



# ENEC20004 Advanced Transportation Engineering Design

## Term 1 - 2018

Profile information current as at 03/05/2024 12:09 am

All details in this unit profile for ENEC20004 have been officially approved by CQUniversity and represent a learning partnership between the University and you (our student). The information will not be changed unless absolutely necessary and any change will be clearly indicated by an approved correction included in the profile.

## General Information

### Overview

Advanced Transportation Engineering Design will prepare you to analyse and solve complex transportation problems. You will develop strategies for managing and controlling traffic, identifying safety issues and recommending solutions. You will also analyse and design intersections using the appropriate software. In this unit, you will apply design codes to solve common design problems involving intersection design and pavement design in an ethical and professional manner by considering stakeholders and sustainability requirements. You are required to work, learn and communicate effectively in a professional manner, independently and in project teams. If you are enrolled in distance mode, you will be required to attend a compulsory residential school during the term.

### Details

Career Level: *Postgraduate*

Unit Level: *Level 9*

Credit Points: 12

Student Contribution Band: 8

Fraction of Full-Time Student Load: 0.25

### Pre-requisites or Co-requisites

Anti-Requisite: ENEC14016 Traffic and Transportation Engineering

Important note: Students enrolled in a subsequent unit who failed their pre-requisite unit, should drop the subsequent unit before the census date or within 10 working days of Fail grade notification. Students who do not drop the unit in this timeframe cannot later drop the unit without academic and financial liability. See details in the [Assessment Policy and Procedure \(Higher Education Coursework\)](#).

### Offerings For Term 1 - 2018

- Melbourne
- Perth
- Rockhampton

### Attendance Requirements

All on-campus students are expected to attend scheduled classes – in some units, these classes are identified as a mandatory (pass/fail) component and attendance is compulsory. International students, on a student visa, must maintain a full time study load and meet both attendance and academic progress requirements in each study period (satisfactory attendance for International students is defined as maintaining at least an 80% attendance record).

### Residential Schools

This unit has a Compulsory Residential School for distance mode students and the details are:

Click here to see your [Residential School Timetable](#).

### Website

[This unit has a website, within the Moodle system, which is available two weeks before the start of term. It is important that you visit your Moodle site throughout the term. Please visit Moodle for more information.](#)

## Class and Assessment Overview

### Recommended Student Time Commitment

Each 12-credit Postgraduate unit at CQUniversity requires an overall time commitment of an average of 25 hours of study per week, making a total of 300 hours for the unit.

### Class Timetable

#### [Regional Campuses](#)

Bundaberg, Cairns, Emerald, Gladstone, Mackay, Rockhampton, Townsville

#### [Metropolitan Campuses](#)

Adelaide, Brisbane, Melbourne, Perth, Sydney

### Assessment Overview

#### 1. **Portfolio**

Weighting: 30%

#### 2. **Portfolio**

Weighting: 30%

#### 3. **Practical Assessment**

Weighting: 10%

#### 4. **Examination**

Weighting: 30%

### Assessment Grading

This is a graded unit: your overall grade will be calculated from the marks or grades for each assessment task, based on the relative weightings shown in the table above. You must obtain an overall mark for the unit of at least 50%, or an overall grade of 'pass' in order to pass the unit. If any 'pass/fail' tasks are shown in the table above they must also be completed successfully ('pass' grade). You must also meet any minimum mark requirements specified for a particular assessment task, as detailed in the 'assessment task' section (note that in some instances, the minimum mark for a task may be greater than 50%). Consult the [University's Grades and Results Policy](#) for more details of interim results and final grades.

## CQUniversity Policies

**All University policies are available on the [CQUniversity Policy site](#).**

You may wish to view these policies:

- Grades and Results Policy
- Assessment Policy and Procedure (Higher Education Coursework)
- Review of Grade Procedure
- Student Academic Integrity Policy and Procedure
- Monitoring Academic Progress (MAP) Policy and Procedure – Domestic Students
- Monitoring Academic Progress (MAP) Policy and Procedure – International Students
- Student Refund and Credit Balance Policy and Procedure
- Student Feedback – Compliments and Complaints Policy and Procedure
- Information and Communications Technology Acceptable Use Policy and Procedure

This list is not an exhaustive list of all University policies. The full list of University policies are available on the [CQUniversity Policy site](#).

