



DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

CL439 Contaminated Land

Module Registrar: Dr Christine Switzer	Taught To (Course): BEr	ng/MEng Civil and Environmental
	Engineering (C); BEng/MI	Eng Civil Engineering (O)
Other Lecturers Involved:	Credit Weighting:	Semester: 1
	10 credits	
Assumed Prerequisites:	Compulsory/ optional/	Academic Level: 4
	elective class	

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

Lecture	Tutorial	Laboratory	Groupwork	External	Online	Project	Assignments	Private Study	Total
(20)	12		(30)		20	30	8	30	100

Educational Aim

This module aims to provide insights into the remediation of contaminated land, including the regulatory framework; exposure assessment; sampling & analysis; and the various remedial processes for contaminated land.

Learning Outcomes

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

LO1 identify possible human health and environmental risks associated with contaminated land management

LO2 demonstrate a working knowledge of the regulatory framework in place in the UK for contaminated land management and remediation, including relevant legislation, policies and regulations.

LO3 evaluate critically the range of technologies that may be suitable for various types of contamination present

LO4 make informed decisions about technologies for contaminated land remediation based upon technical solutions, risk assessment & management, planning and financial constraints

(UK SPEC suggests no more than 4 learning outcomes per module. Statements must be broad and be syllabus free and link in with the intended learning outcomes on the programme specifications.)

Syllabus

The module will include the following:

- Introduction to Land Regeneration definitions, processes and relevant legislation.
- Exposure assessment and its limitations.
- Overview of contaminant mass transfer processes and influences on remediation design & operation.
- Types of pollutants and contaminants (hydrocarbons, chlorinated solvents, metals). Hazards and risks. Site assessment, treatment selection and the related management implications.
- Links between Site Investigation, Risk Assessment and Remediation.
- Risk-informed decision-making.
- Land redevelopment: Residential, industrial/commercial and gardens/parks, risk assessment (source-pathways-receptor).
- Planning advice and legislation in Scotland, the UK and the EU.
- International differences in land regeneration.
- Contaminated land management case studies.

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 identify possible human health and environmental risks associated with contaminated land management
- C1 understand the types of contamination that may be present at a site and their possible impacts
- C2 identify the potential source-pathway-receptor linkages at a site
- C3 use conceptual site models to show the potential linkages
- LO2 demonstrate a working knowledge of the regulatory framework in place in the UK for contaminated land management and remediation, including relevant legislation, policies and regulations.
- C1 identify the major parties involved in remediation decisions
- C2 determine the main mechanisms for triggering remediation decisions
- C3 place UK framework into an international context
- LO3 evaluate critically the range of technologies that may be suitable for various types of contamination present
- C1 determine possible technology choices based on site-specific parameters
- C2 identify strengths and weaknesses of technology choices
- C3 connect strengths and weaknesses to site conditions
- LO4 make informed decisions about technologies for contaminated land remediation based upon technical solutions, risk assessment & management, planning and financial constraints
- C1 identify all stakeholder groups that may be affected by site contamination and/or the remediation effort
- C2 connect information learning objectives L01 L03 and stakeholder needs to remediation decisions
- C3 evaluate critically costing information provided in the literature

[Note: Criteria break the LO down into 'teachable' elements but do not become syllabus orientated i.e. no mention of CAD package names, components etc.]

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:

L/Outcomes

https://www.strath.ac.uk/staff/policies/academic/http://www.strath.ac.uk/learnteach/informationforstaff/staff/assessfeedback/12principles/

PRINCIPLE 1. ASSESSMENT AND FEEDBACK PRACTICES PROMOTE EFFECTIVE STUDENT LEARNING Assessment and feedback structure and timing is designed to support students' learning. Assessments are distributed through the semester to engage students throughout the course and provide sufficient time to reflect upon feedback.

PRINCIPLE 2. ASSESSMENT AND FEEDBACK PRACTICES ARE APPROPRIATE, FAIR, AND TRANSPARENT Assessment criteria are published to students and staff in assignment instructions. Answers to students' questions about assignment instructions are published to all students when necessary.

