Module Leader (Engineering)

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Module Leader (Architecture)

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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 sustainability principles.
- 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 building energy and performance analysis.
- gain an appreciation for design using timber and glass

Syllabus

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 environmental architecture, such as on how to provide energy-efficient building designs. It also considers structural design -- specifically timber.

This year (Mich 2016) the exercise consists of designing a new conservation studio for the Hamilton Kerr Institute. There will be an emphasis on designing in structural timber, and the constraints will involve creating the optimal environment (temperature, relative humidity, etc) for preservation of delicate and valuable artworks, whilst optimising the working experience (mostly the lighting) for conservateurs.

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

On the final afternoon of the course, each group will make a presentation of its design (including a physical model) to an assembled group of architectural, structural, environmental and gallery experts.

Coursework

The Term’s tasks are:

i. Groups can choose to make proposals for a new Conservation Studio as a satellite studio for the Hamilton Kerr Institute (HKI) at the Fitzwilliam Museum or,

ii. to make proposals for a new Conservation Studio at the Hamilton Kerr Institute [likely sites proposed on the site plan below].

iii. To design a structure predominantly in timber for either location, delivering the required quality of environment for viewing and working on paintings and 3D artefacts in minute detail. Smith and Brewer’s pre-war roof designs show how sophisticated the delivery of daylight on paintings can become.

Teams of 6 or 7, balanced between Architects and Engineers, will work together through the Term to deliver the designs and accompanying analysis. The teams need to be established quickly because the first week will be used to gather as much information as possible through team assignments for the collective good. We will use Moodle as the common repository of information on-line, all will be explained in the first session.

Coursework:

- 24% for 3 Group exercises (8% each) in Environment and Structure set during the weekly classes. Two copies of the Group Responses to be submitted with, importantly, a note of who contributed to which aspect.

- 16% for the group presentation of the design and the model at the Final Review

- 60% for an individually authored report summarising the Group solution and 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.

Booklists

Please see the Booklist for Group D Courses [4] for references for this module.

Assessment

Please refer to Form & conduct of the examinations [5].

UK-SPEC

The UK Standard for Professional Engineering Competence (UK-SPEC) [6] describes the requirements that have to be met in order to become a Chartered Engineer, and gives examples of ways of doing this.

UK-SPEC is published by the Engineering Council on behalf of the UK engineering profession. The standard has been developed, and is regularly updated, by panels representing professional engineering institutions, employers
and engineering educators. Of particular relevance here is the 'Accreditation of Higher Education Programmes' (AHEP) document [7] which sets out the standard for degree accreditation.

The Output Standards Matrices [8] indicate where each of the Output Criteria as specified in the AHEP 3rd edition document is addressed within the Engineering and Manufacturing Engineering Triposes.

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