills</li> <li>• Working respectfully in cross-cultural and diverse teams.</li> </ul>	Not applicable	Not applicable
FEDTASK 2 Leadership	<p>Students will demonstrate the ability to apply professional skills and behaviours in leading others. Students will be required to display skills in:</p> <ul style="list-style-type: none"> <li>• Creating a collegial environment</li> <li>• Showing self-awareness and the ability to self-reflect</li> <li>• Inspiring and convincing others</li> <li>• Making informed decisions</li> <li>• Displaying initiative</li> </ul>	Not applicable	Not applicable

FEDTASK attribute and descriptor		Development and acquisition of FEDTASKS in the Unit	
		Learning Outcomes (KSA)	Assessment task (AT#)
FEDTASK 3 Critical Thinking and Creativity	<p>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:</p> <ul style="list-style-type: none"> <li>• Reflecting critically</li> <li>• Evaluating ideas, concepts and information</li> <li>• Considering alternative perspectives to refine ideas</li> <li>• Challenging conventional thinking to clarify concepts</li> <li>• Forming creative solutions in problem solving.</li> </ul>	S2,S4, A1,A3	AT1,AT2
FEDTASK 4 Digital Literacy	<p>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:</p> <ul style="list-style-type: none"> <li>• Finding, evaluating, managing, curating, organising and sharing digital information</li> <li>• Collating, managing, accessing and using digital data securely</li> <li>• Receiving and responding to messages in a range of digital media</li> <li>• Contributing actively to digital teams and working groups</li> <li>• Participating in and benefiting from digital learning opportunities.</li> </ul>	S2,S4	AT1
FEDTASK 5 Sustainable and Ethical Mindset	<p>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:</p> <ul style="list-style-type: none"> <li>• Making informed judgments that consider the impact of devising solutions in global economic environmental and societal contexts</li> <li>• Committing to social responsibility as a professional and a citizen</li> <li>• Evaluating ethical, socially responsible and/or sustainable challenges and generating and articulating responses</li> <li>• Embracing lifelong, life-wide and life-deep learning to be open to diverse others</li> <li>• Implementing required actions to foster sustainability in their professional and personal life.</li> </ul>	A2	AT1, AT2

### Learning Task and Assessment:

Learning Outcomes Assessed	Assessment Tasks	Assessment Type	Weighting
K1, K2, K3, K5, S1, S3, A1, A2	Students will utilise their knowledge of networking protocols, IoT systems and cloud computing techniques to answer conceptual questions and apply their understanding to practical interconnected systems problems.	Assignments and laboratory tasks	40% - 60%
K1, K3, K5, S1,S2,S3, A2	Practical problems designed to test their understanding of networking concepts and protocols in the lab.	Practical lab work	10% - 30%
K1,K2,K3, K4, K5, S1, A1	Students will provide theoretical answers and work out solutions to a range of networking and security questions.	Final Examination	20% - 40%

**Adopted Reference Style:**

IEEE

Refer to the [library website](#) for more information

Fed Cite - [referencing tool](#)