

Profile information current as at 13/12/2025 03:54 pm

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 analysing, managing and controlling traffic; identifying safety issues; and recommending solutions. In this unit, you will apply design standards and guides to solve complex traffic and pavement analysis and design problems involving highway capacity analysis, intersection design and pavement design by considering stakeholders and sustainability requirements. You will also use appropriate industry-relevant software for analysis and design. You are required to work, learn, and communicate effectively in a professional manner, independently and in project teams.

### **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 <u>Assessment Policy and Procedure (Higher Education Coursework)</u>.

# Offerings For Term 1 - 2021

- Melbourne
- Mixed Mode
- 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).

### 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**

Portfolio
 Weighting: 30%
 Portfolio
 Weighting: 30%

3. Practical Assessment

Weighting: 10% 4. In-class Test(s) 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 <u>University's Grades and Results Policy</u> 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.

# **Previous Student Feedback**

# Feedback, Recommendations and Responses

Every unit is reviewed for enhancement each year. At the most recent review, the following staff and student feedback items were identified and recommendations were made.

### Feedback from Student Evaluation

### **Feedback**

The lecture-tutorial-workshop format of the unit was acknowledged to aid student learning.

#### Recommendation

The lecture-tutorial-workshop format of unit delivery will continue to be implemented.

### Feedback from Student Evaluation

#### Feedback

More detailed feedback would help students understand their mistakes in their assessment tasks.

#### Recommendation

More detailed feedback will be provided to students, particularly for wrong answers in their assessment tasks.

### Feedback from Student Evaluation

### **Feedback**

Contents, software, and associated learning resources were acknowledged as being practical and useful.

#### Recommendation

Contents, software, and associated learning resources will continue to be made practical and useful.

# **Unit Learning Outcomes**

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

- 1. Analyse traffic system components and traffic flows to identify key traffic flow parameters and their interrelationships
- 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 Standards and guidelines
- 4. Design structural road pavements using appropriate Australian Standards and guidelines
- 5. Formulate, plan, manage and complete projects individually or in teams in an ethical and professional manner considering stakeholder requirements and principles of sustainable development
- 6. Demonstrate a professional level of communication and leadership.

The Learning Outcomes for this unit are linked with the Engineers Australia Stage 1 Competency Standards for Professional Engineers in the areas of 1. Knowledge and Skill Base, 2. Engineering Application Ability and 3. Professional and Personal Attributes at the following levels:

### Introductory

3.4 Professional use and management of information. (LO: 6N)

#### Intermediate

- 1.2 Conceptual understanding of the mathematics, numerical analysis, statistics, and computer and information sciences which underpin the engineering discipline. (LO: 11 21 3N)
- 1.5 Knowledge of engineering design practice and contextual factors impacting the engineering discipline. (LO: 4I)
- 1.6 Understanding of the scope, principles, norms, accountabilities and bounds of sustainable engineering practice in the specific discipline. (LO: 4I)
- 2.4 Application of systematic approaches to the conduct and management of engineering projects. (LO: 4I 5I)
- 3.2 Effective oral and written communication in professional and lay domains. (LO: 6I)
- 3.6 Effective team membership and team leadership. (LO: 5N 6I)

