



Module Specification

Design of Structural Elements

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Part 1: Information

Module title: Design of Structural Elements

Module code: UBGMVQ-15-2

Level: Level 5

For implementation from: 2022-23

UWE credit rating: 15

ECTS credit rating: 7.5

Faculty: Faculty of Environment & Technology

Department: FET Dept of Geography & Environmental Mgmt

Partner institutions: None

Delivery locations: Frenchay Campus

Field: Geography and Environmental Management

Module type: Project

Pre-requisites: Mathematics for Civil and Environmental Engineering 2022-23

Excluded combinations: None

Co-requisites: None

Continuing professional development: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: This module will introduce students to the scheme design of structural elements in reinforced concrete, steel and timber. The design procedures introduced will use standard codes of practice.

This module will require you to create a structural scheme design for a small multi-storey building against an open-ended design brief.

Students will be required to select appropriate materials for a building structure taking appropriate regard to the structural performance of materials and also to mitigate the contribution the design would make to embodied carbon emissions

The design processes introduced will use standard codes of practice and appropriate industry guidance.

Features: Not applicable

Educational aims: See Learning Outcomes

Outline syllabus: Students will cover:

Principles of permanent, variable and wind loads on structures
Limit and Service State design principles

Assessment of embodied carbon in a structure

Design of a simple bracing system to resist horizontal forces (wind and notional out-of-plane forces)

Design of structural steel beams and columns
Principles of laterally unrestrained steel beam design

Design of reinforced concrete beams, columns and slabs
Principles of RC flanged beam design

Design of timber beams

Part 3: Teaching and learning methods

Teaching and learning methods: The module will support the Assessment Strategy which is progressive through the module, problems - relatable but not identical to the Assessment requirements will be set with appropriate lecture, tutorial and worked example support.

The design process is heavily codified by industry and therefore there is an element of traditional lecturing but the objective is to minimise this through the problem solving element

Module Learning outcomes: On successful completion of this module students will achieve the following learning outcomes.

MO1 Create a design solution for a simplistic structurally stable building

MO2 Select appropriate engineering properties for structural design in a range of materials

MO3 Design basic reinforced concrete elements

MO4 Design basic structural steel elements

MO5 Design basic timber elements

Hours to be allocated: 150

Contact hours:

Independent study/self-guided study = 114 hours

Face-to-face learning = 36 hours

Total = 150

Reading list: The reading list for this module can be accessed at [readinglists.uwe.ac.uk](https://uwe.rl.talis.com/modules/ubgmvg-15-2.html) via the following link <https://uwe.rl.talis.com/modules/ubgmvg-15-2.html>

Part 4: Assessment

Assessment strategy: The assessment strategy for the module aims to create an experiential based learning environment where students work in design teams of 4-6 students to create a solution to an open-ended real world structural engineering design challenge.

Students will produce a solution in three structural materials – reinforced concrete,

structural steel and timber. Their solution will follow real-world industry practice and will require the students to produce a safe solution.

The group work overall mark will be adjusted by peer-review formal Contribution Factors - these factors allow students to assess other members of the group's contribution to the work.

Component A (20%) - Each group will produce a Final Design Presentation in PowerPoint. The presentation will articulate: The Scheme Design Solution, The stability provision within the structure, A Statement on the principle challenges faced a) undertaking the design, b) working in a team c) how working together could have been improved.

Component B (80%) - A group design report consisting of the design of structural elements in three materials - this will be peer assessed by Contribution Factors modifying the group report mark. (35%)

Plus a written discussion on the issues in changing dimensionally the design in the three materials (45%) (2000 words equivalent)

The resit strategy for this module is the same as for the first sit. It will require students to complete a similar project challenge working in groups.

Assessment components:

Presentation - Component A (First Sit)

Description: Group progress review (15 mins)

Weighting: 20 %

Final assessment: No

Group work: Yes

Learning outcomes tested: MO1, MO2

Report - Component B (First Sit)

Description: Group report (6000 words)

Weighting: 35 %

Final assessment: Yes

Group work: Yes

Learning outcomes tested: MO2, MO3, MO4, MO5

Report - Component B (First Sit)

Description: Individual Discussion report (2000 words)

Weighting: 45 %

Final assessment: No

Group work: No

Learning outcomes tested: MO2, MO3, MO4, MO5

Presentation - Component A (Resit)

Description: Component A - Presentation (15 mins)

Weighting: 20 %

Final assessment: No

Group work: Yes

Learning outcomes tested: MO1, MO2

Report - Component B (Resit)

Description: Group Report (6000 words)

Weighting: 35 %

Final assessment: Yes

Group work: Yes

Learning outcomes tested: MO2, MO3, MO4, MO5

Report - Component B (Resit)

Description: Individual Discussion report (2000 words)

Weighting: 45 %

Final assessment: No

Group work: No

Learning outcomes tested: MO2, MO3, MO4, MO5

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Civil Engineering [Sep][FT][Frenchay][4yrs] MEng 2021-22

Civil Engineering [Sep][SW][Frenchay][5yrs] MEng 2021-22

Civil and Environmental Engineering [Sep][SW][Frenchay][4yrs] BEng (Hons) 2021-22

Civil and Environmental Engineering [Sep][FT][Frenchay][3yrs] BEng (Hons) 2021-22

Civil Engineering [Sep][SW][Frenchay][4yrs] BEng (Hons) 2021-22

Civil Engineering [Sep][FT][Frenchay][3yrs] BEng (Hons) 2021-22

Civil and Environmental Engineering [Sep][PT][Frenchay][7yrs] - Not Running MEng 2020-21

Civil and Environmental Engineering [Sep][PT][Frenchay][5yrs] BEng (Hons) 2020-21

Civil and Environmental Engineering {Foundation} [Sep][SW][Frenchay][5yrs] BEng (Hons) 2020-21

Civil and Environmental Engineering {Apprenticeship-UWE} [Sep][FT][Frenchay][5yrs] - Not Running BEng (Hons) 2020-21

Civil and Environmental Engineering {Foundation} [Sep][FT][Frenchay][4yrs] BEng (Hons) 2020-21

Civil Engineering {Foundation} [Sep][FT][Frenchay][4yrs] BEng (Hons) 2020-21

Civil Engineering {Foundation} [Sep][SW][Frenchay][5yrs] BEng (Hons) 2020-21

Civil Engineering [Sep][PT][Frenchay][5yrs] BEng (Hons) 2020-21

Civil Engineering {Apprenticeship-UWE} [Sep][FT][Frenchay][5yrs] BEng (Hons) 2020-21

Civil Engineering [Sep][PT][Frenchay][7yrs] MEng 2020-21