

Module Code	CE7E04
Module Name	E4: Waste Management and Energy Recovery
ECTS Weighting¹	5 ECTS
Semester taught	Semester 2
Module Coordinator/s	Lecturer(s): Asst. Prof. Liwen Xiao (Liwen.Xiao@tcd.ie)
<u>Module Learning Outcomes</u> with reference to the <u>Graduate Attributes</u> and how they are developed in discipline	<p>On successful completion of this module, students should have</p> <p>LO1. An understanding of the nature of solid waste and the conceptual approaches to solving the problems of its management.</p> <p>LO2. An understanding of the theories and technologies of energy recovery from solid waste.</p> <p>Graduate Attributes: levels of attainment</p> <p>To act responsibly - Enhanced</p> <p>To think independently - Enhanced</p> <p>To develop continuously - Enhanced</p> <p>To communicate effectively - Introduced</p>
Module Content	<p>This module will introduce (1) the definition of waste and approaches to the assessment, management and control of solid waste in its various forms, and (2) the theories and technologies of energy recovery from solid waste.</p> <ul style="list-style-type: none"> • Solid waste: definitions and assessment, liquid, solid and gaseous, waste management strategies, legislation and regulations • Landfill: processes and environmental impact. • Thermal treatment: Incineration, pyrolysis, gasification. • Energy recovery: heat, biofuel, electricity and combustible gases recovery from organic waste;
Teaching and Learning Methods	Lectures, tutorials, coursework and field visit

Assessment Details² Please include the following: <ul style="list-style-type: none"> • Assessment Component • Assessment description • Learning Outcome(s) addressed • % of total • Assessment due date 	Assessment Component	Assessment Description	LO Addressed	% of total	Week due
	Examination	3 hours written exam	LO1, LO2	70%	Week 37/38
	Coursework 1	Tutorial/assignment	LO1, LO2	10%	Week 29
	Coursework 2	Report and field visit	LO1, LO2	20%	Week 33

Reassessment Requirements
Examination [3 hours written exam], weighted 100%

Contact Hours and Indicative Student Workload²	Contact hours: 40 hours lectures, tutorial and site visit
	Independent Study (preparation for course and review of materials): 30 hours; Researching journals; reading text books recommended in module booklist; reviewing lecture material and class notes
	Independent Study (preparation for assessment, incl. completion of assessment): 30 hours; literature review, research methods development, data collection and analysis, completion of end of semester essay;

Recommended Reading List

Text books include:

Fetter, C.W. CONTAMINANT HYDROGEOLOGY, 1999, Prentice Hall

La Grega, M.D., Buckingham, P.L., Evans, G.J., HAZARDOUS WASTE MANAGEMENT, 1994, McGraw-Hill

Nathanail, C.P. and Bardos, R.P. RECLAMATION OF CONTAMINATED LAND, 2004, Wiley

Tchobanoglous, G., Theisen, H., Vigil, S.A. INTEGRATED SOLID WASTE MANAGEMENT, 1993, McGraw-Hill

Williams, P. WASTE TREATMENT AND DISPOSAL, 1997, Wiley

Module Pre-requisite
Chemistry and environmental engineering background

Module Co-requisite	
Module Website	
Are other Schools/Departments involved in the delivery of this module? If yes, please provide details.	No
Module Approval Date	
Approved by	
Academic Start Year	1 st September 2021
Academic Year of Date	2021/2022