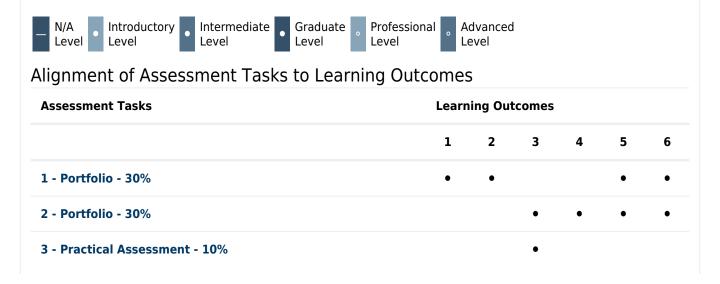
#### **Advanced**

- 1.1 Comprehensive, theory-based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the engineering discipline. (LO: 1A 2A 3N)
- 1.3 In-depth understanding of specialist bodies of knowledge within the engineering discipline. (LO: 1A 2A 3I)
- 1.4 Discernment of knowledge development and research directions within the engineering discipline. (LO: 1A 2A 3I)
- 2.1 Application of established engineering methods to complex engineering problem solving. (LO: 4A)
- 2.2 Fluent application of engineering techniques, tools and resources. (LO: 4A 5A)
- 2.3 Application of systematic engineering synthesis and design processes. (LO: 4A 5A)

Note: LO refers to the Learning Outcome number(s) which link to the competency and the levels: N – Introductory, I – Intermediate and A - Advanced.

Refer to the Engineering Postgraduate Units Moodle site for further information on the Engineers Australia's Stage 1 Competency Standard for Professional Engineers and course level mapping information <a href="https://moodle.cqu.edu.au/course/view.php?id=11382">https://moodle.cqu.edu.au/course/view.php?id=11382</a>

# Alignment of Learning Outcomes, Assessment and Graduate Attributes



Assessment Tasks	Lea	Learning Outcomes							
	1	:	2	3	4	5	i	6	
4 - In-class Test(s) - 30%	•	,	•		•				
Alignment of Graduate Attributes to Lear	ning Outcon	nes							
Graduate Attributes			L	Learning Outcomes					
			1	2	3	4	5	6	
1 - Knowledge			o	٥	٥	٥			
2 - Communication			o	o		0	0	o	
3 - Cognitive, technical and creative skills			o	o	0	٥	0		
4 - Research			o	o	0	0	0		
5 - Self-management			o	o	0	o	0		
6 - Ethical and Professional Responsibility									
7 - Leadership							0	٥	
8 - Aboriginal and Torres Strait Islander Cultures									
Alignment of Assessment Tasks to Gradu	ate Attribut	es							
Assessment Tasks	Gra	Graduate Attributes							
	1	2	3	4	5	6	7	8	
1 - Portfolio - 30%	۰	0	٥	0	0				
2 - Portfolio - 30%	۰	o	o	o	0				
3 - Practical Assessment - 10%	٥	0	o	o	0		0		
								_	

# Textbooks and Resources

### **Textbooks**

ENEC20004

#### Supplementary

### **Traffic Engineering**

Edition: 5th edn (2018)

Authors: Roger P. Roess, Elena S. Prassas, Elena S. Prassas

Pearson

Upper Saddle River, NJ, USA ISBN: 9780134599717 Binding: Hardcover

### IT Resources

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

- CQUniversity Student Email
- Internet
- Unit Website (Moodle)
- Zoom (both microphone and webcam capability)
- Software access (FREEVAL, SIDRA and CIRCLY) (These software can be accessed online on AnyDesk and also available in engineering computer labs at local campuses)

## Referencing Style

All submissions for this unit must use the referencing style: Harvard (author-date) For further information, see the Assessment Tasks.

# **Teaching Contacts**

Kali Nepal Unit Coordinator

k.nepal@cgu.edu.au

### Schedule

### WEEK 1: TRAFFIC FLOW FUNDAMENTALS AND RELATIONSHIPS - 08 Mar 2021

Module/Topic **Events and Submissions/Topic** Chapter

**Tutorial:** Traffic flow fundamentals Traffic flow fundamentals and A Guide to Traffic Management Part 2:

and relationships Traffic Theory (AGTM02) relationships Workshop: FREEVAL HCM software

WEEK 2: TRAFFIC FLOW ANALYSIS (1): CAPACITY AND LEVEL OF SERVICE CONCEPTS - 15 Mar 2021

Module/Topic Chapter **Events and Submissions/Topic** 

Tutorial: Capacity and level of Highway Capacity Manual (2016)

