

ES2H2-15 Creative and Conceptual Design

25/26

Department

School of Engineering

Level

Undergraduate Level 2

Module leader

Stephen Hicks

Credit value

15

Module duration

12 weeks

Assessment

100% coursework

Study location

University of Warwick main campus, Coventry

Description

Introductory description

ES2C2-15 Civil Engineering Design1

[Module web page](#)

Module aims

Design describes a process of imagination and creativity that applies to all engineering activities, whether the requirement is to produce an artefact, a process, or a conceptual framework. Creativity requires imagination, intuition, intellectual rigour, and the sound application of underlying engineering principles. The module aims to develop your creativity and conceptual thinking, exploring where design ideas come from, how those ideas evolve into practical and workable engineering solutions which are able to take into account also equality, diversity, inclusion, and what factors lead to good design at the concept stage of a civil engineering project.

Outline syllabus

This is an indicative module outline only to give an indication of the sort of topics that may be

covered. Actual sessions held may differ.

Structural and conceptual design:

Conceptual design

Actions on structures, design standards and basic load analysis hand-calculations

Load paths

Structural stability

Handling ill-defined briefs

Identifying key requirements

Rapid communication – sketching

Critiquing designs

Considering ED&I into design

Sharing information and security risks

Learning outcomes

By the end of the module, students should be able to:

- Develop conceptual and original civil and environmental engineering solutions to design problems interpreting briefs, bounding problems, identifying key issues and adopting a critical iterative process. [C1(D), M1(D), M2(M), M5(M)]
- Use engineering judgment, sketching, calculations, models and other techniques to develop and communicate design thinking and decision making processes to technical and non-technical audience. [M2(M), M5(M), M17(M)]
- Appreciate how civil engineers design and construct structures and infrastructures taking into considerations safety, sustainability and professional ethics at the core of the process. [M8(M)]
- Develop and analyse suitable inclusive design solutions and meet societal needs and challenges adopting an integrated system approach. [M5(M), M6(M), M11(M)]
- Analyse the implications of security risks and solutions for its mitigation [M10(M)]
- Function effectively as an individual, and as a member or leader of a team. [M16(M)]

Indicative reading list

Structural Engineer's Pocket Book, Fiona Cobb, 2nd Ed, CRC Press, 2015

The Structural Basis of Architecture, Bjorn Sandaker, Arne Eggen, Mark Cruvellier, Routledge, 2nd Ed, 2011

Sketching for Engineers and Architects, Ron Slade Routledge, 2016

M. Millais. Building structures: from concepts to design. 2nd Ed. Taylor and Francis, 2005. TH 854.M4

Subject specific skills

1. Ability to conceive, make and realise a component, product, system or process
2. Ability to develop economically viable and ethically sound sustainable solutions
3. Ability to be pragmatic, taking a systematic approach and the logical and practical steps necessary for, often complex, concepts to become reality

4. Ability to seek to achieve sustainable solutions to problems and have strategies for being creative and innovative
5. Ability to be risk, cost and value-conscious, and aware of their ethical, social, cultural, environmental, health and safety, and wider professional engineering responsibilities

Transferable skills

1. Communicate (written and oral; to technical and non-technical audiences) and work with others
 2. Plan self-learning and improve performance, as the foundation for lifelong learning/CPD
 3. Awareness of the nature of business and enterprise in the creation of economic and social value
 4. Overcome difficulties by employing skills, knowledge and understanding in a flexible manner
 5. Ability to formulate and operate within appropriate codes of conduct, when faced with an ethical issue
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Study

Study time

Type	Required
Lectures	12 sessions of 1 hour (8%)
Seminars	12 sessions of 1 hour (8%)
Tutorials	2 sessions of 1 hour (1%)
Supervised practical classes	12 sessions of 1 hour (8%)
Fieldwork	(0%)
Online learning (independent)	8 sessions of 1 hour (5%)
Other activity	8 hours (5%)
Private study	96 hours (64%)
Total	150 hours

Private study description

96 hours of guided independent learning.

Other activity description

8 hrs for 1 day workshop

Costs

No further costs have been identified for this module.

Assessment

You must pass all assessment components to pass the module.

Assessment group A

	Weighting	Study time	Eligible for self-certification
Individual Structural and Creative Design Portfolio	60%		Yes (extension)
Individual Structural and Creative Design Portfolio (20 pages max length)			
Workshop (industry-based case study) including group oral presentation	40%		Yes (extension)
Workshop (industry-based case study) including group oral presentation and peer assessment			

Feedback on assessment

Individual and cohort level feedback and coaching will be ubiquitous. The focus on fieldwork and design work will allow detailed and regular discussion between academics and students. Students will also be required to both give and receive feedback on peers' work, a key aspect of the design process and learning outcome of the module.

Availability

Courses

This module is Core for:

- Year 2 of UESA-H216 BEng Civil Engineering
- Year 2 of UESA-H217 MEng Civil Engineering

This module is Optional for:

- Year 2 of UESA-H113 BEng Engineering
- UESA-H112 BSc Engineering
 - Year 2 of H112 Engineering
 - Year 2 of H112 Engineering
- Year 2 of UESA-H114 MEng Engineering