MODULE TITLE: 4A8 Transportation

CODE: CE4A8

LEVEL: Senior Sophister (Optional module)

CREDITS: 5

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MODULE ORGANISATION
This module runs for the first 9 weeks of the second semester and comprises of three lectures per week. In addition, there are a number of tutorials.

<table>
<thead>
<tr>
<th>Semester</th>
<th>Start Week</th>
<th>End Week</th>
<th>Associated Practical Hours</th>
<th>Lectures Per week</th>
<th>Total</th>
<th>Tutorials Per week</th>
<th>Total</th>
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<tbody>
<tr>
<td>2</td>
<td>1</td>
<td>9</td>
<td>0</td>
<td>3</td>
<td>27</td>
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<td>2</td>
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Total Contact Hours: 29

MODULE DESCRIPTION/OBJECTIVES
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
On completion of this module, the student will be able to:

- 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;
- 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;
- apply various appraisal methods to evaluate Ireland transport projects and examine these projects under societal, economic, environmental, political, and ethical considerations;
- develop an understanding of the fundamental concepts and standard practices in intersection traffic signal designing; developing signal coordination for one-way streets; draw coordination systems on time-space diagrams;
- 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;
- 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;
- 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;
- 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 SYLLABUS

- Railway engineering;
- Traffic signal control and coordination;
- Transport economics and road pricing;
- Project appraisal;
- Transportation planning and demand forecasting.

MODULE MATERIALS/RECOMMENDED TEXT(S)

Course materials can be found at:
http://www.tcd.ie/civileng/Staff/Dermot.ODwyer/
http://www.tcd.ie/civileng/Staff/Bidisha.Ghosh/
http://www.tcd.ie/civileng/Staff/Brian.Caulfield/

References:

- Transport Economics, Kenneth Button, Brookfield, 1993
- Modern Railway Track, Coenraad Esveld, MRT Productions, ISBN 90 800324 1 7

ASSESSMENT

A formal written end-of year two-hour examination accounts for 80% with 10% allocated to coursework and 10% allocated to a project.