

Engineering Tripos Part IA, Design Challenge, 2024-25

Lecturer and Coordinator

Prof. Nathan Crilly [1]

Timing and Structure

Lent term. Five lectures: two per week during weeks 1 and 2, and one in week 8. There are also two lecture slots reserved for group work: one in week 7 and one in week 8.

Prerequisites

There are no prerequisites, but the coursework submission may additionally draw on knowledge and skills developed in IA Exposition, IA Engineer in Society, IA CAD and IA Drawing.

Aims

The aims of the course are to:

- Highlight the role of design in engineering
- Introduce a structured design process
- Provide a real-world design challenge to work on
- Provide an opportunity for teamwork.

Objectives

As specific objectives, by the end of the course students should be able to:

- Investigate a specific context to identify opportunities for design interventions
- Formulate a problem statement and specify the requirements for a solution
- Generate and explore diverse options for solution concepts
- Evaluate, prioritise and refine suitable design concepts
- Communicate the relationship between the design context and the design solution
- Communicate the design process clearly, including aspects related to teamwork.

Content

The course introduces a four-stage design process, which student teams will work through to address challenges in a specific context (including social, environmental and economic factors). Additionally, the course provides guidance on how to communicate about the problems, solutions and processes that have been considered.

1. Investigating the context

Identifying and reviewing relevant information that provides insights into the factors that characterise the context in which you will intervene.

2. Defining the problem

Formulating and reframing the problem to clearly articulate the design goals and the characteristics of a suitable solution.

3. Generating solution ideas

Developing a broad range of ideas for how the problem could be addressed, and expanding that range of concepts through the application of creative design techniques.

4. Selecting and refining solutions

Evaluating design concepts against the requirements, and iteratively developing the selected concept(s) to improve them.

5. Communicating about design

Establishing the audiences with which you must communicate to initiate change, and identifying their informational needs; developing media that illustrate the key features of the relevant contexts, the problems identified, the solutions developed and the processes used.

Coursework

Full details of the coursework requirements are on Moodle.

Examination Guidelines

Please refer to [Form & conduct of the examinations](#) [2].

UK-SPEC

This syllabus contributes to the following areas of the [UK-SPEC](#) [3] standard:

[Toggle display of UK-SPEC areas](#).

Knowledge and Understanding

Design (D)

Design is the creation and development of an economically viable product, process or system to meet a defined need. It involves significant technical and intellectual challenges and can be used to integrate all engineering understanding, knowledge and skills to the solution of real problems.

Economic, social and environmental context (S)

Engineering Practice (P)

Practical application of engineering skills, combining theory and experience, and use of other relevant knowledge and skills. This must include an appropriate combination of the majority of these outcomes.

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Links

- [1] <mailto:nc266@cam.ac.uk>
- [2] <https://teaching.eng.cam.ac.uk/content/form-conduct-examinations>
- [3] <https://teaching.eng.cam.ac.uk/content/uk-spec>