Engineering Tripos Part IIB, 4D13: Architectural Engineering, 2017-18

Module Leader (Engineering)

Dr R Choudhary [1]

Module Leader (Architecture)

Prof C A Short [2]

Lecturers

Dr R Choudhary, Mr F A McRobie, Dr S Smith,

Timing and Structure

Michaelmas term. 8 afternoons. Assessment: 100% coursework

Prerequisites

[3D3, 3D4, 3D8] useful

Objectives

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

- have some appreciation of the principles of architectural engineering, with a strong focus on environmental and structural aspects.
- be aware of the various functional requirements of building services and building envelopes, and of how they can be met by combinations of materials and proper construction techniques.
- be aware of current digital and computational techniques used in design analysis.
- gain an appreciation for design using timber

Content

This module is run in conjunction with the Department of Architecture. CUED students who elect to do this module will work together one full afternoon per week with final year students from the Department of Architecture. The module involves an architectural engineering design exercise, with students working in mixed groups of architects and engineers.

The course focuses on energy-efficient building designs. It also considers structural design -- specifically timber.

This year (Mich 2017) the exercise consists of designing tall timber buildings.

The teaching format will be unconventional. Each afternoon will probably begin with a short talk by one of the lecturers or by an external speaker. For the remaining class time, students will work (in groups) on developing environmental, structural and other strategies for their design project.

On week 5 of the course, each group will make a presentation of its design (including a physical model) to an assembled group of architectural, structural, environmental experts. Weeks 6-8 will be devoted to developing

detailed design of parts of the project.

Coursework

Coursework:

- 5% for week 1 group exercise

- 20% for the group presentation of the design and the model on week 5

- 15% for group report on last day of term

- 60% for an individually authored report on developing an aspect of the design and analysis, to be submitted digitally on Moodle by each student by 4.00pm on the first day of the Lent Term.

Coursework	Format	Due date & marks
[Coursework activity #1 title / Interim] Coursework 1 brief description Learning objective: • •	Individual/group Report / Presentation [non] anonymously marked	day during te Thu week 3 [xx/60]
[Coursework activity #2 title / Final] Coursework 2 brief description Learning objective: • •	Individual Report [non] anonymously marked	Wed week 9 [xx/60]

Booklists

Please see the **Booklist for Group D Courses** [3] for references for this module.

Examination Guidelines

Please refer to Form & conduct of the examinations [4].

UK-SPEC

This syllabus contributes to the following areas of the UK-SPEC [5] standard:

Toggle display of UK-SPEC areas.

GT1

Develop transferable skills that will be of value in a wide range of situations. These are exemplified by the Qualifications and Curriculum Authority Higher Level Key Skills and include problem solving, communication, and working with others, as well as the effective use of general IT facilities and information retrieval skills. They also include planning self-learning and improving performance, as the foundation for lifelong learning/CPD.

IA1

Apply appropriate quantitative science and engineering tools to the analysis of problems.

IA2

Demonstrate creative and innovative ability in the synthesis of solutions and in formulating designs.

KU1

Demonstrate knowledge and understanding of essential facts, concepts, theories and principles of their engineering discipline, and its underpinning science and mathematics.

KU2

Have an appreciation of the wider multidisciplinary engineering context and its underlying principles.

D1

Wide knowledge and comprehensive understanding of design processes and methodologies and the ability to apply and adapt them in unfamiliar situations.

D2

Understand customer and user needs and the importance of considerations such as aesthetics.

D4

Ability to generate an innovative design for products, systems, components or processes to fulfil new needs.

D5

Ensure fitness for purpose for all aspects of the problem including production, operation, maintenance and disposal.

D6

Manage the design process and evaluate outcomes.

S3

Understanding of the requirement for engineering activities to promote sustainable development.

S4

Awareness of the framework of relevant legal requirements governing engineering activities, including personnel, health, safety, and risk (including environmental risk) issues.

E1

Ability to use fundamental knowledge to investigate new and emerging technologies.

E2

Ability to extract data pertinent to an unfamiliar problem, and apply its solution using computer based engineering tools when appropriate.

E3

Ability to apply mathematical and computer based models for solving problems in engineering, and the ability to assess the limitations of particular cases.

E4

Understanding of and ability to apply a systems approach to engineering problems.

P1

A thorough understanding of current practice and its limitations and some appreciation of likely new developments.

P3

Understanding of contexts in which engineering knowledge can be applied (e.g. operations and management, technology, development, etc).

P4

Understanding use of technical literature and other information sources.

P6

Understanding of appropriate codes of practice and industry standards.

US1

A comprehensive understanding of the scientific principles of own specialisation and related disciplines.

US3

An understanding of concepts from a range of areas including some outside engineering, and the ability to apply them effectively in engineering projects.

US4

An awareness of developing technologies related to own specialisation.

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