

This course is selected as an outcome-based (OB) pilot study; please refer to the following course syllabus with the implementation of the outcome-based approach.

Hong Kong University of Science and Technology
Department of Civil and Environmental Engineering

Rubric	CIVL 3610
Title of course	Traffic and Transportation Engineering
Instructor	Hai Yang
Teaching Assistant	TBD
Prerequisites	None
Credit	3
Textbook(s) and/or Other materials	1. Transportation Engineering: An Introduction: C.J. Khisty and B.K. Lall, Prentice Hall, 3rd Edition 2. Transportation Engineering and Planning: C.S. Papacostas & P.D. Prevedouros. Prentice Hall Inc., 3rd Edition 3. Principles of Highway Engineering and Traffic Analysis. Fred L. Mannering & Scott S. Washburn & Walter P. Kilareski, 7th Edition
Course Objectives	1. Acquire an understanding of the components of a transportation system from a systems engineering perspective 2. Acquire a basic understanding of the characteristics of traffic flow and ways to describe it 3. Acquire basic skills for the geometric design of freeways 4. Develop an understanding of the transportation planning process, covering economic and social aspects involved in the planning process
Topics	Introduction to transportation systems Characteristics of transportation models Traffic flow fundamentals Geometric design of highways Travel demand analysis including trip generation, trip distribution, modal split and trip assignment
Compute usage	To be advised by the lecturers
Lab Projects	No lab work required
Class/lab schedule	Two 80-minute lectures with an additional 50-minute tutorial per week
Contribution to the professional component	80% engineering topics 20% behavioral sciences and engineering management

Intended Learning Outcomes (ILOs) of this course	I. Ability to understand the fundamental theory and methods involved in traffic and transportation engineering, including traffic flow fundamentals, geometric design of highways, and transportation systems planning II. Ability to make use of mathematical or quantitative methods to model components of the traffic and transportation system III. Ability to apply the principles learned in this course for the analysis, design and operations of components of the transportation system, including traffic impact analysis, highway design, and transportation demand forecasting.
Relationship to the program objective	<u>1. Provide professional skills in design, construction and management</u> This course provides an exploration of various components of traffic flow analysis, highway design and urban transportation planning and modeling. <u>2. Train students with good communication skills</u> The course requires students to be involved in discussion on how to model, formulate and solve various traffic problems during tutorials. <u>3. Stimulate self-learning and innovative problem solving skills</u> The course requires students to find applicable reference materials to supplement course lectures. <u>4. Expose students to real projects and cutting-edge research</u> Some emerging and challenging issues of intelligent transportation systems will be introduced in some lectures.
Relationship to program outcome	<u>A. Obtain fundamental knowledge in mathematics and science</u> Theories and equations in mathematics and science are covered in various parts of this course. <u>B. Understand fundamental principles of engineering science</u> Students must apply engineering principles to conduct traffic analysis. <u>D. Apply modern engineering tools</u> Students need to use computer software to address traffic problems. <u>F. Technical competency to design</u> Students need to learn how to design an efficient traffic and highway systems. <u>H. Obtain in-depth knowledge in at least one specialized area</u> Students have to learn fundamental knowledge on traffic and transportation systems engineering. <u>K. Instill a deep sense of professional responsibility and ethics</u> Students have to consider cost, capacity, quality, safety and sustainability of transportation systems.
Assessment of	1. Assignments (5%) and tutorial quiz (5%) are given to facilitate students' learning of the subjects (Outcomes A, B, D, F,H,K)

Outcomes	2. Midterm examination (30%) and final examination (60%) are conducted to assess students' understanding of the subjects (Outcomes A, B, F,H)
Prepared by	Hai Yang
Date	January 21, 2024