



# Course Outline (Higher Education)

<b>Institute / School:</b>	Institute of Innovation, Science, and Sustainability
<b>Course Title:</b>	DIGITAL COMMUNICATION PRINCIPLES
<b>Course ID:</b>	ENGIN3104
<b>Credit Points:</b>	15.00
<b>Prerequisite(s):</b>	ENGIN2102 (Signals and Systems)
<b>Co-requisite(s):</b>	Nil
<b>Exclusion(s):</b>	Nil
<b>ASCED:</b>	031301

**Description of the Course:**

This course facilitates learning and understanding of the fundamental signal processing and modulation concepts and methods that underpin wired and wireless digital communications systems. The course illustrates basic building blocks of a digital communication system (channel encoder / decoder, digital modulator / demodulator and channel characteristics). The focus is on mathematical underpinnings of communications theory along with links to real life industry applications.

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

**Placement Component:** No

**Supplementary Assessment:** Yes

Where supplementary assessment is available a student must have failed overall in the course but gained a final mark of 45 per cent or above and submitted all major assessment tasks.

**Program Level:**

Level of course in Program	AQF Level of Program					
	5	6	7	8	9	10
Introductory						
Intermediate						
Advanced			✓			

**Learning Outcomes:**

**Knowledge:**

- K1.** Recognise common signal processing concepts and methods applicable to digital communication systems.
- K2.** Explain working principles and building blocks of digital communication systems.
- K3.** Demonstrate knowledge and understanding of different characterisation of digital communication signals and systems.

**Skills:**

- S1.** Design and synthesise signal processing modules to implement digital communication systems.
- S2.** Assess the effect of signal noise in digital communication systems.
- S3.** Evaluate the performance of digital communication systems under different environments.

**Application of knowledge and skills:**

- A1.** Interpret performance of various modulation and signal processing techniques for digital communication.
- A2.** Apply software tools to simulate and study characteristics and behaviour of digital communication systems.
- A3.** Analyse fundamental limits and different challenges associated with digital communication systems.

**Course Content:**

Topics may include:

- Introduction to digital communication
- Coding for discrete sources
- Quantization
- Source and channel waveforms
- Vector spaces and signal space
- Channels, modulation, and demodulation
- Random processes and noise
- Detection, coding, and decoding
- Wireless digital communication

**Values:**

- V1.** Appreciate and use terminology, concepts, standards and techniques of signal processing for digital communication systems.
- V2.** Appreciate learning as a lifelong process and the wide range of practical use of digital communications in real world applications.

**Graduate Attributes**

The Federation University Federation graduate attributes (GA) are entrenched in the [Higher Education Graduate Attributes Policy](#) (LT1228). FedUni graduates develop these graduate attributes through their engagement in explicit learning and teaching and assessment tasks that are embedded in all FedUni programs. Graduate attribute attainment typically follows an incremental development process mapped through program progression. **One or more graduate attributes must be evident in the specified learning outcomes and assessment for each FedUni course, and all attributes must be directly assessed in each program**

Graduate attribute and descriptor		Development and acquisition of GAs in the course	
		Learning Outcomes (KSA)	Assessment task (AT#)
GA 1 Thinkers	Our graduates are curious, reflective and critical. Able to analyse the world in a way that generates valued insights, they are change makers seeking and creating new solutions.	K1-K3, S1-S3	1,2
GA 2 Innovators	Our graduates have ideas and are able to realise their dreams. They think and act creatively to achieve and inspire positive change.	K1-K3, S1-S3, A1-A3	1,2
GA 3 Citizens	Our graduates engage in socially and culturally appropriate ways to advance individual, community and global well-being. They are socially and environmentally aware, acting ethically, equitably and compassionately.	K1-K3, S1-S3, A1-A3	1,2
GA 4 Communicators	Our graduates create, exchange, impart and convey information, ideas, and concepts effectively. They are respectful, inclusive and empathetic towards their audience, and express thoughts, feelings and information in ways that help others to understand.	K1-K3, S1-S3, A1-A3	1,2
GA 5 Leaders	Our graduates display and promote positive behaviours, and aspire to make a difference. They act with integrity, are receptive to alternatives and foster sustainable and resilient practices.	S1-S3, A1-A3	1,2

### Learning Task and Assessment:

Learning Outcomes Assessed	Learning Tasks	Assessment Type	Weighting
K1 - K3, S1, A3	Relevant tasks and problems to enforce understanding of the students and help in gradual development of knowledge and skills throughout the course.	assignments / quizzes	20% - 30%
K3, S2, S3, A1-A3	Experimental/simulation work to verify students' ability to apply knowledge and skills acquired in the course.	Report	20% - 30%
K1-K3, S1-S3, A1, A3	The examination tests analytical and critical thinking and a general understanding of the course materials.	Test or exam	40% - 60%

### Adopted Reference Style:

Other (IEEE)

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

Fed Cite - [referencing tool](#)