Module Code	**EEU44C15**
Module Name	**ANALOGUE SIGNAL PROCESSING**
ECTS Weighting[1]	5 ECTS
Semester taught	Semester 2
Module Coordinator/s	Dr. Martin J. Burke
Module Learning Outcomes with reference to the Graduate Attributes and how they are developed in discipline	On successful completion of this module, students should be able to: 1. Describe the properties of a range of physical signals. 2. Identify and specify the performance criteria of signal conditioning amplifiers. 3. Analyse the characteristics and performance of various amplifier configurations. 4. Design analogue circuits for non-linear functions. 5. Evaluate and specify the characteristics of active filters. 6. Evaluate and specify the characteristics of power supplies. 7. Design suitable amplifiers and filters for practical instrumentation applications. **Graduate Attributes: levels of attainment** To act responsibly - Enhanced To think independently - Attained To develop continuously - Enhanced To communicate effectively - Attained
Module Content	Please provide a brief overview of the module of no more than 350 words written so that someone outside of your discipline will understand it. This module will introduce students of Electronic Engineering and Electronic & Computer Engineering to the analogue electronic circuitry for the interfacing, pre- processing and signal conditioning associated with physical measurements carried out in industrial and laboratory environments. The design and implementation of circuits used prior to analogue-to-digital conversion for the purposes of signal amplification, calibration, temperature compensation, impedance matching, band-limiting, anti- aliasing filtering as well as some non-linear applications will be covered. The circuits examined will be considered as utilising commercially available components such as operational amplifiers, transistors and discrete passive components. Syllabus: Measurements and Signals: physical measurements, signals and characteristics, signal conditioning requirements.

[1] TEP Glossary

	Signal Sources: brief treatment of transducer and electrode characteristics. Amplifier Design: signal fidelity, design requirements, circuit configurations, instrumentation amplifiers, performance characteristics, non-ideal properties, practical limitations, performance enhancement, physical and laboratory testing and measurement applications. Non-Linear Applications: precision rectification, peak detection, dynamic range compression, logarithmic amplification. Power Supplies: rectification and smoothing, linear series regulators, switched-mode power supplies. Active Filters: filter characteristics and properties, filter types and functions, approximation methods, active filter implementation, circuit configurations, design methodologies.
Teaching and Learning Methods	e.g., lectures, seminars, online learning via VLE, field trips, laboratories, practice-based etc… The module is taught using a combination of lectures, tutorials and supporting laboratories. During the tutorials students will develop their problem solving skills by tackling problems based on the lecture material. Their design skills will be developed in carrying out a laboratory-based design project

Assessment Details[2]
Please include the following:

- **Assessment Component**
- **Assessment description**
- **Learning Outcome(s) addressed**
- **% of total**
- **Assessment due date**

Assessment Component	Assessment Description	LO Addressed	% of total	Week due
Examination	2-hour written examination	Nos. 1 - 7	80%	Exam week
Lab	Practical design project	Nos. 2,3,4	20%	Week 12

Reassessment Requirements	Written exam only
Contact Hours and Indicative Student Workload[2]	**Contact hours:** 50 hours

[2] TEP Guidelines on Workload and Assessment

	Independent Study (preparation for course and review of materials): 0 hours
	Independent Study (preparation for assessment, incl. completion of assessment): 100 hours
Recommended Reading List	1. Analogue Signal Processing, R. Pallas-Areny & J. G. Webster, John Wiley & Sons, 1999. 2. Operational Amplifiers, 3rd ed., G. B. Clayton & B. Newby, Newnes-Butterworth, 1992.
Module Pre-requisite	Completion of JS BAI year in C or CD stream
Module Co-requisite	
Module Website	Blackboard
Are other Schools/Departments involved in the delivery of this module? If yes, please provide details.	No
Module Approval Date	19-08-2019
Approved by	M. J. Burke
Academic Start Year	
Academic Year of Date	2019-20