

MODULE DESCRIPTION FORM



DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

CL446 Water & Environmental Management

Module Registrar: Dr T K Beattie	Taught To (Course): BEng/MEng Civil and Environmental Engineering/ERASMUS		
Other Lecturers Involved:	Credit Weighting: 10	Semester: 1	
Assumed Prerequisites:	Compulsory/ optional/ class	Academic Level: 4	Suitable for Exchange: Y

Module Format and Delivery (HOURS i.e. 1 credit = 10hrs of study):

Lecture	Tutorial	Laboratory	Groupwork	External	Online	Project	Assignments	Private Study	Total
18	2						20	60	100

Educational Aim

This module aims to provide an insight into water quality, water quality objectives and pollution control strategy, and introduce the design and control of water and wastewater treatment processes.

Learning Outcomes

On completion of the module the student is expected to be able to

LO1 Understand the properties of surface water and how alterations to these, e.g. due to pollution events, can have an impact on water quality, biodiversity and human health

LO2 Discuss the impact of legislation on surface water quality

LO3 Discuss collection and treatment of community wastewater

LO4 Discuss treatment and provision of drinking water

Syllabus

The module will include the following:

Physical and chemical characteristics of water and wastewater, including BOD, COD, alkalinity, hardness, colour, turbidity, Fe, trihalomethanes.

Microbial quality of water and its measurement

Surface water and disease transmission

Effects of principal pollutants on the water ecosystem.

Marine, coastal, estuarine pollution issues and control, objectives in out-fall design, bathing beaches, shell fisheries.

River pollution, oxygen sag curve.

Pollution of lakes and reservoirs, eutrophication, thermal stratification

Review of sources of pollution control strategy on the basis of Environmental Quality Objective, Best Practical Environmental Option, Environmental Quality Standard.

Demand for water and production of wastewater.

Introduction to wastewater treatment: characteristics and quality.

Overview of sewage works design: preliminary processes including screens and grit removal, sedimentation, activated sludge design, sludge treatment and disposal.

Water Treatment: Review of water types and water quality objectives, overview of water treatment works design, coagulation, flocculation, filtration.

Assessment of Learning Outcomes

Criteria

For each of the Module Learning Outcomes the following criteria will be used to make judgements on student learning:

LO1 Understand the properties of surface water and how alterations to these, e.g. due to pollution events, can have an impact on water quality, biodiversity and human health

C1 familiarity with physical, chemical and biological properties of surface waters, and the influence they have on water quality

C2 familiarity with major water pollutants and the effect they have on surface water quality

LO2 Discuss the impact of legislation on surface water quality

C1 familiarity with the influence and impact of various EU directives on national legislation and the provision of national water quality standards for wastewater, surface, bathing and drinking water

C2 have an understanding of pollution control strategies utilising water quality standards and objectives as defined by National/EU regulation

LO3 Discuss collection and treatment of community wastewater

C1 familiarity with wastewater collection systems

C2 have an awareness of wastewater treatment processes and the overall design of sewage works, including the design of settling tanks, activated sludge and sludge treatment

LO4 Discuss treatment and provision of drinking water

C1 familiarity with plant processing for provision of drinking water from raw sources through to delivery of drinking water to the consumer

C2 have an awareness of water treatment including water types, water quality objectives, the processes of coagulation and flocculation and the design of filtration systems

The standards set for each criterion per Module Learning Outcome to achieve a pass grade are indicated on the assessment sheet for all assessment.

Principles of Assessment and 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.

Information issued at start of Semester includes simple & clear guidance on the overall assessment load throughout the Semester. Expectations in terms of time and effort are outlined clearly in the presentation of each assignment. These expectations are communicated clearly in class. Weightings for each assignment underscore the time expectations.

Students are given opportunities to engage in optional assessments using carefully managed mechanisms of only counting the contribution of this work if these marks are in the student's favour. This encourages more able students to try to achieve higher overall marks by taking their learning to a more advanced level, while at the same time avoiding overly penalising overloaded and/or less-able students who may be overwhelmed by the additional workload.

Criterion based feedback to students is an integral part of teaching. This is collated into 'generic' feedback that is shared with the whole class, to complement individual feedback for each student. The generic feedback is particularly useful inasmuch as any common or recurring difficulties experienced by many in the class could suggest ways in which teaching and guidance could be improved. The individual feedback is directed at how each student can improve, in all cases avoiding comparisons between students. Feedback sheets provide information allowing students to compare their work to the expectations for each assignment and reflect on improvements for future work.

Information issued at the start of the class, includes simple & clear guidance on performance criteria by reference to the University Guidance on Marking for Undergraduate Courses*. Reference is made to equivalent p/g marking schemes in MSc handbooks. Marking criteria are outlined clearly in the assignment handout and multiple opportunities for clarification are available in class. Feedback sheets demonstrate what constitutes "excellent" work.

*Guidance on Marking for Undergraduate Courses: <https://www.strath.ac.uk/staff/policies/academic/>

The course includes some assessment scenarios where creativity and ability to solve open-ended problems are valued. In such scenarios tightly specified goals or outcomes in advance may be inappropriate. Instead students are guided about the nature of the assignment and actively engaged in making their own judgements about what would constitute quality.

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

	Examinations			Courseworks		Projects		
	Number	Month(s)	Duration	Weighting	Number	Weighting	Number	Weighting
L/Outcomes	1		2 hours	70	1	30		
	1-3				1-3			

Indicate which learning outcomes (L01, L02 etc) are to be assessed by exam/coursework/project as required.

Coursework / Submissions deadlines (academic weeks):

Class test week 7

Resit Assessment Procedures:

The class registrar will inform the student of the details of the resit assessment after the June exam board. The resit will either be an exam during the August exam diet or a coursework due for submission in August; the submission will be worth 100% of the resit mark.

PLEASE NOTE:

Students must gain a summative mark of 40% to pass the module. Students who fail the module at the first attempt will be re-examined during the August diet. This re-examination will consist entirely of exam or coursework. No marks from any previous attempts will be transferred to a new resit attempt.

Recommended Reading**For reference**

The course was developed around the following text books – however any water quality text book will be suitable for background reading.

Tebbutt, THY. Principles of Water Quality Control. Pergamon (5th Ed) 1998, ISBN 0 7506 3658 0.
Gray, NF. Water Technology: an introduction for environmental scientists and engineers. Elsevier (2nd Ed.) 2005, ISBN0750666331
Ellis, KV; Warn, AE & White, G. Surface Water Pollution & its Control. MacMillan ISBN 0 333 427645.
Harrison, RH. Pollution: Causes, Effects & Control. (4th Ed) 2001 , Royal Society of Chemistry.

Additional Student Feedback

(Please specify details of when additional feedback will be provided)

Date	Time	Room No

Session:

Approved:**Course Director Signature: Dr Tara K. Beattie****Date of Last Modifications: 29/08/22**

(Updated May 2018)

