CEU44A08 4A8 – Transportation [5 credits]

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Module organisation
Department of Civil, Structural and Environmental Engineering

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<tr>
<th>Semester</th>
<th>Start Week</th>
<th>End Week</th>
<th>Associated Practical Hours</th>
<th>Lectures Per week</th>
<th>Total Per week</th>
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Total Contact Hours: 29

Module description, aims and contribution to programme
This module is intended to enable students to identify, formulate, analyse, and solve transportation engineering problems, to apply the theory and employ existing transport software packages to solve real world transport problems as well as to design transport systems, to analyse transport data, to improve their communication and teamwork skills, to work in groups to solve transportation engineering problems, to explain terminology used in practice, and to communicate effectively with the transportation engineering community. The emphasis is on the societal, economic, environmental, political, ethical and business aspects of transport problems.

Learning outcomes
At the end of the module, the students should be able to:

1. Discuss the factors affecting transport demand in Ireland; calculate cross and direct elasticities, equilibrium, and consumer surplus, and; draw the demand, supply, performance, average cost, marginal cost, total cost, fixed, variable, and cost curves.

2. Discuss road pricing in theory and practice such as electronic road pricing in London, alternatives to road pricing, pros and cons of road pricing, societal, economic, political, and environmental considerations of road pricing; state the assumptions of road pricing, and; compute marginal toll

3. Apply various appraisal methods to the evaluate Ireland transport projects and examine these projects under societal, economic, environmental, political, and ethical considerations.

4. Develop an understanding of the fundamental concepts and standard practices in sustainable transportation and how such practices can be implemented in Dublin.
5. Describe the transportation planning process, information required for transportation planning, and travel demand forecasting techniques, and discuss environmental, economic, societal, political, business and ethical issues in transportation planning using Ireland examples.

6. Discuss the factors affecting route, mode, and destination choices; derive the coefficients of regression models; judge whether a regression model is suitable for applications; identify the limitations and assumptions of the gravity model, the discrete choice model, and the user equilibrium model, and; forecast and estimate trip distribution, modal split, and route choice using these models.

7. Explain the principal characteristics of rail transport and the basic terminology used in permanent way engineering; describe the functions of the principal components of rail track, and; perform some simple design calculations.

8. Work as part of a team to identify, formulate, analyse and solve transport engineering problems by using existing transport software packages, and design transport systems.

Module content
1. Railway Engineering
2. Land use
3. Sustainable Transportation
4. Transport Economics and road pricing
5. Project appraisal
6. Transportation planning and demand forecasting
7. Some selected topics (if time allows)

Assessment
Examination 80 %
Coursework 10 %
Course project 10 %

Required textbook

Additional references will be announced at lectures.

**Further information**

Module materials can be found in:
- [http://www.tcd.ie/civileng/Staff/Dermot.ODwyer/](http://www.tcd.ie/civileng/Staff/Dermot.ODwyer/)

[https://www.tcd.ie/Engineering/](https://www.tcd.ie/Engineering/)