

## MODULE DESCRIPTION FORM



### DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

## CL954 Contaminated Land

<b>Module Registrar:</b> Dr Christine Switzer	<b>Taught To (Course):</b> MSc Hydrogeology (C), MSc Civil Engineering (O/C), MSc Environmental Engineering (O), MSc Sustainability and Environmental Studies (O), MSc Environmental Entrepreneurship (O), MEng Civil Engineering (O)	
<b>Other Lecturers Involved:</b>	<b>Credit Weighting:</b> 10 credits	<b>Semester:</b> 1
<b>Assumed Prerequisites:</b>	<b>Compulsory/ optional/ elective class</b>	<b>Academic Level:</b> 5

#### 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:

<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

	Examinations			Courseworks		Projects	
	Number	Month(s)	Duration	Number	Weighting	Number	Weighting
	1	December	27 hours*	4	20%	1	30%
L/Outcomes	LO1-LO4			LO1, LO2, LO3		LO1, LO2, LO4	

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

**Coursework / Submissions deadlines (academic weeks):**

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

**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**

\*\*\*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/](http://www.environment-agency.gov.uk/)  
 SEPA [www.sepa.org.uk/](http://www.sepa.org.uk/)

**Additional Student Feedback**

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

Date	Time	Room No

Session:

**Approved:**

Course Director Signature:

Date of Last Modifications:

(Updated May 2018)



