CE7T05: T5: Transport Design [5 credits]

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Lecturers: Professor Margaret O’Mahony and Marcello Corsi (TII)

Module organisation
Department of Civil, Structural and Environmental Engineering

Module description, aims and contribution to programme
In this module, students will work individually or in teams (depending on class size) on a transport infrastructure design project, typically a Light Rail Line. Students will be given a series of design briefs and are required to develop solutions, criticising them and refining them as the project develops.

Learning outcomes
On completion of this module, students will:

1. Be able to apply engineering knowledge gained in other modules to formulate solutions to multidisciplinary design problems.
2. Be able to integrate knowledge, handle complexity and formulate judgements with incomplete or limited information.
3. Be able to identify which methods to use to solve complex design challenges.
4. Be able to develop empathy for the users/customers who will use the design.
5. Be able to iterate through many design cycles.
6. Have the ability to apply design methods, processes and techniques to unfamiliar, ill-defined problems.
7. Develop the skills needed to work as individuals and/or in teams.
8. Develop skills in presentation of an idea and solution to potential clients, both verbally and in writing.
9. Be able to interpret the requirements from design briefs and formulate and appraise potential solutions. In the case of the design project, this involves the ability to:
   a. Identify functional and operational requirements.
   b. Identify infrastructural requirements.
   c. Appraise the environmental and social impact of the development.
   d. Identify and appraise potential sites/routes before making selection.
   e. Develop general arrangement drawings, ensuring that the functional requirements are satisfied.
   f. Write a technical specification.
   g. Conduct detailed designs of key operational features.
Module content
The aim of the module is to enable the student to use the knowledge gained on the other modules on the programme in an applied way in a design project. Some lectures will be provided, by staff and industry professionals, that are specific and sequenced with the required output of the project phases, but most of the timetabled hours will involve the students working on their design assignments in cooperative learning style sessions.

The first part of the module will focus on students delivering a scheme design addressing potential sites/routes depending on transport demand, budget, accessibility, benefits etc having consideration for environmental and social impacts. The second part of the module will involve students preparing designs of detailed operational elements of the scheme. The objective is to develop the student’s design office skills and to challenge the students with realistic problems that force them to make decisions even when faced with limited information. Presentation of the final designs, both verbally and in writing, will be assessed.

Teaching strategies
- Problem based learning
- Cooperative learning
- Individual and group design exercises
- Presentations

Assessment
Assessment will be on the basis of individual and team assignments.

Further information
https://www.tcd.ie/Engineering/undergraduate/maiyear5/