

Module Title:	Hydraulics
Language of Instruction:	English
Credits:	5
NFQ Level:	8
Module Delivered In	1 programme(s)
Teaching & Learning Strategies:	Lectures; Project Work; Practicals/ Site Visits; Private Study
Module Aim:	The aims of this module are: (1) to develop an understanding of the concepts of hydraulics; (2) to equip students to solve problems in hydraulics; (3) to prepare the students for further study in the area of hydraulic engineering, where fundamental principles can be applied in a practical way
Learning Outcomes	
<i>On successful completion of this module the learner should be able to:</i>	
LO1	Derive, apply & analyse (a) the flow in broadly-defined pipe network problems, specifying underlying assumptions & limitations. (b) the flow in broadly-defined pumped system problems, specifying underlying assumptions & limitations.
LO2	Derive, apply & estimate the flow-rate to broadly-defined open channel problems, specifying underlying assumptions & limitations.
LO3	Carry out tests and analyse & interpret data on fluids & hydraulic structures.
LO4	Use appropriate software tools to present findings from tests on fluids & hydraulic structures.
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>	
Bachelor of Engineering (Ordinary) in Civil Engineering	

Module Content & Assessment

Indicative Content

Flow of Water in Pipes

(a) Ideal fluid flow in a piped system (b) Real Fluid flow in a piped system (c) Frictional head losses (d) Local Head losses

Pipe Network Analysis

(a) Loop Method (b) Nodal Method (c) Matrix Method

Pumps

(a) Hydraulic gradient in pump-pipeline systems (b) Multiple pump systems (c) Variable speed pump operation (d) Suction lift limitations

Open Channel Flow

(a) Types of Flow (b) Properties of Open Channels (c) Fundamental Equations (Conservation of Mass, Energy & Momentum) (d) Velocity Distribution in Open Channels (e) Laminar and Turbulent Flow (f) Critical, sub-critical and super-critical flow (g) Froude Number (h) Uniform Flow: (i) Application of Energy equation for Rapidly Varied Flow; (ii) Application of Momentum equation for Rapidly Varied Flow (i) Gradually Varied Flow: (i) Classification of profiles; (ii) How to determine the surface profile; (iii) Method of solution for the Gradually Varied Flow equation (j) Critical Depth Meters

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	No Description	1,2,3,4	50.00	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	50.00	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	12 Weeks per Stage	3.75
Practicals	12 Weeks per Stage	0.25
Estimated Learner Hours	12 Weeks per Stage	6.50
Total Hours		126.00

Module Delivered In

Programme Code	Programme	Semester	Delivery
CW_CMHCE_B	Bachelor of Engineering (Honours) in Civil Engineering	6	Mandatory