Capacity and level of service concepts service concepts Chapters 4, 5 & 10 Workshop: FREEVAL HCM software

WEEK 3: TRAFFIC FLOW ANALYSIS (2): FREEWAYS AND MULTILANE ROADS - 22 Mar 2021

Module/Topic Chapter **Events and Submissions/Topic** 

**Tutorial:** Freeways and multilane

Highway Capacity Manual (2016) Freeways and multilane roads roads

(Chapters 12-14) Workshop: SIDRA software

WEEK 4: TRAFFIC FLOW ANALYSIS (3): TWO-LANE TWO-WAY ROADS - 29 Mar 2021

Module/Topic Chapter **Events and Submissions/Topic** 

Tutorial: Pavement design input

parameters

Highway Capacity Manual (Update Two-lane two-way roads

V6.1 2020) (Chapter 15)

Workshop: SIDRA software **Traffic Engineering Portfolio** 

(Quiz#1 due)

WEEK 5: ANALYSIS AND DESIGN OF ROAD INTERSECTIONS (1): UNSIGNALISED INTERSECTIONS - 05 Apr 2021

**Events and Submissions/Topic** Module/Topic Chapter

Highway Capacity Manual (2016) **Tutorial:** Unsignalised intersections Unsignalised intersections

(Chapter 20) Workshop: SIDRA software

Vacation Week - 12 Apr 2021

Module/Topic Chapter **Events and Submissions/Topic** 

WEEK 6: ANALYSIS AND DESIGN OF ROAD INTERSECTIONS (2): ROUNDABOUTS AND TRAFFIC SIGNALS - 19

Apr 2021

Module/Topic Chapter **Events and Submissions/Topic** 

**Tutorial:** Roundabouts and signalised

intersections

Roundabouts and signalised

intersections

Highway Capacity Manual (2016)

(Chapters 22-23)

**Workshop: Traffic Engineering** Portfolio (SIDRA software: DIY) **Traffic Engineering Portfolio** 

(Quiz#2 Due)

WEEK 7: PAVEMENT DESIGN SYSTEM AND PAVEMENT DESIGN INPUT PARAMETERS (1) - 26 Apr 2021

Module/Topic Chapter **Events and Submissions/Topic** 

Tutorial: Pavement design input

parameters

A Guide to Pavement Technology: Part Pavement design input parameters

2 (AGPT02)

Workshop: CIRCLY software

**Traffic Engineering Portfolio Due:** Week 7 Friday (30 Apr 2021) 11:59 pm

**AFST** 

WEEK 8: PAVEMENT DESIGN INPUT PARAMETERS (2): PAVEMENT MATERIALS - 03 May 2021

Module/Topic Chapter **Events and Submissions/Topic** 

**Tutorial:** Traffic calculation A Guide to Pavement Technology: Part Pavement materials spreadsheet

2 (AGPT02) Workshop: CIRCLY software

WEEK 9: PAVEMENT DESIGN (1): FLEXIBLE PAVEMENTS - 10 May 2021

Module/Topic Chapter **Events and Submissions/Topic** 

Tutorial: Flexible pavement design

A Guide to Pavement Technology: Part Workshop: CIRCLY software Flexible pavements 2 (AGPT02) and flexible pavement design

