Module Descriptor Form

Civil and Environmental Engineering

CL315 - Water Engineering 1

Module Code	CL315	**Module Title**	Water Engineering 1				
Module Registrar	Nieradzinska, Dr Kamila						
Other Staff Involved							
Credit Weighting	20	**Semester**	1/2	**Elective**	No	**Academic Level**	3
Pre-requisites							
Required for							

Module Format and Delivery (hours):

Lectures	Tutorials	Assignments	Labs	Private Study	Total
40	48	48	2	62	200

Educational Aim

This module aims to:

n semester 1 (exchange CL337) 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.

In semester 2 (exchange CL326), the class builds on engineering hydrology knowledge by developing students' understanding of turbomachinery concepts and providing an introduction to its theory and design. The class also familiarises students with the principles of sustainability and renewable energy production through the use of water. In addition, students will explore water resource systems planning, management, and water resources risk management.
As part of the class, students will undertake a hydropower project, applying their theoretical knowledge to a practical case study. This project introduces the fundamentals of hydropower design and evaluation, with an emphasis on sustainable energy generation, environmental considerations, and the role of hydropower within future renewable energy systems.

CL315 - Water Engineering 1

Syllabus

This module will teach the following:

Semester 1 (exchange CL337)

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.

Semester 2 (exchange CL326)

Common hydraulic concepts and principles and systems.

Appreciate application of turbo-machinery in hydro power.

Power generation from water.

Water resource systems planning, management and water resources risk management.

Learning Outcomes

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

LO: 1	Calculate friction and minor energy losses in pipes, analyse and/or design flows in pipelines and small networks.
LO: 2	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 green energy production, turbines and pumps turbine selection and system design.
LO: 3	Understand water resource systems planning, management and water resources risk management and appreciating the underlying relationships and uncertainties in hydrology.

(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.)

CL315 - Water Engineering 1

Assessment of Learning Outcomes - Criteria

Learning Outcome: **1**

	Criteria
1	Ability to characterise and identify types of flow, and calculate relevant parameters
2	Ability to work with simple models of fluid flow and flow in pipes
3	Ability to perform analysis and design calculations on pipelines and pipe networks

Learning Outcome: **2**

	Criteria
1	The ability to identify and apply common hydraulic principles, relationships, and concepts relevant to water engineering structures, turbomachinery, and renewable energy 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 clearly explain and communicate technical concepts in hydraulics, turbomachinery, and sustainable energy production to a wider audience.

Learning Outcome: **3**

	Criteria
1	The ability to identify and describe key concepts, relationships, and uncertainties in hydrology relevant to water resource systems planning and management.
2	The ability to examine water engineering systems and develop detailed understandings or demonstrations of their underlying principles and operations.
3	The ability to clearly explain and communicate issues of water resources planning, management, and risk to technical and non-technical audiences.

CL315 - Water Engineering 1

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
Quiz 1. Closed Book	1		2.00	2%	3	
Quiz 2. Closed Book	1		2.00	2%	5	
Week 5 lab group	1	5		15%	7	
Week 6 lab group	1	6		15%	8	
Quiz 3. Closed Book	1		2.00	2%	8	
Quiz 4. Closed Book	1		2.00	2%	10	
Quiz 5. Closed Book	1		2.00	2%	11	
Exam . Closed Book	1		2.00	25%	E	
Quiz 1. Closed Book	2		2.00	2%	5	
Hydropower Project	2	2		20%	8	
Quiz 2. Closed Book	2		2.00	3%	9	
Exam . Closed Book	2		2.00	25%	E	

CL315 - Water Engineering 1

Principles of Assessment Feedback

Principles of Assessment and Feedback

(within Assessment and Feedback Policy at:
https://www.strath.ac.uk/staff/policies/academic/http://www.strath.ac.uk/learnteach/informationforstaff/staff/assessfeedback/12principles/)

Please state briefly how these are incorporated in this module.

Principle 1. Assessment and feedback practices promote effective student learning

Coursework and lab assignments are designed to focus student learning on key topics and learning material.

Tutorial problems with answers to encourage and guide private study are provided.

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

All assignments and assessments combine straightforward and challenging tasks.

Model solutions are provided for some coursework assignments.

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

All assessed coursework assignments are open to view within a reasonable time before the deadline.

All assessed coursework assignments are returned to students with feedback including annotations and comments.

Principle 4. Assessment and feedback practices are continuously reviewed

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.

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 exams 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. This re-examination will consist entirely of exam.

Resit Procedure

Resit Assessment Procedures:

Sem. 1 resit: Formal examination in August with same format as in December.

Sem. 2 resit: Formal examination in August with same format as in May/June.

NB: The August examination marks are 100% of the resit marks. Students will be advised as to what semester exams they are required to resit by the module lecturers.

Recommended Reading

Chadwick & Morfett. Hydraulics in Civil and Environmental Engineering, E&FN Spon.
L Hamill. Understanding Hydraulics, Palgrave, 2001.
JF Douglas, JM Gasiorek, JA Swaffield, LB Jack. Fluid Mechanics, Prentice Hall, 2005.
YA Cengel, JM Cimbala. Fluid Mechanics, McGrawHill, 2006.
Massey. Mechanics of Fluids Chapman & Hall, 1998.
Featherstone & Nalluri. Civil Engineering Hydraulics, BSP.
FM White. Fluid Mechanics, McGrawHill, 2003.
Shaw. Hydrology in practice, 3rd Ed. Nelson Thornes.
Hornberger, Raffensperger, Wiberg & Eshleman. Elements of Physical Hydrology. John Hopkins University Press.

CL315 - Water Engineering 1

Module Timetable

Week	Semester 1	Semester 2
0		
1		
2		
3	Test 2%	
4		
5	Test 2%	Test 2%
6		
7	Lab 15%	
8	Test 2%, Lab 15%	Submission 20%
9		Test 3%
10	Test 2%	
11	Test 2%	
E	Examination 25%	Examination 25%

Date of Last Modification

11-09-2025