Course Outline (Higher Education)

School: School of Engineering, Information Technology and Physical Sciences

Course Title: SIGNALS AND SYSTEMS

Course ID: ENGIN2102

Credit Points: 15.00

Prerequisite(s): MATHS1001 AND MATHS1005

Co-requisite(s): MATHS2016

Exclusion(s): Nil

ASCED: 031301

Description of the Course:
This course introduces concepts of continuous-time and discrete-time signals, their sampling and aliasing issues. Complex numbers, in particular, complex exponentials are introduced along with their representation as phasors, leading to periodic waveforms, Fourier series and the signal frequency spectrum. Modification of spectra will be described using FIR and IIR filters, discrete-time systems, the unit-sample response, linear time-invariant systems, the continuous-time Fourier transform, windowing, DFT, FFT, time-frequency spectrum analysis, spectrogram and Laplace Transform.

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. Describe the principles and theories governing signals and systems.

K2. Explain different transformation techniques.

K3. Recognise the fundamental limitation of continuous time system design.

Skills:

S1. Investigate signals in frequency and time domains.

S2. Solve signals and system problems using different transformations.

S3. Evaluate impulse and frequency response of different order systems.

Application of knowledge and skills:

A1. Analyse engineering systems by applying linear time invariant system concepts.

A2. Interpret continuous-time and discrete-time signals using appropriate techniques.

A3. Employ fundamental mathematical tools to model, analyse and design signals and systems in both time-domain and frequency-domain.

Course Content:

Topics may include:

- Complex exponentials and sinusoids
- Time and frequency domains of signals
- Continuous and discrete time signals and systems
- Sampling and reconstruction of signals
- FIR and IIR filter design and analysis
- Impulse responses, frequency responses and transfer functions of systems

Values:

V1. Recognise sampling errors and aliasing phenomena.

V2. Appreciate learning as a lifelong process and the applicability of the mathematics of signals and systems theory .

Graduate Attributes

The Federation University FedUni 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#)

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		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, A1-A3	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.	S1, S3	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.	K2, S3, A2	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 - S3, A1 - A3	Experimental work and / or projects to verify students ability to apply knowledge and skills acquired in the course. Relevant tasks and problems to enforce understanding of the students and help in gradual development of knowledge and skills throughout the course.	Reports / demonstrations / assignments / quizzes	30% - 50%
K1 - K3, S1 - S3, A1 - A3	Questions and problems related to the materials covered in the course.	Mid and / or End of semester examination	50% - 70%

Adopted Reference Style:

Other (IEEE)

Refer to the library website for more information

Fed Cite - referencing tool