## Unit Learning Outcomes

On successful completion of this unit, you will be able to:

1. Analyse traffic flows and describe the effects of key traffic flow parameters and their inter-relationships
2. Apply systematic approaches to conduct capacity analysis and level of service of roadways and intersections
3. Evaluate the pavement sublayer materials properties using appropriate Australian guidelines
4. Design structural road pavements using appropriate Australian guidelines
5. Formulate, plan, manage and complete projects individually or in teams in an ethical and professional manner considering stakeholder requirements and principals of sustainable development
6. Demonstrate a professional level of communication and leadership.

The Learning Outcomes for this unit are linked with **Engineers Australia's Stage 1 Competency Standard for Professional Engineers**.

## Alignment of Learning Outcomes, Assessment and Graduate Attributes



### Alignment of Assessment Tasks to Learning Outcomes

Assessment Tasks	Learning Outcomes					
	1	2	3	4	5	6
1 - Portfolio - 30%	•	•			•	•
2 - Portfolio - 30%			•	•	•	•
3 - Practical Assessment - 10%			•			
4 - Examination - 30%	•	•		•		

### Alignment of Graduate Attributes to Learning Outcomes

Graduate Attributes	Learning Outcomes					
	1	2	3	4	5	6
1 - Knowledge	○	○	○	○	○	○
2 - Communication	○	○	○	○	○	○
3 - Cognitive, technical and creative skills	○	○	○	○	○	○
4 - Research	○	○	○	○	○	○
5 - Self-management	○	○	○	○	○	○
6 - Ethical and Professional Responsibility	○	○	○	○	○	○
7 - Leadership					○	○

Graduate Attributes	Learning Outcomes					
	1	2	3	4	5	6
<b>8 - Aboriginal and Torres Strait Islander Cultures</b>						

## Alignment of Assessment Tasks to Graduate Attributes

Assessment Tasks	Graduate Attributes							
	1	2	3	4	5	6	7	8
<b>1 - Portfolio - 30%</b>	○	○	○	○	○	○	○	
<b>2 - Portfolio - 30%</b>	○	○	○	○	○	○	○	
<b>3 - Practical Assessment - 10%</b>	○	○	○	○	○	○	○	
<b>4 - Examination - 30%</b>	○	○	○		○	○		

## Textbooks and Resources

### Textbooks

ENEC20004

#### Supplementary

#### Traffic and Highway Engineering, SI Edition

Edition: 5 (2015)

Authors: Nicholas J. Garber & Lester A. Hoel

Cengage Learning US

Stamford, CT 06902 , USA

ISBN: 9781133607083

Binding: Paperback

[View textbooks at the CQUniversity Bookshop](#)

### IT Resources

**You will need access to the following IT resources:**

- CQUniversity Student Email
- Internet
- Unit Website (Moodle)
- Pavement Design Software CIRCLY
- SIDRA Software

## Referencing Style

All submissions for this unit must use the referencing style: [Harvard \(author-date\)](#)

For further information, see the Assessment Tasks.

## Teaching Contacts

**Jerome Egwurube** Unit Coordinator  
[j.egwurube@cqu.edu.au](mailto:j.egwurube@cqu.edu.au)

## Schedule

### Week 1 - 05 Mar 2018

Module/Topic	Chapter	Events and Submissions/Topic
Traffic Flow Relationships	1. Traffic & Highway Engineering by Garber and Hoell SI Edition Chapter 6	
	2. Guide to Traffic Management Part 2: Traffic Theory (AGTM02-15) Chapter 2 pages 3 to 9	
	3. Guide to Traffic Management Part 2 Traffic Theory (AGTM02-15) Chapter 7 Pages 50 to 72	

### Week 2 - 12 Mar 2018

Module/Topic	Chapter	Events and Submissions/Topic
Capacity and Level of Service Concepts	1. Highway Capacity Manual (2016) 2. Guide to Traffic Management Part 3: Traffic Studies and Analysis (AGTM03-13) Chapter 3 & 4	1. Quiz 1:Traffic Flow Relationship due on Friday 16/03/2018 @ 17:00 2. Traffic Flow Relationship workbook due on Friday 16/03/2018 @ 17:00

