

Subject Description Form

Subject Code	EE3012 / EE3012B																					
Subject Title	Transport Operations Modelling																					
Credit Value	3																					
Level	3																					
Pre-requisite/ Co-requisite/ Exclusion	Nil																					
Objectives	<ol style="list-style-type: none"> 1. To introduce macroscopic and microscopic simulation techniques for transport operations modelling. 2. To provide a sound understanding of the theories used in transport operations modelling. 3. To enable the building, calibration and validation of transport models. 4. To explain the simplifications in modelling and the interpretation of modelling results. 																					
Intended Learning Outcomes	<p>Upon completion of the subject, students will be able to:</p> <ol style="list-style-type: none"> a. Understand the fundamentals and theoretical knowledge of transport modelling and simulation. b. Formulate, apply and assess the transport modelling techniques. c. Understand the strength and limitations of various transport models. 																					
Subject Synopsis/ Indicative Syllabus	<ul style="list-style-type: none"> • Introduction to transport operations modelling (macro and micro) • Car following and lane changing models – Gipps, IDM, MOBIL, etc. • Use of microscopic simulation software (SUMO, Aimsun or Vissim) • Macroscopic dynamic traffic flow model (Cell Transmission Model, CTM) 																					
Teaching/Learning Methodology	<p>Delivery of the subject is mainly through formal lectures and complemented by tutorials. Assignments and projects provide students hands-on experience in modelling, while report-writing enables students to practise writing skill.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2" style="width: 60%;">Teaching/Learning Methodology</th> <th colspan="3" style="text-align: center;">Outcomes</th> </tr> <tr> <th style="width: 15%;">a</th> <th style="width: 15%;">b</th> <th style="width: 10%;">c</th> </tr> </thead> <tbody> <tr> <td>Lectures</td> <td style="text-align: center;">✓</td> <td style="text-align: center;">✓</td> <td style="text-align: center;">✓</td> </tr> <tr> <td>Tutorials</td> <td style="text-align: center;">✓</td> <td style="text-align: center;">✓</td> <td style="text-align: center;">✓</td> </tr> <tr> <td>Assignments and projects</td> <td style="text-align: center;">✓</td> <td style="text-align: center;">✓</td> <td style="text-align: center;">✓</td> </tr> </tbody> </table>			Teaching/Learning Methodology	Outcomes			a	b	c	Lectures	✓	✓	✓	Tutorials	✓	✓	✓	Assignments and projects	✓	✓	✓
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Assignments and projects	✓	✓	✓																			

Assessment Methods in Alignment with Intended Learning Outcomes	Specific assessment methods/tasks		% weighting	Intended subject learning outcomes to be assessed		
				a	b	c
	1. Written examination		40%	✓	✓	✓
	2. Assignments and exercises		30%	✓	✓	✓
	3. Projects		30%		✓	✓
	Total		100 %			
Examination and test allow assessment on outcomes covering principles, techniques, design and application. Assignments and projects enable students to explore and apply transport modelling techniques and evaluate transport operations performance.						
Student Study Effort Expected	Class contact:					
	▪ Lecture / Tutorial					39 Hrs.
	Other student study effort:					
	▪ Assignments and projects					35 Hrs.
	▪ Self-study					33 Hrs.
	Total student study effort					107 Hrs.
Reading List and References	<ul style="list-style-type: none"> D. Ni, Traffic Flow Theory: Characteristics, Experimental Methods, and Numerical Techniques, Elsevier, 2015. 					