ENVI C3501: Environmental Engineering I and Hydraulics

Module Title:	Environmental Engineering I and Hydraulics
Language of Instruction:	English

Credits:	10

NFQ Level:	8

Module Delivered In	1 programme(s)

Teaching & Learning Strategies:	Lectures, Project Work, Laboratories and Private Study

Module Aim:	The aims of this module are: to develop a general appreciation of environmental issues and their role in assessing the sustainable impact of engineering development; to develop an understanding of basic scientific principles associated with water, wastewater and soil; to develop the skills required to collect and process relevant data; to prepare the student for further study in the area of environmental engineering, where basic principles can be applied in a practical way to protect the environment and transition to a more sustainable society.

Learning Outcomes	
On successful completion of this module the learner should be able to:	
LO1	Describe and interpret the legal definition of the environment, the environmental legislative framework influencing engineering practice and the principle mechanisms by which it is enforced
LO2	Define, quantify and analyse fundamental hydrological processes
LO3	Describe and appraise key aspects of sustainable water resource engineering and management including water supply, demand, quality, water treatment and onsite disposal.
LO4	Describe & examine (a) the properties of fluids (b) the scientific laws of fluids at rest. (c) the different flow characteristics & the concepts of fluids in motion. (d) the different types of flow measurement devices. (e) Newton's Laws of Motion.
LO5	Derive & apply (a) expressions from the scientific laws of fluids at rest, to engineering problems, specifying underlying assumptions & limitations. (b) expressions from the concepts of fluids in motion, to broadly- defined engineering problems, specifying underlying assumptions & limitations (c) expressions for flow measurement devices, to broadly- defined engineering problems, specifying underlying assumptions & limitations. (d) the energy equation to broadly-defined pipeline problems, specifying underlying assumptions & limitations

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.*
Bachelor of Engineering (Honours) in Civil Engineering

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Module Content & Assessment

Indicative Content
Environmental Legislation and Policy a) Legal definition of the environment b) Key environmental principles and legislation c) UN Sustainable Development Goals d) Biodiversity and Appropriate Assessment (AA) e) Environmental Impact Assessment
Water Resource Engineering a) Water and energy cycles b) catchment water balances c) water sources d) water demand e) climate change
Hydrology a) Catchment water pathways b) Hydrological measurements: rivers, rainfall and evapotranspiration c) Statistical analysis of discharge data d) Precipitation analysis
Water and Wastewater Treatment a) Water quality parameters b) Water treatment unit processes c) Domestic wastewater treatment systems d) Investigation and remediation of contaminated land
Hydraulics: Fluid Properties Fluids Vs Solids (b) Newtonian & Non-Newtonian Fluids (c) Properties of Fluids
Statics (a) Pascal's Law (b) Pressure measurement using manometers (c) Forces on Submerged Surfaces
Fluid Dynamics Flow Characteristics (b) Streamlines & Streamtubes (c) Fluids in Motion- Conservation of Mass, Energy and Momentum (d) Venturimeters & Orifices (e) Weirs and Notches

Assessment Breakdown	%
Project	50.00%
End of Module Formal Examination	50.00%

No Continuous Assessment

Project

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Project	n/a	4,5	10.00	n/a
Project	This project will include a component of cross-module assessment with the Engineering Geology module. Common catchments will be used across both modules to allow a more comprehensive description of catchment hydrology, morphology, geology and hydrogeology be developed.	1,2,3	40.00	n/a

No Practical

End of Module Formal Examination

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Formal Exam	No Description	1,2,3,4,5	50.00	End-of-Semester

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

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Module Workload

Workload: Full Time		
Workload Type	*Frequency*	*Average Weekly Learner Workload*
Lecture	12 Weeks per Stage	7.00
Laboratory	12 Weeks per Stage	1.00
Independent Learning	12 Weeks per Stage	13.00
	Total Hours	252.00

Module Delivered In

Programme Code	Programme	Semester	Delivery
CW_CMHCE_B	Bachelor of Engineering (Honours) in Civil Engineering	5	Mandatory