

## MODULE DESCRIPTION FORM



### DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

## CL904 Waste Management and Landfill Design

<b>Module Registrar:</b> Dr Tara K. Beattie	<b>Taught To (Course):</b> MSs courses in Dept of Civil & Environmental Engineering		
<b>Other Lecturers Involved:</b>	<b>Credit Weighting:</b> 10	<b>Semester:</b> 2	
<b>Assumed Prerequisites:</b>	<b>Compulsory/ optional class</b>	<b>Academic Level:</b> 5	<b>Suitable for Exchange:</b> 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 develop a critical understanding of the process involved with management of primarily municipal solid waste, including storage, collection, treatment methods, and ultimately disposal. Students will also gain knowledge of the regulation associated with such wastes, and the roles of the various agencies involved in the processes

#### Learning Outcomes

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

LO1 Discuss the generation of solid waste

LO2 Discuss legislation related to solid waste management

LO3 Discuss common methods used in the management and treatment of solid municipal waste

#### Syllabus

The module will include the following:

Introduction to Solid Waste Management – definition, categorisation (controlled & non-controlled) and arisings  
National Waste Strategy for Scotland and UK and other Regulation pertinent to Solid Waste Management  
Collection, Recycling & Materials Recovery Facilities  
Energy from Waste - incineration, gasification, pyrolysis and refuse derived fuel  
Anaerobic digestion and composting of solid waste  
Landfill – design, operation, waste degradation processes, leachate & gas management  
Solid Waste Management in Developing countries  
Hazardous Waste, Clinical Waste, C & D Waste.

#### 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 Discuss the generation of solid waste

C1 categorise solid waste as defined by pertinent Scottish/UK/European legislation, and understand why this is an important concept

C2 familiarity with solid waste arisings in Scotland & the UK

LO2 Discuss legislation related to solid waste management

C1 Familiarity with government strategy and the concepts behind development of regulation, i.e. to protect human health and the environment, and be aware of current development within this field of regulation

C2 Familiarity with the drivers behind change in the management of such methods

LO3 Discuss common methods used in the management and treatment of solid municipal waste

C1 familiarity with solid waste collection, sorting and transfer

C2 familiarity with recycling, thermal treatment of solid waste (incineration, gasification, pyrolysis), biological treatment of solid waste (anaerobic digestion and composting), landfill as a disposal option, and developing methods

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	55 or 70	1 or 2	30 or 45		

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 8

Optional Waste poster Week 10

### 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 50% 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

Harrison, RH. Pollution: Causes, Effects & Control. (4rd Ed) 2001 , Royal Society of Chemistry.  
Waste Disposal & Treatment by Paul T. Williams, 2nd Ed, 2005, published by John Wiley & Sons Ltd – Main Library, short loan D628.445WIL

#### Wider References

National Waste Strategy – Scotland, England, etc

Netregs <http://www.netregs.gov.uk/netregs/>

SEPA [www.sepa.org.uk/](http://www.sepa.org.uk/)

DEFRA [www.defra.gov.uk/](http://www.defra.gov.uk/)

Environment Agency [www.environment-agency.gov.uk/](http://www.environment-agency.gov.uk/)

Environment Agency guidance for landfill gas management (various guidance documents)

Guidance on monitoring landfill leachate, groundwater and surface water, SEPA 2003

### 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

## MODULE TIMETABLE

**Module Code:** CL904

**Module Title:** Waste Management and Landfill Design

**Brief Description of Assessment:**

Class test (30%)  
 Optional poster assignment (15%)  
 Examination (55% or 70%) – 2nd Diet Exam in May

**Assessment Timing:-**

Indicate on the table below the start/submission dates for each assignment/project and the timing of each exam/assessment using the dropdowns provided. Dropdowns can be left blank. Add extra notes below the dropdowns.

**Please note: Timings can and will change, this should only be used as a guide.**

Semester One	W&D Wk	WK1	WK2	WK3	WK4	WK5	WK6	WK7	WK8	WK9	WK10	WK11	Exam Period
		Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.

Semester Two	C&D Wk	WK1	WK2	WK3	WK4	WK5	WK6	WK7	WK8	WK9	WK10	WK11	Exam Period
		Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	<b>Class Test</b> Choose an item.	Choose an item. Choose an item.	<b>Course work Submit</b> Choose an item.	Choose an item. Choose an item.