MODULE SPECIFICATION

Part 1: Information			
Module Title	Hydraulics and Engineering Applications		
Module Code	UBGMNU-30-2	Level	Level 5
For implementation from	2018-19		
UWE Credit Rating	30	ECTS Credit Rating	15
Faculty	Faculty of Environment & Technology	Field	Geography and Environmental Management
Department	FET Dept of Geography & Envrnmental Mgmt		
Contributes towards			
Module type:	Standard		
Pre-requisites	Mathematics for Civil and Environmental Engineering 2018-19		
Excluded Combinations	None		
Co- requisites	None		
Module Entry requirements	None		

Part 2: Description

Features: Module Entry Requirements: 60 credits at Level 1

Educational Aims: In addition to the learning outcomes, the educational experience may explore, develop, and practise but not formally discretely assess the following:
Working as a team member

Outline Syllabus: HYDRAULICS (FLUID MECHANICS):
Statics: general properties of fluids, pressure, buoyancy.
Basic Concepts of Fluid Motion: flow of Newtonian fluids, types of flow, drag.
Two Dimensional Inviscid Flow: conservation equations, continuity, Bernoulli equation, kinematics of fluid motion, velocity, acceleration, streamlines.
Dynamics: laminar and turbulent flows, Reynold's number, fluid acceleration, energy equation, momentum equation, flow around a cylinder, flow around aerofoils and over buildings.
Open Channel Flow: classification, Manning's equation, sections, normal depth, Bernoulli equation, critical depth, critical conditions, hydraulic jumps, flumes, weirs.

Steady Flow in Pipes: Darcy equation, Moody diagram, HR Wallingford tables.
Unsteady Pipe Flow: pressure surge – simulation and mitigation techniques.
Machines: the use and characteristics of roto-dynamic pumps and turbines.
Dimensional Analysis: principles, dimensionless groups, dynamic similarity, experimental verification.
Hydraulic modelling: numerical / physical, creating a model .

APPLICATIONS (FEASIBILITY STUDY):
Determine alternative design options.
Use Net Present Value analysis.

Teaching and Learning Methods: Scheduled learning includes lectures, seminars, tutorials, project supervision, demonstration, practical classes and workshops; fieldwork; external visits; supervised time in studio/workshop. Scheduled sessions may vary slightly depending on the module choices you make.

Independent learning includes hours engaged with essential reading, assignment preparation and completion etc. Students will receive on average 3 hours contact time per week. This will be in a range of formats including lectures, tutorials, hydraulics laboratories, computer laboratories and field work.

The amount of time spent on activities in this module is shown below in hours:
Contact time: 72
Assimilation and development of knowledge: 150
Exam and coursework preparation: 78
Total study time: 300

Part 3: Assessment

Component A - Examination. Learning outcomes 1,2, 3, 4, 5, 7 and 8
3 hour examination (Hydraulics).
Written exam with an unseen question paper.
Assessment will be a mix of calculation based solutions and descriptive theory.

Component B - Report. Learning outcomes 1, 3, 4, 6, 7 and 8.
3000 word report (Applications).
Report to be based on a feasibility study of a hydraulic application.
Assessment will be base on relevance, depth of interpretation and standards of literacy and presentation.

First Sit Components	**Final Assessment**	**Element weighting**	**Description**
Report - Component B		50 %	Report (3000 words)
Examination - Component A	✓	50 %	Exam (3 hours)
Resit Components	**Final Assessment**	**Element weighting**	**Description**
Report - Component B		50 %	Report (3000 words)
Examination - Component A	✓	50 %	Exam (3 hours)

Part 4: Teaching and Learning Methods

Learning Outcomes

On successful completion of this module students will be able to:

	Module Learning Outcomes
MO1	Show a detailed knowledge and understanding of the application of hydraulics to describe and solve problems encountered in civil and environmental engineering
MO2	Explain basic concepts and derive logical equations of fluid flow
MO3	Calculate pressures and loads imposed by static and moving fluids
MO4	Design open channels and pipes
MO5	Compare and contrast the requirements for and applications of hydraulic modelling
MO6	. Undertake a feasibility study, selecting appropriate systems, technologies and materials for a hydraulic application
MO7	Show cognitive skills with respect to logical thinking and the use of symbolic language to describe the relationships between real or abstract quantities in the context of problems that arise in civil and environmental engineering
MO8	Recognise and understand the link to the mathematics modules and the typically non-linear nature of engineering problems

Contact Hours

Contact Hours	
Independent Study Hours:	
Independent study/self-guided study	228
Total Independent Study Hours:	228
Scheduled Learning and Teaching Hours:	
Face-to-face learning	72
Total Scheduled Learning and Teaching Hours:	72
Hours to be allocated	300
Allocated Hours	300

Reading List

The reading list for this module can be accessed via the following link:

https://uwe.rl.talis.com/modules/ubgmnu-30-2.html