

Module Details

Title:	Fundamental Process Measurements DRAFT		
Module Title:	Fundamental Process Measurements		
Language of Instruction:	English		
Module Code:	n/a	Duration:	1 Semester
Credits:	5		
NFQ Level:	6		
Field of Study:	Engineering & Engineering Trades		
Valid From:	Autumn 2021 (September 2021)		
Module Delivered In	1 programme(s)		
Head of Department:	Frances Hardiman		
Module Author:	Eddie McElheron		
Teaching & Learning Strategies:	This module will be delivered through a combination of lectures, discussion, practical demonstration and student workshop demonstrations using industrial grade process instrumentation and reference standards. Extensive use of the whiteboard, in conjunction with physical Instrumentation systems will be used when delivering lectures. To facilitate the ongoing practical demonstrations throughout the course, as well as student “hands on” workshops, all theory and practical classes will be conducted using a selection of industrial grade pressure, level, flow and temperature instruments, with the assistance of the relevant technical support personnel where necessary. Each student will be supplied with reference material for all the areas covered on the course in addition to hard copies of all PowerPoint slides used. Details of all Web resources and product or application examples will also be supplied. While the core technical content of the course is fixed, the delivery is based mainly on using examples from the students' own workplace. Students are therefore encouraged to become aware of their own workplace measurement applications, and then introduce and discuss these during class time, in addition to completing Continuous Assessments based on these. Students who are not actively working in the area of Instrumentations will be provided with practical examples by the lecturer.		
Module Aim:	The aim of this module is to equip the learner with a basic understanding of the theory on which modern industrial Pressure, Level, Flow and Temperature measurement systems are based. This module will allow participants to develop a working understanding of measurement technologies, and to become aware of the significance of accurate and reliable process data.		

Learning Outcomes

On successful completion of this module the learner should be able to:

LO1	Define and interpret the terminology used to describe the performance and specification of industrial process instruments.
LO2	Explain the principles of operation of the most common instruments used to measure Pressure, Level, Flow and Temperature.
LO3	Summarise examples of specifications, menus and instructions as given in manufacturers documentation.
LO4	Summarise the relevant process and application parameters to be considered for correct instrument selection and installation.

Pre-requisite 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.

No requirements listed

Module Content & Assessment

Indicative Content

Measurement Terminology

Definition and explanation of terms used for instrument specification and to quantify the quality and reliability of measurements taken.

Pressure Measurement

Pressure Basics; definitions, units, scales, absolute, gauge and differential pressure types of measurement. Analogue Current Transmission Loop. Common pressure measuring technologies used in modern industrial measurement, their principle of operation, construction, factors for selecting the correct instrument, process characteristics that effect instrument performance, installation, sources of errors and calibration techniques for the following technologies; Manometers, Pressure Switches; Pressure Transmitters.

Level Measurement

Nature of Level Measurement, vessel design, volume, contents. Common level measuring technologies used in modern industrial measurement, their principle of operation, construction, factors for selecting the correct instrument, process characteristics that effect instrument performance, installation, sources of errors and calibration techniques including the following technologies; Hydrostatic Level Measurement, Capacitance Level Measurement, Ultrasonic Level Measurement; Radar Level Measurement

Temperature Measurement

Temperature Basics, specific heat capacity, temperature scales. Common temperature measuring technologies used in modern industrial measurement, their principle of operation, construction, factors for selecting the correct instrument, process characteristics that effect instrument performance, installation, sources of errors and calibration techniques for the following technologies, Thermocouples and Resistance Temperature Detectors.

Flow Measurement

Flow variables; velocity, volumetric, mass. - Common flow meters used in modern industrial measurement, their principle of operation, construction, factors for selecting the correct instrument, installation, sources of errors and calibration techniques for the following technologies; Differential Pressure, Electromagnetic Flowmeter, Vortex Flowmeter, Ultrasonic Flowmeter, Coriolis Flowmeter

Assessment Breakdown	%
Continuous Assessment	30.00%
End of Module Formal Examination	70.00%

Continuous Assessment

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Case Studies	Report on an industrial application to explain the principles associated with the technologies used, accuracy of readings taken, and the relevant process parameters required for successful operation.	1,2,3,4	20.00	Sem 1 End
Short Answer Questions	Online/Classroom based written test	1,2,3,4	10.00	Week 8

No Project

No Practical

End of Module Formal Examination

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Formal Exam	Final written exam	1,2,3,4	70.00	End-of-Semester

Reassessment Requirement

Repeat examination

Reassessment of this module will consist of a repeat examination. It is possible that there will also be a requirement to be reassessed in a coursework element.

ITCarlow reserves the right to alter the nature and timings of assessment

Module Workload

This module has no Full Time workload.

Workload: Part Time					
Workload Type	Workload Description	Learning Outcomes	Hours	Frequency	Average Weekly Learner Workload
Lab/Lecture	No Description		36	12 Weeks per Stage	3.00
Independent Learning	No Description		84	15 Weeks per Stage	5.60
Total Hours					120.00
Total Weekly Learner Workload					8.60
Total Weekly Contact Hours					3.00

Module Resources

Recommended Book Resources

Tony R. Kuphaldt 2020, *Lessons In Industrial Instrumentation*, 2.33 Ed., Samurai Media Limited
Beamax 2012, *Ultimate Calibration*, 2nd Edition Ed.

This module does not have any article/paper resources

Other Resources

Website: International Society of Automationwww.isa.org

Website: Instrumentation and Control<https://instrumentationandcontrol.net/>

Website: Endress and Hauser<https://www.endress.com/en>

Website: Control Global
<https://www.controlglobal.com/>

Module Delivered In

Programme Code	Programme Title
	Certificate in Fundamental Process Measurement (Draft)

Module Teachers	
Module Teachers	
Staff Member	Staff Email
No Teacher Staff Assigned	