spreadsheet

WEEK 10: PAVEMENT DESIGN (2): RIGID PAVEMENTS - 17 May 2021

**Events and Submissions/Topic** Module/Topic Chapter

**Tutorial:** Rigid pavement design A Guide to Pavement Technology: Part Workshop: Rigid pavement design Rigid pavements

2 (AGPT02) spreadsheet

WEEK 11: PAVEMENT DESIGN (3): PAVEMENT EVALUATION AND TREATMENT DESIGN - 24 May 2021

Module/Topic **Events and Submissions/Topic** Chapter

Pavement evaluation and treatment design	A Guide to Pavement Technology: Part 5 (AGPT05)	Tutorial: Pavement evaluation and treatment design Workshop: Pavement Design Portfolio (DYI) Pavement Design Portfolio (Quiz due)
Week 12: Revision - 31 May 2021		
Module/Topic	Chapter	<b>Events and Submissions/Topic</b>
All unit revision including exam-style class test	All	Pavement Design Portfolio Due: Week 12 Friday (4 June 2021) 11:59 pm AEST Practical Assessment Report Due: Week 12 Friday (4 June 2021) 11:59 pm AEST
Review/Exam Week - 07 Jun 2021		
Module/Topic	Chapter	Events and Submissions/Topic
Exam-style class test - 14 Jun 2021		
Module/Topic	Chapter	<b>Events and Submissions/Topic</b>
Exam-style class test		<b>Exam-style class test</b> Due: Exam Week Monday (14 June 2021) 11:45 pm AEST

### **Assessment Tasks**

### 1 Traffic Engineering Portfolio

### **Assessment Type**

Portfolio

### **Task Description**

This assessment task relates to the unit learning outcomes 1, 2, 5 and 6. It contains two quizzes (6 Marks) and analysis tasks (24 Marks) and covers Week 1 to Week 6 learning resources. Students are required to complete two quizzes online via Moodle and submit a written traffic analysis report that documents a series of traffic engineering analysis tasks (freeways, multi-lane roads, two-lane two-way roads and traffic intersections). SIDRA software required for this assessment task can be accessed online via AnyDesk and also available in engineering labs at local campuses. Details of the task will be provided in Moodle.

### **Assessment Due Date**

Week 7 Friday (30 Apr 2021) 11:59 pm AEST

### **Return Date to Students**

Week 9 Friday (14 May 2021)

### Weighting

30%

### Minimum mark or grade

50%

### **Assessment Criteria**

### 1. (100%) Content, presentation and layout includes:

- the process and accuracy of calculations
- interpretation of the results
- relevance of information
- application of knowledge
- language and grammar used in answering questions
- proper referencing of sources of information (when referencing, Harvard style should be used.)
- equations, images, data and tables, and the quality of presentation and layout.

### 2. A similarity check will be always done before marking the submitted documents for all students. Upon

### detection of any plagiarism including:

• Similarity between submitted document within the same cohort or with the previous cohorts or submitted works to other institutions or using the material provided by cheating websites will result in failing that assignment without marking and the student will be reported to the CQU Academic Misconduct team for further actions

### **Referencing Style**

• Harvard (author-date)

#### **Submission**

Online

#### **Learning Outcomes Assessed**

- Analyse traffic system components and traffic flows to identify key traffic flow parameters and their interrelationships
- 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 principles of sustainable development
- Demonstrate a professional level of communication and leadership.

#### **Graduate Attributes**

- Knowledge
- Communication
- Cognitive, technical and creative skills
- Research
- Self-management

### 2 Pavement Design Portfolio

### **Assessment Type**

Portfolio

### **Task Description**

This assessment item relates to the unit learning outcomes 3, 4, 5 and 6. It contains a quiz (6 Marks) and pavement design tasks (24 Marks) and covers Week 7 to Week 11 learning resources. Students are required to complete one quiz online via Moodle and submit a written pavement design report that documents a series of alternative pavement designs (flexible pavement alternatives, rigid pavement alternatives and pavement overlays). CIRCLY software required for this assessment task can be accessed online via AnyDesk and also available in engineering labs at local campuses. Details of the task will be provided in Moodle.

#### **Assessment Due Date**

Week 12 Friday (4 June 2021) 11:59 pm AEST

### **Return Date to Students**

Review/Exam Week Friday (11 June 2021)

#### Weighting

30%

### Minimum mark or grade

50%

### **Assessment Criteria**

### 1. (100%) Content, presentation and layout includes:

- the process and accuracy of calculations
- interpretation of the results
- relevance of information
- application of knowledge
- language and grammar used in answering questions
- proper referencing of sources of information (when referencing, Harvard style should be used.)
- equations, images, data and tables, and the quality of presentation and layout.

