

Module Title:	Water Engineering
Language of Instruction:	English
Credits:	5
NFQ Level:	6
Module Delivered In	1 programme(s)
Teaching & Learning Strategies:	Lectures Laboratory practicals Project work Private study
Module Aim:	The aims of this module are: • to provide students with the technical knowledge to work, with supervision, in the area of water and wastewater engineering; • to provide students with the basis for further study to degree level.

Learning Outcomes	
<i>On successful completion of this module the learner should be able to:</i>	
LO1	to describe the basic physical and chemical properties of water and how these are applied in water and wastewater engineering.
LO2	to describe the hydrological cycle and its component parts;
LO3	to calculate water demand figures and understand how a source can be developed to meet the demand.
LO4	to appreciate how a chemical analysis is undertaken and be able to identify the significance of the results of analysis in the context of design and operation of a water treatment plant
LO5	to describe how a domestic wastewater system works and how the suitability of a site is assessed.
LO6	to set up and carry out tests and experiments in Water Engineering and to interpret findings
LO7	to work in a team to derive common results and to present these results as a team

Pre-requisite learning
Module Recommendations <i>This is prior learning (or a practical skill) that is recommended before enrolment in this module.</i>
No recommendations listed
Incompatible Modules <i>These are modules which have learning outcomes that are too similar to the learning outcomes of this module.</i>
No incompatible modules listed
Co-requisite Modules
No Co-requisite modules listed
Requirements <i>This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed.</i>
No requirements listed

Module Content & Assessment

Indicative Content
1) Water properties and water quality a) Density, surface tension, capillary action, solvency b) Key parameters, water sampling and analysis
2) Surface water hydrology a) The hydrologic cycle, rainfall, evaporation, transpiration-runoff, river hydrology, groundwater hydrology, water budgets and balances b) Catchments, river hydrology, hydrographs, measurement of hydrological data, extreme events
3). Fluid Mechanics a. Hydrostatics and buoyancy b. Open channel hydraulics
4) Stormwater Management a) Sewerage, combined and separate systems b) Sewer layouts, falls, pipe velocities c) Rational and modified Rational methods
5. Groundwater Hydrology a) Aquifers and aquifer properties b) Groundwater flow c) Development of groundwater sources
6) Water Demand and Sources ~ a) Calculating water demand b) Source options c) Selecting the best source
7) Water Treatment and Distribution a) unit processes b) water networks
8) Wastewater a) Wastewater characteristics b) Domestic wastewater treatment systems c) Site suitability Assessment
9) Water And Waste Water Tests a) Water sampling techniques b) Potable water tests - colour, Ph, alkalinity, hardness, chlorine, iron, aluminium, flocculation. c) Waste water tests - oxygen, B.O.D., Nitrogen d) Understanding an analysis report e) Water chemistry practicals, f) Water treatment practicals
10) Water and Wastewater Treatment Plant Visits a) Water Treatment Plant Visit b) Wastewater Treatment Plant Visit

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

No Continuous Assessment

Project				
Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Project	Project	2,3,5,7	20.00	n/a

Practical				
Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Practical/Skills Evaluation	Labs	1,2,3,4,6,7	20.00	n/a

End of Module Formal Examination				
Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Formal Exam	Final Examination	1,2,3,4,5	60.00	End-of-Semester

SETU Carlow Campus reserves the right to alter the nature and timings of assessment

Module Workload

Workload: Full Time		
<i>Workload Type</i>	<i>Frequency</i>	<i>Average Weekly Learner Workload</i>
Lecture	Every Week	2.00
Practicals	Every Week	2.00
Estimated Learner Hours	Every Week	2.00
Total Hours		6.00

Module Delivered In

Programme Code	Programme	Semester	Delivery
CW_CMCIV_D	Bachelor of Engineering in Civil Engineering	3	Mandatory