### Week 3 - 19 Mar 2018

Module/Topic	Chapter	Events and Submissions/Topic
Highway Capacity Analysis	1. Highway Capacity Analysis (2016) Chapters 14 &15 2. Guide to Traffic Management Part 3: Traffic Studies and Analysis (AGTM03-13) Chapter 4 3. Traffic & Highway Engineering by Garber and Hoell SI Edition Chapter 9 pages 465 to 493	Quiz 2:Capacity Analysis of two lanes and multilanes due Friday 23/03/2018 @ 17:00

### Week 4 - 26 Mar 2018

Module/Topic	Chapter	Events and Submissions/Topic
Basic Segment Freeway Capacity Analysis	1. Highway Capacity Analysis (2016) Chapters 10 &11 2. Guide to Traffic Management Part 3: Traffic Studies and Analysis (AGTM03-13) Chapter 4 3. Traffic & Highway Engineering by Garber and Hoell SI Edition Chapter 9 pages 447 to 465	Task 1: Capacity Analysis release

### Week 5 - 02 Apr 2018

Module/Topic	Chapter	Events and Submissions/Topic
Merge, Diverge and Weaving Segment Freeway Capacity Analysis	Highway Capacity Analysis (2016) Chapters 12 & 13	

### Vacation Week - 09 Apr 2018

Module/Topic	Chapter	Events and Submissions/Topic
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### Week 6 - 16 Apr 2018

Module/Topic	Chapter	Events and Submissions/Topic
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Intersection Capacity Analysis	1. Guide of Traffic Management Part 3: Traffic Studies and Analysis (AGTM03-13) Section 6.1 & 6.2 pages 66 to 79	1. Quiz 3: Freeway Capacity due on Friday 20/04/2018 @ 17:00 2. Task 1: Capacity Analysis due on Friday 20/04/2018 @ 17:00
	2. Guide of Traffic Management Part 6: Traffic Studies and Analysis (AGTM06-13) Chapter 4 pages 60 to 79	
	3. Guide of Traffic Management Part 6: Traffic Studies and Analysis (AGTM06-13) Chapter 5	
	4. Traffic & Highway Engineering by Garber and Hoell SI Edition Chapters 8 & 10	

#### Week 7 - 23 Apr 2018

Module/Topic	Chapter	Events and Submissions/Topic
Introduction to Pavement Design	Australian Guide to Pavement Technology Part 2 (AGPT02-17)	Task 2: SIDRA Report due on Friday 27/04/2018 @ 17:00  <b>Traffic Engineering Portfolio</b> Due: Week 7 Friday (27 Apr 2018) 5:00 pm AEST

#### Week 8 - 30 Apr 2018

Module/Topic	Chapter	Events and Submissions/Topic
Flexible Pavement Design	Australian Guide to Pavement Technology Part 2 (AGPT02-17) Chapter 8	

#### Week 9 - 07 May 2018

Module/Topic	Chapter	Events and Submissions/Topic
Rigid Pavement Design	Australian Guide to Pavement Technology Part 2 (AGPT02-17) Chapter 9	

#### Week 10 - 14 May 2018

Module/Topic	Chapter	Events and Submissions/Topic
Pavement Overlay Design	Australian Guide to Pavement Technology Part 5 (AGPT05-11) Chapter 6	

#### Week 11 - 21 May 2018

Module/Topic	Chapter	Events and Submissions/Topic
Thickness Design of Stabilisation Treatment	Australian Guide to Pavement Technology (AGPT05-11) Chapter 7	

#### Week 12 - 28 May 2018

Module/Topic	Chapter	Events and Submissions/Topic
Review		1. Quiz 4 due on Friday 01/06/2018 @ 17:00 2. Laboratory Report due on Friday 01/06/2018 @ 17:00 3. Pavement Design Portfolio due on Friday 01/06/2018 @ 17:00
		<b>Pavement Design Portfolio</b> Due: Week 12 Friday (1 June 2018) 5:00 pm AEST <b>Laboratory Report</b> Due: Week 12 Friday (1 June 2018) 5:00 pm AEST

#### Review/Exam Week - 04 Jun 2018

Module/Topic	Chapter	Events and Submissions/Topic
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## Term Specific Information

### General Information

1. Answer Moodle quiz in the relevant modules.
2. Additional unit details are provided in the Moodle unit page

### Communication with Lecturer

- All unit related questions must be asked through appropriate forums or during the scheduled class time. No email will be responded for any queries related to this unit unless those are private in circumstances.
- All emails related to this unit should have the unit code (ENEC20004) in the subject line. Any email without unit code in the subject line may not be responded.

