Subject Description Form

Subject Code	CSE563
Subject Title	Development of Transport Infrastructure
Credit Value	3
Level	5
Pre-requisite/ Co-requisite/ Exclusion	Recommended background knowledge: It is expected that students will have a fundamental understanding of mathematics and physics consistent with undergraduate level study in science/ engineering.
Objectives	To provide a comprehensive course in the design and construction of transport infrastructure projects. Emphasis is also placed on the application of design/ analysis techniques, concept of integration of transportation systems and application of advanced methods to real cases for students to assess engineering feasibility of alternative designs.
Intended Learning Outcomes	Upon completion of the subject, students will be able: a. to understand the functions and characteristics of different transportation modes and infrastructure for urban and regional transport system; b. to understand the traffic impact assessment process following the Hong Kong guidelines and review/comment the traffic impact assessment report based on the assumptions made in such study; c. to apply the design guidelines and standards to design the basic layout, analyze the capacity, and provide preliminary engineering design of transport infrastructure projects; and d. to use professional judgment in analyzing the functional design, requirement, and effects of different transport infrastructure projects.
Subject Synopsis/ Indicative Syllabus	**Keyword Syllabus** i) Transportation systems Various modes of transportation systems; passenger and freight movements; basic considerations and impacts of transport infrastructure developments; current development programmes. ii) Concepts and trends in transportation system development Integration of transportation systems; sustainable transport planning; applications of Information and Communication Technologies (ICTs) in transportation; Intelligent Transportation System (ITS) development and sustainable transport strategy in Hong Kong.

	iii) <u>Traffic Impact Assessment (TIA)</u> TIA Guidelines, requirements, scope of study, methodology, other considerations and examples of TIA. iv) <u>Highway Planning and Pavement Design</u> Principles of highway planning/design; types of highway; design and construction of highway; design principles for flexible and rigid pavements; loading on pavements; theoretical and empirical design methods. v) <u>Railway development and basic design concept</u> Railway development; railway capacity; railway systems; rail joints and ballast. vi) <u>Airport</u> Airport activity systems; airport planning procedure; runway orientation and runway length. vii) <u>Port</u> Port activity systems; port planning procedure; services quality; port development strategy. viii) <u>Individual Project and Computer Labs</u> **<u>Two</u>** Computer Laboratories: design and analysis of transport infrastructures One individual project: Integration of transportation systems or TIA studies. Field data collection exercises will be undertaken, and case studies will augment this course.
Teaching/Learning Methodology	There are two components of this course: (i) basic understanding of the functions/roles of different transport infrastructure and their impact assessment and (ii) functional and preliminary design and considerations of transport infrastructure (including highway, railway, airport, and port). The first part of this course requires the students to develop their abilities to critically review the benefits and impacts of a transport infrastructure project based on the background knowledge. Thus, the teaching methodology will involve the provision of the basic knowledge on the issues as well as the analyses of the case studies. The students will be engaged in self-learning tasks in which they will be asked to review and discuss the case study presented in the class. This will also be combined with the individual project on the impact assessment of a major infrastructure. On the individual project, the lecturer will provide the students with relevant background information and data sources. The students should be able to develop their skills in analyzing the impacts/benefits of this project by reviewing these materials independently. The second part of the course will involve a more technical component in which the students will have to learn and master the design procedures and guidelines for different types of transport infrastructure.

	The lecturer will explain the design principles and standards during the classes. This will be supplemented by the tutorial session at the end of each class in which the students will be asked to apply the design procedures/standards to the questions presented in the class.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)			
		a.	b.	c.	d.
1. Individual Project	20%		√	√	√
2. Computer Lab Reports	20%	√	√	√	√
3. Written Examination	60%	√	√	√	√
Total	100%				

Students must attain at least grade D in both coursework and final examination (whenever applicable) in order to attain a passing grade in the overall result.

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Continuous assessment will be based on individual project and 2 computer laboratory reports.

The individual project will involve assessment of a large transport infrastructure proposal. Students will be asked to appreciate the critical issues (both planning, design, and construction) of the infrastructure project, considerations, alternative designs, and construction methods. The assessment will be based on the individual report. This element will achieve all intended learning outcomes.

There will be 2 laboratory sessions and students will be required to submit 2 laboratory reports. These sessions will access students' ability in planning, designing, and evaluating transport infrastructure in modern means. The assessment will be based on the laboratory reports and this element will achieve the intended learning outcomes a, c, and d.

Students must attain at least Grade D in both coursework and final examination (whenever applicable) in order to attain a passing grade in the overall result.

Student Study Effort Expected		
	Class contact:	Average hours per week
	Lecture/ Tutorial/ Laboratory	3 Hrs.
	Other student study effort:	
	Reading and studying	3 Hrs.
	Completion of Assignments	3 Hrs.
	Total student study effort	9 Hrs.

Reading List and References	*Code of Practice for the Lighting, Signing and Guarding of Road Works*, Highways Department, HKSAR, https://www.hyd.gov.hk/en/publications_and_publicity/publications/technical_document/code_of_practice/index.html *Guidelines for Traffic Impact Assessment*, Institution of Highways and Transportation, London, 1994. *Pavement Engineering: Principles and Practice*, 3rd Ed., Mallick R.B. and El-Korchi T., CRC Press, 2018. *Planning & Design of Airports*, 5th Ed., Horonjeff R., McKelvey F.X., Sproule W.J. and Young S.B., McGraw-Hill, 2010. *Principle of Highway Engineering & Traffic Analysis*, 7th Ed., Mannering F.L. and Washburn S.S., John Wiley & Sons, 2019. *Traffic Engineering*, 5th Ed., Roess R.P., Prassas E.S. and McShane W.R., Pearson, 2019. *Traffic Impact Assessment & Daytime Ban Requirements for Road Works on Traffic Sensitive Routes*, Highways Department, HKSARG, Guidance Notes No. RD/GN/021, https://www.hyd.gov.hk/en/publications_and_publicity/publications/technical_document/guidance_notes/pdf/gn021a.pdf *Transport Planning Design Manual*, Transport Department, HKSARG. https://www.lib.polyu.edu.hk/text/21677463/index.htm *Transportation Engineering and Planning*, 3rd Ed., Papacostas C.S. and Prevedouros P.D., Prentice Hall, 2001. *Transportation Engineering Planning and Design*, 4th Ed., Wright P.H. and Ashford N.J., John Wiley & Sons, 1997. *Urban Mass Transportation Planning*, Black J., McGraw-Hill, 1995. *Urban Transit Systems and Technology*, Vuchic V.R., John Wiley & Sons, 2007. https://hos.housingauthority.gov.hk/pdf/wangchau_report/Transport_and_Traffic_ Impact_Assessment_Phase1.pdf https://www.hyd.gov.hk/en/publications_and_publicity/publications/index.html https://www.td.gov.hk/en/publications_and_press_releases/publications/index.html