

Subject Description Form

Subject Code	EE3013 / EE3013B																					
Subject Title	Transportation Data Analytics																					
Credit Value	3																					
Level	3																					
Pre-requisite/ Co-requisite/ Exclusion	Co-requisite of EE3013: EE2029 / EEE2003 Co-requisite of EE3013B: EE2029B																					
Objectives	<ol style="list-style-type: none"> 1. To introduce various types of transportation data, and ways to use the data to assess, analyze, and assist the modeling of transportation systems. 2. To equip the students with modeling and analysis techniques for transportation data. 3. To enable the students to understand problems and issues in real-world transportation data and methods to deal with them. 4. To prepare the students for tackling real-world transportation problems using data, with a combination of deep understanding of data issues and solid analytical skills. 																					
Intended Learning Outcomes	<p>Upon completion of the subject, students will be able to:</p> <ol style="list-style-type: none"> a. Demonstrate theoretical knowledge of transportation data analytics b. Apply appropriate data analytics methods and tools to various types of transportation data and interpret the results c. Understand problems and issues in real-world data and ways to tackle those problems and issues 																					
Subject Synopsis/ Indicative Syllabus	<ol style="list-style-type: none"> 1. Review/briefing of probability, statistics, and regression 2. Discrete choice model, modeling travel behavior using travel survey data 3. Diagnosis of roadway traffic using fixed-location sensor data and floating vehicle sensor data, bottleneck detection, and delay calculation 4. Modeling passenger and vehicle traffic using Bluetooth and/or Wi-Fi sensor data 																					
Teaching/Learning Methodology	<p>Delivery of the subject is mainly through formal lectures and complemented by tutorials. Exercises (in-class or take-home), assignments, and projects provide students hands-on experience in data modelling, estimation, and analysis of practical transportation problems, 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">Outcomes</th> </tr> <tr> <th style="width: 16.6%;">a</th> <th style="width: 16.6%;">b</th> <th style="width: 16.6%;">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>Exercises, 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	✓	✓	✓	Exercises, assignments and projects	✓	✓	✓
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Assessment Methods in Alignment with Intended Learning Outcomes	Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed		
			a	b	c
	1. Examination	40%	✓	✓	✓
	2. In-class exercises and assignments	30%	✓	✓	✓
	3. Projects	30%		✓	✓
Total	100%				
	Examination allows assessment on outcomes covering concepts, principles, techniques and application. Exercises, assignments, and projects enable students to explore and apply analytical and tool-based data modelling techniques to evaluate transportation systems' characteristics and performance. Report-writing enables students to interpret the data analysis results, link them to practical issues in transportation systems and find solutions.				
Student Study Effort Expected	Class contact:				
	▪ Lecture/Tutorial		39 Hrs.		
	Other student study effort:				
	▪ Exercises, assignments and projects		35 Hrs.		
	▪ Self-study		33 Hrs.		
	Total student study effort		107 Hrs.		
Reading List and References	<ol style="list-style-type: none"> Richard J. Larsen and Morris L. Marx, An Introduction to Mathematical Statistics and Its Applications, 5th Edition, Prentice Hall, 2012. Robert S. Pindick and Daniel L. Rubinfeld, Econometric Models and Economic Forecasts, 4th Edition, Irwin/McGraw-Hill, 1998. Frank S. Koppelman and Chandra Bhat, A Self Instructing Course in Mode Choice Modeling: Multinomial and Nested Logit Models, 2006. https://www.ce.utexas.edu/prof/bhat/courses/lm_draft_060131final-060630.pdf Jeremy Watt, Reza Borhani and Aggelos K. Katsaggelos, Machine Learning Refined: Foundations, Algorithms, and Applications, Cambridge University Press, 2016. Marco Gori, Machine Learning: A Constraint-Based Approach, Morgan Kaufmann, 2017. 				