Example: ENEC20004: Moodle Quiz

### Laboratory Time Table

Detail of the laboratory timetable will be available from unit website separately in Week 2.

## Assessment Tasks

### 1 Traffic Engineering Portfolio

#### Assessment Type

Portfolio

#### Task Description

This portfolio contribute 30 marks out of 100 marks. It consist of three independent assessment task. **This assessment focus on weeks 1 to 6 content.**

1. Workbook Task (6 marks out of 30): This is an individual activity. You will be required to complete 3 Moodle quizzes. For each quiz you will have only two attempts that would have time limit. You will also complete one workbook question
2. Capacity Analysis Task (18 marks out of 30): This is an individual activity. Each student will be provided individual data for each of the questions categories. This will be generated through Moodle Quiz.
3. SIDRA Analysis Task (6 marks out of 30): This is a team activity. You will be expected to apply SIDRA software to analyse selected intersections

More details are provided in Moodle

#### Assessment Due Date

Week 7 Friday (27 Apr 2018) 5:00 pm AEST

#### Return Date to Students

10 working days

#### Weighting

30%

#### Assessment Criteria

The marking matrix shall be based on the content consisting of the following principles. Each sequential step shall be allocated marks proportionately

1. Accuracy of Input parameter for each computation step with appropriate unit. Marks will only be awarded for correct input
2. Application of accurate methodology with appropriate referencing. Full mark will only be awarded for error free computational steps with appropriate explanation to be understood by an

- independent person.
3. Accuracy of answer with appropriate unit. Zero mark will be awarded with error in either Input or methodology.
  4. If answers to any proceeding steps are inaccurate. Zero mark be awarded for subsequent answers.

Additional information should be obtained from the Moodle Unit web-page

### Referencing Style

- [Harvard \(author-date\)](#)

### Submission

Online

### Submission Instructions

Team members are to submit a single SIDRA Report highlighting the contribution of each members

### Learning Outcomes Assessed

- Analyse traffic flows and describe the effects of key traffic flow parameters and their inter-relationships
- Apply systematic approaches to conduct capacity analysis and level of service of roadways and intersections
- Formulate, plan, manage and complete projects individually or in teams in an ethical and professional manner considering stakeholder requirements and principals of sustainable development
- Demonstrate a professional level of communication and leadership.

### Graduate Attributes

- Knowledge
- Communication
- Cognitive, technical and creative skills
- Research
- Self-management
- Ethical and Professional Responsibility
- Leadership

## 2 Pavement Design Portfolio

### Assessment Type

Portfolio

### Task Description

This portfolio contribute 30 marks out of 100 marks. It consist of five independent assessment task.

1. Quiz (3 marks out of 30)
2. Laboratory Activity and Report (3 out of 30 marks)
3. Design Task 1: Flexible Pavement Design (12 marks out of 30)
4. Design Task 2: Rigid Pavement Design (6 marks out of 30)
5. Design Task 3: Structural Overlay Design (6 marks out of 30)

Refer to Moodle for details

### Assessment Due Date

Week 12 Friday (1 June 2018) 5:00 pm AEST

### Return Date to Students

10 working days

### Weighting

30%

### Assessment Criteria

The marking matrix shall be based on the content consisting of the following principles. Each sequential step shall be allocated marks proportionately



1. Accuracy of Input parameter for each computation step with appropriate unit. Marks will only be awarded for correct input
2. Application of accurate methodology with appropriate referencing. Full mark will only be awarded for error free computational steps with appropriate explanation to be understood by an independent person.
3. Accuracy of answer with appropriate unit. Zero mark will be awarded with error in either Input or methodology.
4. If answers to any proceeding steps are inaccurate. Zero mark be awarded for subsequent answers.

Additional information should be obtained from the Moodle Unit web-page

### Referencing Style

- [Harvard \(author-date\)](#)

### Submission

Online

### Submission Instructions

Team members are to submit a single Design Report highlighting the contribution of each members

### Learning Outcomes Assessed

- Evaluate the pavement sublayer materials properties using appropriate Australian guidelines
- Design structural road pavements using appropriate Australian guidelines
- Formulate, plan, manage and complete projects individually or in teams in an ethical and professional manner considering stakeholder requirements and principals of sustainable development
- Demonstrate a professional level of communication and leadership.

