

<b>Module Code</b>	CEU44A16
<b>Module Name</b>	4A16 Transport Engineering & Modelling
<b>ECTS Weighting<sup>1</sup></b>	5 ECTS
<b>Semester taught</b>	Semester 1
<b>Module Coordinator/s</b>	Brian Caulfield
<b><u>Module Learning Outcomes</u> with reference to the <u>Graduate Attributes</u> and how they are developed in discipline</b>	<p>On successful completion of this module, students should be able to:</p> <ol style="list-style-type: none"> <li>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.</li> <li>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</li> <li>3. Apply various appraisal methods to the evaluate Ireland transport projects and examine these projects under societal, economic, environmental, political, and ethical considerations.</li> <li>4. Develop an understanding of the fundamental concepts and standard practices in sustainable transportation and how such practices can be implemented in Dublin.</li> <li>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.</li> <li>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.</li> <li>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.</li> <li>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.</li> </ol>

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**Graduate Attributes: levels of attainment**

To act responsibly - Introduced

To think independently - Attained

To develop continuously - Enhanced

To communicate effectively - Enhanced

**Module Content**

Please provide a brief overview of the module of no more than 350 words written so that someone outside of your discipline will understand it.

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.

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

**Teaching and Learning Methods**

Lectures, tutorials, assignments, independent study.

<b>Assessment Details<sup>2</sup></b> <b>Please include the following:</b> <ul style="list-style-type: none"> <li>• <b>Assessment Component</b></li> <li>• <b>Assessment description</b></li> <li>• <b>Learning Outcome(s) addressed</b></li> <li>• <b>% of total</b></li> <li>• <b>Assessment due date</b></li> </ul>	Assessment Component	Assessment Description	LO Addressed	% of total	Week due			
	Examination	2 hour written examination	LO1-8 etc	80%				
	Coursework	Assignments	LO1-8 etc	20%				
<b>Reassessment Requirements</b>	100% written examination							
<b>Contact Hours and Indicative Student Workload<sup>2</sup></b>	<table border="1"> <tr> <td><b>Contact hours: lectures 27 hours; Tutorials 6 hours</b></td> </tr> <tr> <td><b>Independent Study (preparation for course and review of materials): 60 hours</b></td> </tr> <tr> <td><b>Independent Study (preparation for assessment, incl. completion of assessment): 30 hours</b></td> </tr> </table>					<b>Contact hours: lectures 27 hours; Tutorials 6 hours</b>	<b>Independent Study (preparation for course and review of materials): 60 hours</b>	<b>Independent Study (preparation for assessment, incl. completion of assessment): 30 hours</b>
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<b>Recommended Reading List</b>	<ol style="list-style-type: none"> <li>1. <i>Modeling Transport</i>. J. de D. Ortuzar and L. G. Willumsen. John Wiley &amp; Sons. 1990</li> <li>2. <i>Traffic Engineering</i> (2<sup>nd</sup> Edition), W.R. McShane and R.P. Roess, Prentice Hall, Inc. 1998.</li> <li>3. <i>British Railway Track</i>, 6th Edition, Published by the Permanent Way Institution, 1993, ISBN 0 903489 03 1.</li> <li>4. <i>Transport Economics</i>. Kenneth Button. Aldershot, Hants, England; Brookfield, Vt.: Elgar, 1993</li> <li>5. <i>Transportation Engineering: An Introduction</i>. C. Jotin Khisty. Prentice Hall Inc. 1990</li> </ol>							
<b>Module Pre-requisite</b>	None							
<b>Module Co-requisite</b>	None							
<b>Module Website</b>	<a href="http://tcd.ie">Year Four - School of Engineering - Trinity College Dublin (tcd.ie)</a>							
<b>Are other Schools/Departments involved in the delivery of this module? If yes, please provide details.</b>	None							
<b>Module Approval Date</b>								
<b>Approved by</b>								
<b>Academic Start Year</b>	September 2023							
<b>Academic Year of Date</b>	2023-24							