

CLASS/MODULE DESCRIPTOR 2019/20



**CL904 Waste Management and Landfill Design**

<b>Registrar:</b> Dr T K Beattie	<b>Taught To (Programme):</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 Pre-requisites:</b>	<b>Compulsory/ optional class</b>	<b>Academic Level:</b> 5

**Class Format and Delivery (hours):**

Lecture	Tutorial	Laboratory	Coursework	Project	Private Study	Total
18	2		20		60	100

**Class Aim(s)**

This class 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 class 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 class will teach 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 Criteria

For each of the Course 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 Learning Outcome to achieve a pass grade are indicated on the assessment sheet for all assessments.

## Principles of Assessment and Feedback (<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.

## Recommended Reading

### Background reading

Harrison, RH. Pollution: Causes, Effects & Control. (4<sup>th</sup> 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

SEPA Waste Aware Course – MyPlace

NSCA Pollution Control Handbook - Main Library, short loan

**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

**PLEASE NOTE:**

**Students need to 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 may consist of either an exam or coursework.**

**Resit Arrangements**

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.

**Approved**

Programme Director Signature: Tara K. Beattie

Date of Last Modifications: September 2019

(Updated 9<sup>th</sup> August 2018)

