

# CA4685: TRAFFIC AND HIGHWAY ENGINEERING

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## Effective Term

Semester A 2022/23

## Part I Course Overview

### Course Title

Traffic and Highway Engineering

### Subject Code

CA - Civil and Architectural Engineering

### Course Number

4685

### Academic Unit

Architecture and Civil Engineering (CA)

### College/School

College of Engineering (EG)

### Course Duration

One Semester

### Credit Units

3

### Level

B1, B2, B3, B4 - Bachelor's Degree

### Medium of Instruction

English

### Medium of Assessment

English

### Prerequisites

Nil

### Precursors

CA2676 Transportation Engineering

Students must have attempted (including class attendance, coursework submission, and examination) the precursor course(s) so identified.

### Equivalent Courses

BC4685 Traffic and Highway Engineering; CA4710 Highway Engineering

### Exclusive Courses

Nil

## Part II Course Details

### Abstract

The course provides some advance information on solving traffic modeling and highway engineering problems. The course content is intended to equip students advance knowledge of traffic modeling and highway design methods. The course covers detailed demand modeling procedures using the four-step models, pavement material testing methods and data, empirical design method for flexible and rigid pavement structure, detailed design procedures for signal-controlled and roundabout junctions. Simple transport economics for analyzing traffic demand and supply.

### Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if DEC-A1 DEC-A2 DEC-A3 app.)			
1	Apply advanced technique for traffic demand modeling including trip generation/attraction model, trip distribution model, mode choice model, and route choice model;	25	x		
2	Design of highway flexible and rigid pavement;	25			x
3	Design calculations of signal-controlled and roundabout junctions;	30		x	
4	Apply theory in transport economics to analyze traffic demand and supply characteristics.	20	x		

#### A1: Attitude

Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

#### A2: Ability

Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.

#### A3: Accomplishments

Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

### Teaching and Learning Activities (TLAs)

TLAs	Brief Description	CILO No.	Hours/week (if applicable)
1	Lectures	Explain the key principles, theories and tools for traffic and highway engineering	1, 2, 3, 4
2	Hand-on exercise	Require students to discuss the concepts and solve the problems in traffic and highway engineering individually or in a group basis	2, 3

3	Project	Require students to take on a role as a traffic and highway engineering for operating a highway related project; and to apply the taught concept to accomplish the relevant designs	1, 4	
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**Assessment Tasks / Activities (ATs)**

ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Assignment	3, 4	30
2	Quiz (mid-term test)	1, 2	20

**Continuous Assessment (%)**

50

**Examination (%)**

50

**Examination Duration (Hours)**

3

**Additional Information for ATs**

To pass a course, a student must obtain minimum marks of 30% in both coursework and examination components, and an overall mark of at least 40%.

**Assessment Rubrics (AR)****Assessment Task**

Assignment

**Criterion**

1. ABILITY to APPLY suitable techniques to operate a highway engineering project

**Excellent (A+, A, A-)**

High

**Good (B+, B, B-)**

Significant

**Fair (C+, C, C-)**

Moderate

**Marginal (D)**

Basic

**Failure (F)**

Not even reaching marginal levels

**Assessment Task**

Quiz (mid-term test)

**Criterion**

1. CAPACITY to DISCUSS the roles, functions and responsibilities of highway engineers
2. ABILITY to USE the scientific techniques in solving the design and operation problems

**Excellent (A+, A, A-)**

High

**Good (B+, B, B-)**

Significant

**Fair (C+, C, C-)**

Moderate

**Marginal (D)**

Basic

**Failure (F)**

Not even reaching marginal levels

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**Assessment Task**

Examination

**Criterion**

1. CAPACITY to RELATE and EXPLAIN the theories and principles to highway engineering projects, and DISCUSS the roles, functions and responsibilities of highway engineers
2. ABILITY to USE the scientific techniques in solving the design and operation problems

**Excellent (A+, A, A-)**

High

**Good (B+, B, B-)**

Significant

**Fair (C+, C, C-)**

Moderate

**Marginal (D)**

Basic

**Failure (F)**

Not even reaching marginal levels

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## Part III Other Information

**Keyword Syllabus**

Basic concepts of traffic flow theory; transportation planning and modeling; highway system and geometric design; pavement design;; traffic surveys and data collection; intersection control and design.

**Reading List**

**Compulsory Readings**

Title	
1	Nil

**Additional Readings**

Title	
1	Khisty C.J. and Lall B.K. 2003, Transportation Engineering An Introduction, 3rd edition, Prentice Hall, New Jersey.
2	Wright P.H. and Dixon K.K. 2004, Highway Engineering, 7th edition, John Wiley.
3	Hong Kong Transport Department, Transport Planning and Design Manuals.
4	Hong Kong Highways Department, Guidance Notes on Pavement Design.