

## PROC H3601: Signal Processing

University				
Module Title:		Signal Processing		
Language of Instruction:		English		
Credits:	5			
NFQ Level:	7			
Module Deli	ivered In	No Programmes		
Teaching & Learning Strategies:		This module will be delivered through lectures and laboratory assignments.		
Module Aim	ı:	To introduce the student to signal processing techniques and applications		
Learning O	utcomes			
On successi	ful completion of t	his module the learner should be able to:		
LO1	Understand and	d analyse signals.		
LO2	Specify signal p	processing requirements.		
LO3	Apply signal processing techniques.			
LO4	Design simple digital filters.			
LO5	Use software packages for the purposes of digital filter design.			
Pre-requisit	te learning			
Module Recommendations This is prior learning (or a practical skill) that is recommended before enrolment in this module.				
No recommendations listed				
Incompatible Modules These are modules which have learning outcomes that are too similar to the learning outcomes of this module.				
No incompatible modules listed				
Co-requisite Modules				
No Co-requisite modules listed				

Requirements
This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed.

Mathematics 1 & 2 or equivalent



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### **Module Content & Assessment**

### **Indicative Content**

Overview of signal processing Analog and digital

**B. Signals and Frquency Content**Power Energy Averaging Phasors Frequency content of signals Audio signals and other examples

**C. Signal Conversions**Signal converters including ADC and DAC Applications Resolution The Sampling Theorem

Over view of signal processing applications Real time Non real time

### E. Difference Equations

Recursive and non recursive equations

### D. Discrete Time Systems

Sampled signals Processor selection The design cycle

### F. Continuous Time Systems

Time and frequency specifications

### H. The z-transform

Definition of z transform Application to time sequences Transfer functions Poles and zeros Inverse transform

**G. Linear Filtering**Design of filters Difference equations

## J. Differentiation, Prediction & Integration Methods Applications Accuracy

K. Complex Signals
Applications of complex signals

### L. Spectral Analysis and the Discrete Transform

Spectrum of a signal Fourier transforms

Assessment Breakdown	%
Continuous Assessment	20.00%
Practical	20.00%
End of Module Formal Examination	60.00%

Continuous Assessment				
Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Examination	This will consist of a mid-year examination.	1,2,3,4,5	20.00	n/a

No Project

Practical				
Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Practical/Skills Evaluation	A program of experiments will be carried out based on material covered on the course. Assignments will be given to the students on aspects of signal processing during the course. A short report will be written and submitted for marking.	1,2,3,4,5	20.00	n/a

End of Module Formal Examination				
Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Formal Exam	The students are required to take a written examination at the end of the year.	1,2,3,4,5	60.00	End-of- Semester



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### Module Workload

Workload: Full Time				
Workload Type	Frequency	Average Weekly Learner Workload		
Lecture	Every Week	1.00		
Practicals	Every Week	2.00		
Estimated Learner Hours	Every Week	2.00		
	Total Hours	5.00		