PRINCIPLE 3. ASSESSMENT AND FEEDBACK PRACTICES ARE CLEARLY COMMUNICATED TO STUDENTS AND STAFF Course descriptor is published to all staff and students at the start of term.

PRINCIPLE 4. ASSESSMENT AND FEEDBACK PRACTICES ARE CONTINUOUSLY REVIEWED Assessment and feedback practices are reviewed in midterm and end of term surveys.

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

		Examin	ations		Course	eworks	Pro	ojects
	Number	Month(s)	Duration	Weighting	Number	Weighting	Number	Weighting
	1	December	27 hours*	50%	4	20%	1	30%
6	LO1-LO4				LO1, LO2, L	O3	LO1, LO2,	LO4

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

Project Presentation - Week 7 Project Peer Evaluation – Week 8 Project Report / Presentation – Week 9 **Resit Assessment Procedures:** 27-hr online examination in August diet OR resubmission of coursework(s) prior to commencement of the August exam 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 ***Purchase recommended **Highly recommended reading *For reference Recommended textbook and resources: Nathanail, C.P. and R.P. Bardos (2004) Reclamation of Contaminated Land, London: Wiley Blackwell, 250pp. USEPA Hazardous Waste Clean-up Information http://www.clu-in.org Wider References van Liedekerke, M., G. Prokop, S. Rabl-Berger, M. Kibblewhite, G. Louwagie (2014) Progress in the Management of Contaminated Sites in Europe, Joint Research Centre Institute for Environment and Sustainability, European Commission doi:10.2788/4658 Environment Agency www.environment-agency.gov.uk/ SEPA www.sepa.org.uk/ **Additional Student Feedback** (Please specify details of when additional feedback will be provided) Room No Date Time Session:

Coursework / Submissions deadlines (academic weeks):

Quiz 1 – Week 3 Quiz 2 – Week 4 Quiz 3 – Week 5 Quiz 4 – Week 6

(Updated May 2018)

Approved:

Course Director Signature:

Date of Last Modifications:

MODULE TIMETABLE

Module Code: CL439 Module Title: Contaminated Land

Brief Description of Assessment:

- 1. Quiz 1 (Q1): Formative assessment on contaminant behaviour, toxicology, and public health
- 2. Quiz 2 (Q2): Formative assessment on conceptual site models
- 3. Quiz 3 (Q3): Formative assessment on contaminant transport and mass transfer
- 4. Quiz 4 (Q4): Formative assessment on remediation implementation, monitoring, and verification/validation as well as legislation, policy, and planning
- 5. Project Presentation (PP): Working in groups or individually, students develop a remediation solution or set of solutions for a contaminated land case study
- 6. Peer Evaluation (PE): Students evaluate each other's remediation proposals for quality and effectiveness.
- 7. Project (P): Based on PP and PE, students propose a final remediation solution or set of solutions for their contaminated land case study.
- 8. Examination (E): Students sit a 27-hour online examination in the December diet.

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.

Compostor	W&D	10/12/4	MICO	MICO	10/12/4	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	VAUCE	14/127	14/1/0	MICO	14//240	10/1/244	Every Deried
Semester	Wk	WK1	WK2	WK3	WK4	WK5	WK6	WK7	WK8	WK9	WK10	WK11	Exam Period
One	Choose	Course	Choose	Course	Course	Course	Course	Present	Present	Project	Choose	Choose	Choose an
	an item.	work	an item.	work	work	work	work	ation	ation	Submiss	an item.	an item.	item.
	Choose	Set	Choose	Submit	Submit	Submit	Submit			ion	Choose	Choose	
	an item.	Choose	an item.	Project	Choose	Choose	Choose	Propose	Peer	Choose	an item.	an item.	
		an item.		Set	an item.	an item.	an item.	d project	Evaluati	an item.			
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	C&D												
Semester	Wk	WK1	WK2	WK3	WK4	WK5	WK6	WK7	WK8	WK9	WK10	WK11	Exam Period

vo	Choose	Choose an											
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