

APPROVED**PHYS6038: Water Quality Instrumentation****Module Details**

Module Code:	PHYS6038
Title:	Water Quality Instrumentation APPROVED
Long Title:	Water Quality Instrumentation
NFQ Level:	Fundamental
Valid From:	Semester 1 - 2019/20 (September 2019)
Duration:	1 Semester
Credits:	5
Field of Study:	4411 - Physics
Module Delivered in:	7 programme(s)
Module Description:	This module deals with the operation, performance metrics and calibration of a range of inline instrumentation used to monitor water quality, both waste water and potable.

Learning Outcomes

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

#	Learning Outcome Description
LO1	Operate inline water testing instrumentation.
LO2	Explain the operation of a range of sensors and transducers with particular reference to monitoring water quality
LO3	Describe and perform calibration procedures
LO4	Perform calculations to quantify instrument performance and analyse data
LO5	Interpret manufacturer specifications with respect to instrument operation and performance

Dependencies**Module Recommendations**

13458	PHYS6038	Water Quality Instrumentation
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Incompatible Modules

No incompatible modules listed

Co-requisite Modules

No Co-requisite modules listed

Requirements

No requirements listed

Indicative Content**Water quality measurement**

Water quality sensors: temperature / pH / flow / dissolved solids / turbidity / conductivity / dissolved oxygen / chlorine / fluoride / TOC / phosphates and nitrates levels. Description of appropriate sensor, mode of operation, type of output etc.

Sensor performance

Fundamental technologies to include electrochemical, optical and photometric. Sensitivity, accuracy, resolution, hysteresis, drift and offsets of a range of sensors. Mathematical analysis of sensor performance

Manufacturer specifications

Data sheets, calibration protocols, operating conditions

Lab Programme

Operation and analysis of a range of sensors used to monitor water quality.

Module Content & Assessment

Assessment Breakdown	%
Coursework	100.00%

Assessments

Coursework			
Assessment Type	Practical/Skills Evaluation	% of Total Mark	30
Timing	Every Second Week	Learning Outcomes	1,3,4
Assessment Description LAB assessments			
Assessment Type	Short Answer Questions	% of Total Mark	30
Timing	Week 7	Learning Outcomes	2,4,5
Assessment Description Examination of lecture material			
Assessment Type	Short Answer Questions	% of Total Mark	40
Timing	Sem End	Learning Outcomes	2,4,5
Assessment Description Examination of lecture material			
No End of Module Formal Examination			
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.			

Module Workload

Workload: Full Time					
Workload Type	Contact Type	Workload Description	Frequency	Average Weekly Learner Workload	Hours
Lecture	Contact	Course material	Every Week	2.00	2
Lab	Contact	Experiments	Every Week	2.00	2
Independent & Directed Learning (Non-contact)	Non Contact	Study	Every Week	3.00	3
Total Hours					7.00
Total Weekly Learner Workload					7.00
Total Weekly Contact Hours					4.00

Workload: Part Time					
Workload Type	Contact Type	Workload Description	Frequency	Average Weekly Learner Workload	Hours
Lecture	Contact	Course material	Every Week	3.00	3
Lecturer-Supervised Learning (Contact)	Contact	Directed Study	Every Week	1.00	1
Independent Learning	Non Contact	Study	Every Week	3.00	3
Lab	Contact	Experiment and assessment	Every Week	0.00	0
Total Hours					7.00
Total Weekly Learner Workload					7.00
Total Weekly Contact Hours					4.00

Module Resources	
<i>Recommended Book Resources</i>	
American Water Works Association. (2012), Standard methods for the examination of water and wastewater, 22. [ISBN: 0875532357].	
<i>Recommended Article/Paper Resources</i>	
EPA. (2017), Drinking Water Report for Public Water Supplies 2016, p.44. EPA. (2017), Water Quality in Ireland 2010-2015, p.68.	
<i>Other Resources</i>	
Website, Vernier Software and Technology, http://www.vernier.com Website, Endress & Hauser, https://www.ie.endress.com/en Website, Environmental Protection Agency, http://www.epa.ie	

Module Delivered in			
Programme Code	Programme	Semester	Delivery
CR_SCHQA_8	Bachelor of Science (Honours) in Analytical Chemistry with Quality Assurance	-1	Elective
CR_SESST_8	Bachelor of Science (Honours) in Environmental Science and Sustainable Technology	-1	Mandatory
CR_SINEN_8	Bachelor of Science (Honours) in Instrument Engineering	-1	Elective
CR_SCHEM_7	Bachelor of Science in Analytical and Pharmaceutical Chemistry	-1	Elective
CR_SPHYS_7	Bachelor of Science in Applied Physics and Instrumentation	-1	Elective
CR_SPHYS_6	Higher Certificate in Science in Applied Physics and Instrumentation	-1	Elective
CR_SCHEM_6	Higher Certificate in Science in Chemistry	-1	Elective