MODULE DESCRIPTION FORM

DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

CL328 Environmental Engineering

Module Registrar: Dr Christine Switzer	**Taught To (Course): BEng/MEng Civil Engineering, BEng/MEng Civil and Environmental Engineering**	
Other Lecturers Involved:	**Credit Weighting:** **10 credits**	**Semester: 1**
Assumed Prerequisites: MM115 and MM215 (or equivalent)	**Compulsory**	**Academic Level: 3**

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

Lecture	Tutorial	Laboratory	Groupwork	External	Online	Project	Assignments	Private Study	**Total**
20	0	6	(26)	n/a	n/a	20	20	34	100

Educational Aim

In its Charter for Sustainable Development, the Institution of Civil Engineers mandates that "sustainable development is central to civil engineering," and that the profession must "protect and enhance the environment and use resources in a way that does not disadvantage future generations." Environmental engineers work at the interfaces between the built and natural environments, linking fundamental science and engineering to address complex problems. This class aims to provide an overview of how to apply engineering principles to mitigate, adapt to, or prevent human effects on the environment.

Learning Outcomes

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

LO1: recognise the interplay between engineering and the environment (especially their consequential impacts and risks on each other).

LO2: use fundamental scientific and engineering principles to develop representations of environmental systems

LO3: understand the interfaces between human and environmental health

LO4: demonstrate a working knowledge of environmental impact assessment, mitigation strategies, and enhancement

(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:

1: Introduction to Environmental Science and Engineering
2: Environmental Chemistry
3: Environmental Biology
4: Mass and Energy Balances in Environmental Systems
5: Mass and Energy Balances in Environmental Systems
6: Environmental and Climate Justice
7: Environmental Impact Assessment
8: Strategic Environmental Assessment
9: Risk Perception, Exposure Assessment, and Risk Management
10: Environmental Engineering and the Circular Economy

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: recognise the interplay between engineering and the environment (especially their consequential impacts and risks on each other)
C1 identify the interactions between infrastructure development and environmental impacts
C2 understand key scientific principles affecting environmental systems

LO2: use fundamental scientific and engineering principles to develop representations of environmental systems
C1 identify key mass and energy balances governing environmental systems
C2 identify key assumptions that affect these systems and potential simplifications
C3 evaluate representations of these systems using mathematical techniques
C4 determine the effects of uncertainty on these systems and mathematical solutions

LO3: develop solutions to complex environmental problems taking into account the principles of sustainable development
C1 identify engineering solutions to complex environmental problems
C2 determine key specifications that must be met in developed solutions
C3 apply engineering judgment to evaluate proposed solutions

LO4: demonstrate a working knowledge of environmental impact assessment, mitigation strategies, and enhancement
C1 identify potential environmental impacts (positive and negative) associated with development
C2 apply the precautionary principle in evaluating impacts
C3 develop mitigation and enhancement strategies for impacts that can support development when appropriate
C4 identify situations, perhaps because mitigation is insufficient, where development is inappropriate

[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/
)

Please state briefly how these are incorporated in this module.

Assessment and feedback practices promote student learning

- Multiple, diverse assessments are utilised to guide student learning.
- General (class-wide) and individual assessments will be provided via MyPlace.
- Small, formative assessments, some of which are for credit, will provide rapid feedback to students.
- Feedback on substantial written assessments will be provided within three weeks of submission, as per Departmental policy.

Assessment and feedback practices are appropriate, fair and transparent

- Professional-quality report writing and conduct are expected in assignments.
- Assessment criteria and rubrics will be provided in advance of assignments.
- Feedback will be accessible via Myplace and, in most cases, will be based on pre-determined rubrics.
- Assessment and feedback practices are clearly communicated to students and staff.
- Course syllabus will be provided to all students before the first day of class with assignment deadlines indicated.
- Clarifications and further feedback are possible via individual meeting upon request.

Assessment weighting and lecture order

- Rubrics will be provided for assignments.
- Class structure includes both lecture and tutorial.

Assessment and feedback practices are continuously reviewed

- Students will have opportunities to evaluate the course (mid- and final-semester)
- Responses to evaluations (esp. mid-term) will be provided by the class registrar
- Assessments, feedback and course evaluations are reviewed by external examiner, examination boards, and accreditation reviews.
- Class performance is also reviewed via online surveys at the end of each academic year.

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

	Examinations				Courseworks		Projects	
	Number	Month(s)	Duration	***Weighting***	Number	***Weighting***	Number	***Weighting***
	1	December	3 hours	50%	5	30%	1	20%
L/Outcomes								

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

Coursework / Submissions deadlines (*academic weeks*):

Recommended: Davis & Masten (2013) *Principles of Environmental Engineering and Science*. McGraw Hill, 3rd edition (ISBN 9781259060472)

Strongly Recommended: MacKay DJC (2009) *Sustainable Energy without the Hot Air*.

Resit Assessment Procedures:
2 hr 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 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 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**

** Davis & Masten (2013) *Principles of Environmental Engineering and Science*. McGraw Hill, 3rd edition (ISBN 9781259060472)

** MacKay DJC (2009) *Sustainable Energy without the Hot Air*.

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)

MODULE TIMETABLE

Module Code:	**CL328**	**Module Title:**	**Environmental Engineering**

Brief Description of Assessment:
4 x quizzes (3%, 4%, 4%, 4%) throughout the semester
1 laboratory (15%)
1 project (20%)
1 examination (50%)

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.	Course work Set Choose an item.	Choose an item. Choose an item.	Course work Submit Lab Quiz 1 Outdoor lab briefing	Choose an item. Choose an item.	Course work Submit Quiz 2 Project Set	Lab Report Submission Choose an item.	Course work Submit Choose an item. Quiz 3	Choose an item. Choose an item.	Project Submission Choose an item.	Course work Submit Choose an item. Quiz 4	Choose an item. Choose an item.	Exam

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.	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.