Subject Description Form

Subject Code	CSE40407
Subject Title	Design of Transport Infrastructure
Credit Value	3
Level	4
Pre-requisite/ Co-requisite/ Exclusion	Pre-requisites: CSE304/ CSE312/ CSE30312 Exclusion: CSE407
Objectives	1. To enable students to acquire basic knowledge of design principles for transport infrastructure development; 2. To enable students to design major transport infrastructures including road drainage, road pavement, road junction, railways; 3. To enable students to assess engineering judgment on alternative transport infrastructure designs.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. Apply the basic principles and professional judgement in the planning and design of transport infrastructure; b. Utilise common design computer packages as well as manual calculations in transport infrastructure design; c. Conduct appropriate measurement and test for traffic design and evaluation; d. Communicate effectively through writing, calculation, and drawing; e. Work effectively in teams with shared responsibilities; f. Understand and discuss the contemporary issues in transport infrastructure design and development.
Subject Synopsis/ Indicative Syllabus	1. <u>Introduction</u> (0.5 week) Basic consideration of transport infrastructure developments. Current development programmes. Design concept. 2. <u>Highway Drainage</u> (1.5 weeks) General considerations. Types of drainage structure. Design and construction of surface drainage and sub-soil drainage. Effects on pavement support. Filter layer design. 3. <u>Pavements</u> (2.5 weeks) Design principles for flexible and rigid pavements. Loading on

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pavements. Theoretical and empirical design methods. Pavement evaluation and rehabilitation.
4. <u>Junction Design</u> (5.5 weeks)
Types of at-grade junction. Design of signal-controlled junctions, priority junctions and roundabout. Co-ordination of traffic signal systems.
5. <u>New Technology for Transport Infrastructure</u> (1 week)
Introduction to intelligent transportation systems (ITS), Elements of ITS, Basic considerations of sensor deployment and system architecture.
6. <u>Railway Design</u> (2 weeks)
Railway development. Railway capacity. Railway alignment. Rail joints and ballast.
7. <u>Laboratory</u>
Laboratory work will include: skid-resistance; pavement conditions studies; Junction design and capacity analysis
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<tr><td>Teaching/Learning Methodology</td><td>Fundamental knowledge will be covered in lectures. Tutorials will provide opportunities for discussion of lecture materials; examples and problem-solving discussion session will supplement the lectures. Laboratory work will help students appreciate the basic principles and familiarize themselves with real-world problems.</td></tr>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>
<table>
<tr><td rowspan="2">Specific assessment methods/tasks</td><td rowspan="2">% weighting</td><td colspan="6">Intended subject learning outcomes to be assessed</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td>d</td><td>e</td><td>f</td></tr>
<tr><td>1. Assignments and Quizzes</td><td>20%</td><td>✓</td><td>✓</td><td></td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>2. Laboratory reports</td><td>20%</td><td></td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td></td></tr>
<tr><td>3. Final Examination</td><td>60%</td><td>✓</td><td>✓</td><td></td><td></td><td></td><td>✓</td></tr>
<tr><td>Total</td><td>100%</td><td colspan="6"></td></tr>
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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:
The assignments and quizzes will assess students' achievements in all learning outcomes (except ILO c). The assignments would require students to integrate concepts acquired in lecture and knowledge acquired through self-learning, and apply to real case studies or design scenarios, which aims to foster critical learning. The quizzes would target at accurate understanding of essential concepts and design techniques.
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<tr><td></td><td colspan="2">The laboratory sessions and reports targets at students' development in ILO b,c , d, and e. Through individual or group tasks, students would acquire hands-on learning experience in design packages, field measurements and material testing. Students would have the opportunity to develop technical communication skills through writing of laboratory reports.

The examination will help students consolidate knowledge learnt in lectures and tutorials and thus achieving intended learning outcomes a, b, f.</td></tr>
<tr><td rowspan="6">Student Study Effort Expected</td><td>Class contact:</td><td>Average hours per week</td></tr>
<tr><td>▪ Lectures/Tutorials/Laboratory</td><td>3 Hrs.</td></tr>
<tr><td>Other student study effort:</td><td></td></tr>
<tr><td>▪ Reading and studying</td><td>3 Hrs.</td></tr>
<tr><td>▪ Completion of project assignment/Lab reports</td><td>3 Hrs.</td></tr>
<tr><td>Total student study effort</td><td>9 Hrs.</td></tr>
<tr><td>Reading List and References</td><td colspan="2">1. Roess R. P., Prassas E.S., and McShane W.R., Traffic Engineering, 4th Edition, Pearson, 2011.

2. Mallick R.B. and Korchi T.E., Pavement Engineering: principles and practice, CRC Press, 2009.

3. Vuchic, Vukan., Urban Transit Systems and Technology, John Wiley, 2007.

4. Wright, P., Highway Engineering-sixth edition, John Wiley & Sons, 2004.

5. Watson, J., Highway Construction & Maintenance, Longman Scientific & Technical, 1994.

6. Transport Planning Design Manual, Transport Department, HKSARG.

7. Guidance Note on Road Pavement Drainage Design, Highways Department, RD/RN/035, 2010.

http://www.hyd.gov.hk/eng/public/publications/road_notes/index.htm.

https://www.td.gov.hk/en/publications_and_press_releases/publications/index.html

https://www.hyd.gov.hk/en/publications_and_publicity/publications/index.html

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