



Module Specification

Hydraulics and Engineering Applications

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Part 1: Information

Module title: Hydraulics and Engineering Applications

Module code: UBGMNU-30-2

Level: Level 5

For implementation from: 2023-24

UWE credit rating: 30

ECTS credit rating: 15

Faculty: Faculty of Environment & Technology

Department: FET Dept of Geography & Environmental Mgmt

Partner institutions: None

Field: Geography and Environmental Management

Module type: Module

Pre-requisites: Engineering Principles for Civil Engineering 2023-24, Mathematics for Civil and Environmental Engineering 2023-24

Excluded combinations: None

Co-requisites: None

Continuing professional development: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: Not applicable

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.

Part 3: Teaching and learning methods

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

Module Learning outcomes: On successful completion of this module students will achieve the following 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

Hours to be allocated: 300

Contact hours:

Independent study/self-guided study = 228 hours

Face-to-face learning = 72 hours

Total = 300

Reading list: The reading list for this module can be accessed at [readinglists.uwe.ac.uk](https://uwe.rl.talis.com/modules/ubgmnu-30-2.html) via the following link <https://uwe.rl.talis.com/modules/ubgmnu-30-2.html>

Part 4: Assessment

Assessment strategy: Assessment Task 1 - Examination (Online). Learning outcomes 1,2, 3, 4, 5, 7 and 8
exam (4 hours) (Hydraulics).

Written exam with an unseen question paper.

Assessment will be a mix of calculation based solutions and descriptive theory.

Assessment Task 2 - 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.

Assessment tasks:

Examination (Online) (First Sit)

Description: Online Exam (4 hours)

Weighting: 50 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO4, MO5, MO7, MO8

Report (First Sit)

Description: Report (3000 words)

Weighting: 50 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO3, MO4, MO6, MO7, MO8

Examination (Online) (Resit)

Description: Online exam (4 hours)

Weighting: 50 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO4, MO5, MO7, MO8

Report (Resit)

Description: Report (3000 words)

Weighting: 50 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO3, MO4, MO6, MO7, MO8

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Civil Engineering [Frenchay] BEng (Hons) 2022-23

Civil Engineering [Jan][FT][Northshore][4yrs] - Not Running MEng 2022-23

Civil Engineering [Jan][FT][Northshore][3yrs] - Not Running BEng (Hons) 2022-23

Civil and Environmental Engineering [Sep][SW][Frenchay][4yrs] - Not Running BEng (Hons) 2022-23

Civil and Environmental Engineering [Sep][FT][Frenchay][3yrs] - Not Running BEng (Hons) 2022-23

Civil Engineering [Frenchay] MEng 2022-23

Civil and Environmental Engineering {Foundation} [Sep][FT][Frenchay][4yrs] - Not Running BEng (Hons) 2021-22

Civil and Environmental Engineering {Foundation} [Sep][SW][Frenchay][5yrs] - Not Running BEng (Hons) 2021-22

Civil Engineering {Foundation} [Sep][FT][Frenchay][4yrs] BEng (Hons) 2021-22

Civil Engineering {Foundation} [Sep][SW][Frenchay][5yrs] BEng (Hons) 2021-22

Civil and Environmental Engineering [Sep][PT][Frenchay][7yrs] - Not Running MEng 2020-21

Civil and Environmental Engineering [Sep][PT][Frenchay][5yrs] - Not Running BEng (Hons) 2020-21

Civil and Environmental Engineering {Apprenticeship-UWE} [Sep][FT][Frenchay][5yrs] - Not Running BEng (Hons) 2020-21

Civil Engineering [Sep][PT][Frenchay][5yrs] BEng (Hons) 2020-21

Civil Engineering {Apprenticeship-UWE} [Sep][FT][Frenchay][5yrs] BEng (Hons) 2020-21

Civil Engineering [Sep][PT][Frenchay][7yrs] MEng 2020-21