

Module Descriptor Form

Civil and Environmental Engineering

CL528 - Sustainable Structural Design

Module Code	CL528	Module Title	Sustainable Structural Design							
Module Registrar	Valentine, Mrs Viola									
Other Staff Involved										
Credit Weighting	10	Semester	2	Elective	Yes	Academic Level				
Pre-requisites	CL418									
Required for										

Module Format and Delivery (hours):

Lectures	Tutorials	Assignments	Labs	Private Study	Total
10	6	34	0	50	100

Educational Aim

This module aims to:

develop ability at conceptual and detailed design of structures using sustainable materials. Students will work in small groups to generate a unique and innovative design concept for a large structure, selected from a number of project briefs, followed by preparation of a contractual report summarising the design proposals.

Syllabus

This module will teach the following:

The class is run on the basis of being a mentored project, however several lectures are included in this module. Topics that students will learn about, in class and especially through self-study are as follows:

- Sustainable structural materials
- Conceptual design and optimisation of sustainable structures
- Preliminary sizing and detailed design of structural elements
- Sway sensitivity and dynamic behaviour of lightweight structures
- Embodied carbon assessment
- Connections and methods of construction

Learning Outcomes

On Completion of the module, the student is expected to be able to:

LO: 1	Generate a unique or innovative design concept for a large structure adopting sustainable and low-carbon/carbon-neutral materials.
LO: 2	Assess the limitations of the proposed concept in terms of dynamic and sway sensitivity of lightweight structures.
LO: 3	Prepare the detailed technical design of typical structural elements.
LO: 4	Produce a coherent final report summarising the design proposals.
LO: 5	Work and collaborate in a group on a complex design brief.

(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.)

Assessment of Learning Outcomes - Criteria

Learning Outcome: 1

	Criteria
1	Knowledge of structural forms for large sustainable structures
2	Ability at defining load paths for both gravitational and lateral loadings
3	Ability at initial sizing of typical structural elements
4	Knowledge of methods of construction for large sustainable structures

Learning Outcome: 2

	Criteria
1	Ability to assess the sway sensitivity of lightweight structures in accordance with the relevant Eurocodes or British Standards
2	Knowledge of methods of assessing the dynamic behaviour of large lightweight structures

Learning Outcome: 3

	Criteria
1	Ability at selecting appropriate material properties
2	Ability at defining the loadings and load transfer in a structure
3	Ability at detailed analysis of individual structural elements using also computer software and technical design of individual typical structural elements in accordance with relevant Eurocodes or British Standards
4	Knowledge of connection design

Learning Outcome: 4

	Criteria
1	Ability at producing a concise contractual report
2	Ability at preparing structural calculations, including assessing embodied carbon of the primary frame
3	Ability at producing structural drawings of general arrangement and details

Learning Outcome: 5

	Criteria
1	Ability to further develop a complex design brief as a team
2	Ability to work on delegated tasks and coordinate own work with others in the group

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

To Pass the module, students need to gain a summative mark of: 50%

Description	Semester	Start Week	Duration	Weight	Submission Week	Linked Criteria
DP51 Material Selection	2	1		10%	3	LO 1: C1, C4 LO 3: C1 LO 5: C1, C2
DP52 Design Review	2			20%	6	LO 1: C1, C2, C3, C4 LO 3: C1, C2, C3, C4 LO 5: C1, C2
DP53 Final Design Report	2	1		70%	11	LO 1: C1, C2, C4 LO 2: C1, C2 LO 3: C1, C2, C3, C4 LO 4: C1, C2, C3 LO 5: C1, C2

Principles of Assessment 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/>)

These are incorporated in this module as follows:

- The project activities are spread throughout the semester.
- Feedback to groups is given on a weekly basis so that they have the opportunity to improve their work on an ongoing basis.
- The design reviews in week 6 have relatively low marks but allows feedback to be given at this key point in the project so that students can incorporate the advice given into their final design report.
- The group project encourages peer dialogue covering many issues and also, structured discussion with the teacher.
- Assessment covers a range of skills and abilities (communication and technical writing, sketching, structural analysis and calculations and technical drawings etc.) so that students who have strengths in some skills, but not others, can still do well in this class.
- Coursework is broken down into the specific topics to be covered and the proportion of the overall marks allocated to each topic is specified.
- Examples of the presentation standard required for calculations and engineering drawings are provided on Myplace.

Additional Information

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 resit diet in July/August. This re-examination will consist entirely of coursework with resit assessment procedures as above. The resit mark will be 100% of the resit coursework. No marks from any previous attempts will be transferred to a new resit attempt.

Resit Procedure

Resubmission of DP53 Final Design Report, either individually or by the whole group, prior to commencement of the resit exam diet in July/August.

Recommended Reading

An extensive list of references for specific technical topics, as well as other general references are provided on Myplace.

Module Timetable

Week	Semester 1	Semester 2
0		
1		
2		
3		Submission 10%
4		
5		
6		In Person 20%
7		
8		
9		
10		
11		Submission 70%
E		

Date of Last Modification

10-09-2025