# 2. A similarity check will be always done before marking the submitted documents for all students. Upon detection of any plagiarism including:

• Similarity between submitted document within the same cohort or with the previous cohorts or submitted works to other institutions or using the material provided by cheating websites will result in failing that assignment without marking and the student will be reported to the CQU Academic Misconduct team for further actions.

### **Referencing Style**

• Harvard (author-date)

#### **Submission**

Online

### **Learning Outcomes Assessed**

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

#### **Graduate Attributes**

- Knowledge
- Communication
- Cognitive, technical and creative skills
- Research
- Self-management

### 3 Practical Assessment Report

### **Assessment Type**

**Practical Assessment** 

### **Task Description**

This assessment item relates to the unit learning outcomes 3, 4, 5 and 6. Students are required to write a professional laboratory report on all practical activities demonstrated/completed during the trimester. Details of the task will be provided in Moodle.

### **Assessment Due Date**

Week 12 Friday (4 June 2021) 11:59 pm AEST

#### **Return Date to Students**

Exam Week Friday (18 June 2021)

### Weighting

10%

#### Minimum mark or grade

50%

### **Assessment Criteria**

### 1. (100%) Content, presentation and layout includes:

- the process and accuracy of calculations
- interpretation of the results
- relevance of information
- application of knowledge
- language and grammar used in answering questions
- proper referencing of sources of information (when referencing, Harvard style should be used.)
- equations, images, data and tables, and the quality of presentation and layout.

# 2. A similarity check will be always done before marking the submitted documents for all students. Upon detection of any plagiarism including:

• Similarity between submitted document within the same cohort or with the previous cohorts or submitted works to other institutions or using the material provided by cheating websites will result in failing that assignment without marking and the student will be reported to the CQU Academic Misconduct team for further actions.

### **Referencing Style**

Harvard (author-date)

#### **Submission**

Online Group

#### **Submission Instructions**

Submit one copy per group (uploaded by a member of the group)

### **Learning Outcomes Assessed**

• Evaluate the pavement sublayer materials properties using appropriate Australian Standards and guidelines

#### **Graduate Attributes**

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

### 4 Exam-style class test

### **Assessment Type**

In-class Test(s)

#### **Task Description**

The time-restricted exam-style class test will be conducted. Class test covers all learning outcomes and all learning resources of the entire trimester. Exact format of the test will be announced/advised/published towards the end of trimester.

#### **Assessment Due Date**

Exam Week Monday (14 June 2021) 11:45 pm AEST

Test timetable will be published/advised towards the end of trimester

#### **Return Date to Students**

### Weighting

30%

### Minimum mark or grade

50%

### **Assessment Criteria**

Assessment Criteria

- 1. The following assessment criteria will be used for assessing the test:
  - The correctness of the answers;
  - The correct process followed; and
  - Accuracy of the calculations.
- 2. A similarity check will be always done before marking the submitted test papers for all students. Upon detection of any plagiarism including:
  - Similarity between submitted document within the same cohort or with the previous cohorts or submitted works to other institutions or using the material provided by cheating websites will result in failing that assignment without marking and the student will be reported to the CQU Academic Misconduct team for further actions.

### **Referencing Style**

• Harvard (author-date)

### **Submission**

Offline

### **Submission Instructions**

Test answer-book showing all steps of processes and answers.

### **Learning Outcomes Assessed**

- Analyse traffic system components and traffic flows to identify key traffic flow parameters and their interrelationships
- Apply systematic approaches to conduct capacity analysis and level of service of roadways and intersections
- Design structural road pavements using appropriate Australian Standards and guidelines

### **Graduate Attributes**

- Knowledge
- Communication
- Cognitive, technical and creative skills
- Self-management

## **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 <u>Academic Learning Centre (ALC)</u> 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