MODULE SPECIFICATION

Part 1: Information			
Module Title	Measurements and Instrumentations		
Module Code	UFMFNP-15-2	Level	Level 5
For implementation from	2019-20		
UWE Credit Rating	15	ECTS Credit Rating	7.5
Faculty	Faculty of Environment & Technology	Field	Engineering, Design and Mathematics
Department	FET Dept of Engin Design & Mathematics		
Module type:	Standard		
Pre-requisites	Practical Electronics 2019-20		
Excluded Combinations	None		
Co- requisites	None		
Module Entry requirements	None		

Part 2: Description

Overview: Pre-requisites: students must take one out of UFMFVA-15-1 Electrical and Electronic Principles B or UFMFCA-15-1 Practical Electronics

Educational Aims: This module aims to develop students' broad understanding of instrumentation techniques which are used in a wide range of engineering applications.

By the end of the module students should be able to understand the instrumentation requirements in the specific engineering contexts and specify appropriate instrumentation (if available off the shelf), design new instruments and instrument systems fit for the purpose, critically evaluate and carry out a performance analysis of a complete instrumentation system.

Outline Syllabus: In order to equip students with the advanced knowledge of the instrumentations, the following areas will be focussed:
The physics and mathematics of sensor action
Measurement technique
Errors and their control
Design principles of instrumentation systems
Data conditioning
Relevant signal processing techniques.

Teaching and Learning Methods: In order to achieve the educational aims, the following content will be taught:

General principles of measurements and instrumentation:
Structure and classification of measurement systems, systematic characteristics (range and span, errors and accuracy, linearity, sensitivity and hysteresis), statistical characteristics (repeatability and reproducibility), calibration, traceability and standards.

Sensing devices and principles:
Introduction to a range of sensors and transducers.

Working principles and characteristics of commonly used instruments in automation industry.

Signal conditioning and data presentation:
Design of bridges, amplifiers and filters, panel meters, LED and LCD displays, moving coil meters, chart recorders and printers, data acquisition with microcomputers, smart sensors and intelligent instrumentation systems.

Part 3: Assessment

The assessment consists of an end of module examination and a group coursework.

The strategy has been chosen to ensure that the measurements and instrumentations engineering principles are assessed under controlled conditions, while a more open ended research based assignment is used to encourage wider engagement and reflection on this topic. In component B, the students will design an instrumentation system for running automatic processes in the industry and will implement it by simulating using a given simulation package. Within the group project students will have the opportunity to present their individual research for feedback. The submission will involve a group report and an individual evaluation of the group design against a set of criteria addressing technical and user requirements.

In the resit run in component A, control condition written exam will be required. In component B, the individual student will rework the original coursework submission following feedback.

First Sit Components	**Final Assessment**	**Element weighting**	**Description**
Report - Component B		50 %	CW: Group Project Report: maximum page limit 10 (excluding appendices and any additional material)
Examination - Component A	✓	50 %	Exam (2 Hours)
Resit Components	**Final Assessment**	**Element weighting**	**Description**
Report - Component B		50 %	Individual Report: maximum page limit 10 (excluding appendices and any additional material)
Examination - Component A	✓	50 %	Exam (2 Hours)

Part 4: Teaching and Learning Methods

Learning Outcomes

On successful completion of this module students will achieve the following learning outcomes:

Module Learning Outcomes	Reference
Demonstrate knowledge of general principles of measurement and instrumentation	MO1
Express an awareness of commercial instrumentation design process	MO2
Understand the working principles of measuring instruments used in automation/ processes in oil & gas, power and car industries	MO3
Use electronics associated with the instrumentation systems	MO4
Understand and use analytical techniques relevant to instrumentation design	MO5
Design an instrumentation system using traditional as well as microprocessor and microcontroller programming techniques	MO6

Contact Hours

Independent Study Hours:	
Independent study/self-guided study	114
Total Independent Study Hours:	114
Scheduled Learning and Teaching Hours:	
Face-to-face learning	36
Total Scheduled Learning and Teaching Hours:	36
Hours to be allocated	150
Allocated Hours	150

Reading List

The reading list for this module can be accessed via the following link:

https://uwe.rl.talis.com/index.html

Part 5: Contributes Towards

This module contributes towards the following programmes of study: