



## **Module Specification**

### **Advanced Water and Wastewater Engineering Design**

Version: 2023-24, v3.0, 14 Jul 2023

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## Part 1: Information

**Module title:** Advanced Water and Wastewater Engineering Design

**Module code:** UBGMUR-15-M

**Level:** Level 7

**For implementation from:** 2023-24

**UWE credit rating:** 15

**ECTS credit rating:** 7.5

**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:** None

**Excluded combinations:** None

**Co-requisites:** None

**Continuing professional development:** No

**Professional, statutory or regulatory body requirements:** None

## Part 2: Description

**Overview:** In this module you will examine the analysis of water and wastewater infrastructure, the treatment and distribution of potable water, the collection, treatment and disposal or reuse of wastewater and polluted streams and the management of stormwater runoff.

**Features:** Not applicable

**Educational aims:** See Learning Outcomes.

**Outline syllabus:** You will cover:

The Global Water and Wastewater Industry: Historical developments of the water sector across the United Kingdom, legislative, financial and managerial frameworks for the sector and current needs in developing countries.

Water Resources: Assessment of sustainable yield of water resources (water balance concepts, hydrologic design of structures, pumping stations, pipelines, reservoirs, dams; assessment of groundwater resources (aquifer properties, design of wells, boreholes and pumping plants).

Water Quality: Water quality indices and criteria, drinking water guidelines and standards, water quality parameters, wastewater treatment standards.

Irrigation and Drainage Engineering: Surface, sprinkler and trickle irrigation, land grading, on-farm and biosystems water requirement schemes, scheduling of irrigation, design of canals and hydraulic structures, drainage design theories, drain spacing and depth requirements for irrigated areas, computer applications in drainage.

Water Process Engineering and Supply: Standards for raw and potable water treatment processes, water collection, supply and treatment systems, overall design of water treatment plants.

Wastewater Treatment: Wastewater quantities and collection systems, characteristics of industrial and municipal wastewater, preliminary, primary, secondary and tertiary treatment stages of wastewater. Reactor kinetics, reactor types and analyses. On-site wastewater treatment systems.

**Part 3: Teaching and learning methods**

**Teaching and learning methods:** See Assessment Strategy

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

**MO1** Review and evaluate the complex structures and management for water and wastewater sectors, including health and safety issues

**MO2** Apply Environmental Engineering concepts and processes related to the water cycle, water supply engineering and wastewater management with critical insight

**MO3** Analyse and evaluate aspects of water quality and how they may be quantified

**MO4** Apply design processes and methodologies for water and wastewater engineering, showing how health and safety issues are addressed at the design stage

**MO5** Formulate innovative solutions for water quality and water quantity problems through analysis and research; developing appropriate environmental engineering solutions that consider sustainability issues

**MO6** Analyse and evaluate the importance of practical water and wastewater infrastructure, designs, construction, operations and maintenance considerations in relation to the process through hands-on field-based activities

**Hours to be allocated:** 150

**Contact hours:**

Independent study/self-guided study = 114 hours

Face-to-face learning = 36 hours

Total = 150

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

## **Part 4: Assessment**

**Assessment strategy:** The strategy of the assessment is to ensure that students have critical understanding of engineering theories as well as the ability to design water and wastewater infrastructure systems. Hence, the assessment is divided into two parts of coursework. Each piece of coursework will assess the student's abilities to use current techniques, technologies and infrastructure for various water and wastewater industry schemes- and to reflect on the engineering processes.

#### Task 1.

A study, analysis and design report of a water infrastructure scheme, e.g. Water Treatment and Supply Plant, Drainage and Irrigation Systems, Hydropower Stations or similar water infrastructure.

#### Task 2.

A wastewater treatment plant or wastewater treatment works design project report for wastewater management, water reuse and recycling.

The resit strategy is the same as the first sit.

#### **Assessment tasks:**

##### **Report (First Sit)**

Description: Individual Design Report 1: 2000 words plus appendices

Weighting: 50 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO2, MO3

##### **Report (First Sit)**

Description: Individual Design Report 2: 2000 words plus appendices

Weighting: 50 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO4, MO5, MO6

**Report (Resit)**

Description: Individual Design Report 1: 3000 words plus appendices

Weighting: 50 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO2, MO3

**Report (Resit)**

Description: Individual Design Report 2: 2000 words plus appendices

Weighting: 50 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO4, MO5, MO6

**Part 5: Contributes towards**

This module contributes towards the following programmes of study:

Civil Engineering [Frenchay] MSc 2023-24

Civil Engineering [Frenchay] MSc 2022-23

Civil and Environmental Engineering [Sep][FT][Frenchay][4yrs] - Not Running MEng  
2020-21

Civil Engineering [Sep][FT][Frenchay][4yrs] MEng 2020-21

Civil and Environmental Engineering [Sep][SW][Frenchay][5yrs] MEng 2019-20