Module Descriptor Form

Civil and Environmental Engineering

EO309 - Water Engineering 1

Module Code	EO309	**Module Title**	Water Engineering 1				
Module Registrar	Lavery, Mrs Sarah E						
Other Staff Involved							
Credit Weighting	10	**Semester**	2	**Elective**	No	**Academic Level**	3
Pre-requisites							
Required for							

Module Format and Delivery (hours):

Lectures	Tutorials	Assignments	Labs	Private Study	Total
20	15	20	10	35	100

Educational Aim

This module aims to:

This module aims to introduce common concepts, applications and design calculation methods used in water engineering. The class will develop students to be able to examine hydraulics in common water engineering situations such as for steady flows in pipes and flow in pipe networks. The class also aims to build on engineering hydrology knowledge through developing students understanding of the concept of turbomachinery and provides an introduction to its theory and design as well as familiarises students with the concept of sustainability and renewable energy production with use of water.

Syllabus

This module will teach the following:

•Incompressible flow in pipes and pipe networks.
•Major frictional head loss and minor losses in pipes.
•Moody diagram to estimate the friction factor in a pipeline.
•Pipe in series, parallel and branched pipelines.
•Pipe network analysis.
•Pipe roughness and hydraulics research charts.
•Common hydraulic concepts and principles and systems.
•Appreciate application of turbo-machinery in hydro power.
•Power generation from water and sustainable energy resources.

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Learning Outcomes

On Completion of the module, the student is expected to be able to:

LO: 1	Examine problems associated with flow in pipes by analysing frictional and minor energy losses such as those associated with flow in a piped system
LO: 2	Examine flow hydraulics in pipelines and small pipe loops focusing on pressure and energy (head losses), so that they are able to analyse conditions in networks
LO: 3	Examine and explain the underpinning hydraulic principles and operations of a range of common water engineering structures, applications and equipment, including understanding turbomachinery with an introduction to turbines and pumps selections and system design.

(UK SPEC suggests no more than 4 learning outcomes per module. Statements must be broad and be syllabus free and link in with the intended learning outcomes on the programme specifications.)

Assessment of Learning Outcomes - Criteria

Learning Outcome: **1**

	Criteria
1	Ability to differentiate between a frictional and minor energy losses in a pipe system
2	Ability to apply the Darcy-Weisbach Headloss Equation to evaluate frictional losses in a simple pipe system

Learning Outcome: **2**

	Criteria
1	Ability to work with simple models of fluid flow and flow in pipes
2	Ability to calculate the discharge for a simple pipe system in series by evaluating the major and minor losses
3	Ability to perform analysis and design calculations on pipelines and pipe networks

Learning Outcome: **3**

	Criteria
1	The ability to identify common and relevant hydraulic concepts, relationships and systems
2	The ability to examine water engineering systems and develop detailed understandings or demonstrations of their underlying principles and operations
3	The ability to explain and communicate these clearly to wider audiences

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Assessment Method(s) Including Percentage Breakdown and Duration of Exams

To Pass the module, students need to gain a summative mark of: 40%

Description	Semester	Start Week	Duration	Weight	Submission Week	Linked Criteria
Online Myplace Quiz. Open Book: Notes allowed as online Myplace Quiz	2		1.00	2%	1	
Online Myplace Quiz. Open Book: Notes allowed as online Myplace Quiz	2		1.00	2%	2	
Online Myplace Quiz. Open Book: Notes allowed as online Myplace Quiz	2		1.00	2%	3	
Online Myplace Quiz. Open Book: Notes allowed as online Myplace Quiz	2		1.00	2%	4	
Online Myplace Quiz. Open Book: Notes allowed as online Myplace Quiz	2		1.00	2%	5	
Online Myplace Quiz. Open Book: Notes allowed as online Myplace Quiz	2		1.00	2%	6	
Lab A (Pipeflow)	2	4		15%	6	
Online Myplace Quiz. Open Book: Notes allowed as online Myplace Quiz	2		1.00	2%	7	
Online Myplace Quiz. Open Book: Notes allowed as online Myplace Quiz	2		1.00	2%	8	
Online Myplace Quiz. Open Book: Notes allowed as online Myplace Quiz	2		1.00	2%	9	
Online Myplace Quiz. Open Book: Notes allowed as online Myplace Quiz	2		1.00	2%	10	
Lab B (Pumps)	2	8		15%	10	
End of Term Exam. Closed Book	2		2.00	50%	E	

Principles of Assessment Feedback

(within Assessment and Feedback Policy at: https://www.strath.ac.uk/staff/policies/academic/)

Please state briefly how these are incorporated in this module.

Principle 1. Assessment and feedback practices promote effective student learning

1. Coursework assignments are designed to focus student learning on key topics and learning material.
2. Tutorial problems with answers to encourage and guide private study are provided.
3. Tutorial classes are held frequently for one-to-one interaction between instructors and students and timely feedback.

Principle 2. Assessment and feedback practices are appropriate, fair, and transparent

1. All assignments and assessments combine straightforward and challenging tasks.
2. Model solutions are provided for some coursework assignments.

Principle 3. Assessment and feedback practices are clearly communicated to students and staff

1. All assessed coursework assignments are open to view within a reasonable time before the deadline.
2. All assessed coursework assignments are returned to students with feedback including annotations and comments.

Principle 4. Assessment and feedback practices are continuously reviewed

1. Interim student feedback is taken during each semester to review progress and resolve current issues; final semester student feedback taken upon completion of lecture courses to monitor student experience.
2. Coursework assignment and examination marks reviewed at end of year to monitor attainment and compared to student experience.

Additional Information

Students must gain a summative mark of 40% to pass the module. Attendance at the end of semester exam is a requirement of this module. Absence from the exam will result in an Absence being returned. Students who fail the module at the first attempt will be re-examined during the August resit diet.

Resit Procedure

Examination in GA Resit diet / Resubmission of coursework(s) prior to commencement of the Resit exam diet. This will be confirmed by the module team before the resit diet.

Recommended Reading

•L Hamil. Understanding Hydraulics, 4th Ed., Palgrave
•LJF Douglas, JM Gasiorek, JA Swaffield, LB Jack. Fluid Mechanics, Prentice Hall
YA Cengel, JM Cimbala. Fluid Mechanics, McGraw-Hill
•Chadwick & Morfett. Hydraulics in Civil and Environmental Engineering, E&FN Spon
•MC Potter, DC Wiggert and BH Ramadan, Mechanics of Fluids, Cengage Learning
Featherstone and Nalluri, Civil Engineering Hydraulics, BSP
•Wilson. Engineering Hydrology, 4th Ed., Palgrave MacMillan
•Shaw. Hydrology in Practice, 4th Ed., Routledge, Taylor Francis

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Module Timetable

Week	Semester 1	Semester 2
0		
1		Test 2%
2		Test 2%
3		Test 2%
4		Test 2%
5		Test 2%
6		Lab 15%, Test 2%
7		Test 2%
8		Test 2%
9		Test 2%
10		Lab 15%, Test 2%
11		
E		Examination 50%

Date of Last Modification

28-08-2025