### Graduate Attributes

- Knowledge
- Communication
- Cognitive, technical and creative skills
- Research
- Self-management
- Ethical and Professional Responsibility
- Leadership

## 3 Laboratory Report

### Assessment Type

Practical Assessment

### Task Description

- You will complete the practical activities and the laboratory report as a team.
- Each team should check their schedule timetable as shown in Moodle
- All teams will upload a single team report due as per the Unit Profile.
- The required practical activities are as follows

1. Sample Preparation
2. Compaction
3. Permanent deformation
4. Resilience Modulus
5. Lime demand

### Assessment Due Date

Week 12 Friday (1 June 2018) 5:00 pm AEST

### Return Date to Students

10 working days

**Weighting**

10%

**Assessment Criteria**

The marking matrix shall be based on the content consisting of the following principles. Each sequential step shall be allocated marks proportionately

1. Accuracy of Input parameter for each computation step with appropriate unit. Marks will only be awarded for correct input
2. Application of accurate methodology with appropriate referencing. Full mark will only be awarded for error free computational steps with appropriate explanation to be understood by an independent person.
3. Accuracy of answer with appropriate unit. Zero mark will be awarded with error in either Input or methodology.
4. If answers to any proceeding steps are inaccurate. Zero mark be awarded for subsequent answers.

Additional information should be obtained from the Moodle Unit web-page

**Referencing Style**

- [Harvard \(author-date\)](#)

**Submission**

Online

**Submission Instructions**

Team members are to submit a single Report highlighting the contribution of each members

**Learning Outcomes Assessed**

- Evaluate the pavement sublayer materials properties using appropriate Australian guidelines

**Graduate Attributes**

- Knowledge
- Communication
- Cognitive, technical and creative skills
- Research
- Self-management
- Ethical and Professional Responsibility
- Leadership

**Examination****Outline**

Complete an invigilated examination.

**Date**

During the examination period at a CQUniversity examination centre.

**Weighting**

30%

**Length**

180 minutes

**Minimum mark or grade**

50

**Exam Conditions**

Open Book.

**Materials**

Dictionary - non-electronic, concise, direct translation only (dictionary must not contain any notes or comments).  
Calculator - all non-communicable calculators, including scientific, programmable and graphics calculators are authorised

## Academic Integrity Statement

As a CQUniversity student you are expected to act honestly in all aspects of your academic work.

Any assessable work undertaken or submitted for review or assessment must be your own work. Assessable work is any type of work you do to meet the assessment requirements in the unit, including draft work submitted for review and feedback and final work to be assessed.

When you use the ideas, words or data of others in your assessment, you must thoroughly and clearly acknowledge the source of this information by using the correct referencing style for your unit. Using others' work without proper acknowledgement may be considered a form of intellectual dishonesty.

Participating honestly, respectfully, responsibly, and fairly in your university study ensures the CQUniversity qualification you earn will be valued as a true indication of your individual academic achievement and will continue to receive the respect and recognition it deserves.

As a student, you are responsible for reading and following CQUniversity's policies, including the [Student Academic Integrity Policy and Procedure](#). This policy sets out CQUniversity's expectations of you to act with integrity, examples of academic integrity breaches to avoid, the processes used to address alleged breaches of academic integrity, and potential penalties.

### What is a breach of academic integrity?

A breach of academic integrity includes but is not limited to plagiarism, self-plagiarism, collusion, cheating, contract cheating, and academic misconduct. The Student Academic Integrity Policy and Procedure defines what these terms mean and gives examples.

### Why is academic integrity important?

A breach of academic integrity may result in one or more penalties, including suspension or even expulsion from the University. It can also have negative implications for student visas and future enrolment at CQUniversity or elsewhere. Students who engage in contract cheating also risk being blackmailed by contract cheating services.

### Where can I get assistance?

For academic advice and guidance, the [Academic Learning Centre \(ALC\)](#) can support you in becoming confident in completing assessments with integrity and of high standard.

### What can you do to act with integrity?



#### Be Honest

If your assessment task is done by someone else, it would be dishonest of you to claim it as your own



#### Seek Help

If you are not sure about how to cite or reference in essays, reports etc, then seek help from your lecturer, the library or the Academic Learning Centre (ALC)



#### Produce Original Work

Originality comes from your ability to read widely, think critically, and apply your gained knowledge to address a question or problem