



ENEC20004 Advanced Transportation Engineering Design

Term 1 - 2019

Profile information current as at 01/07/2022 02:48 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 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 - 2019

- 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).

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](#).

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 Course Evaluation

Feedback

The tutorial and workshop activities were acknowledged to aid learning. This involve hands-on demonstrations on worked examples and suitable exercise on the Industry based software.

Recommendation

The tutorial and workshop sessions will continue to be implemented. The hands-on demonstrations of worked examples will be continued.

Feedback from Student Course Evaluation

Feedback

The Moodle site format with Icon to aid navigation was reported as the best aspect of the unit. It was graded 4.7 out of 5

Recommendation

The format of the Moodle site with Icon aiding navigation will be implemented across all units delivered by the lecturer.

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					○	○
8 - Aboriginal and Torres Strait Islander Cultures						

Alignment of Assessment Tasks to Graduate Attributes

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

Textbooks and Resources

Textbooks

ENEC20004

Supplementary

Traffic and Highway Engineering, Enhanced SI Edition

Edition: 5 (2019)

Authors: Nicholas J. Garber & Lester A. Hoel

Cengage Learning US

Stamford, CT 06902, USA

ISBN: 9781337631044

Binding: Paperback

Additional Textbook Information

Copies are available to purchase at the CQUni Bookshop here: <http://bookshop.cqu.edu.au> (search on the Unit code)

[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

Schedule

Week 1: Traffic Flow Relationship - 11 Mar 2019

Module/Topic	Chapter	Events and Submissions/Topic
Traffic Flow Relationships	1. Traffic & Highway Engineering by Garber and Hoel SI Edition Chapter 6; 2. Guide to Traffic Management Part 2: Traffic Theory (AGTM02-15) Chapter 2 3. Guide to Traffic Management Part 2: Traffic Theory (AGTM02-15) Commentary 1 & 2 pages 90 to 92 4. Guide to Traffic Management Part 2: Traffic Theory (AGTM02-15) Chapter 7 pages 50 to 72	

Week 2: Capacity and Level of Service Concepts - 18 Mar 2019

Module/Topic	Chapter	Events and Submissions/Topic
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Capacity and Level of Service Concepts

1. [Highway Capacity Manual \(2016\) Chapters 4 & 5;](#)
2. [Guide to Traffic Management Part 3: Traffic Studies and Analysis \(AGTM03-17\) Chapter 3 & 4](#)

Week 3:Capacity Analysis I - 25 Mar 2019

Module/Topic	Chapter	Events and Submissions/Topic
Highway Capacity Analysis	<ol style="list-style-type: none"> 1. Highway Capacity Manual (2016) Chapters 12 & 15 2. Guide to Traffic Management Part 3: Traffic Studies and Analysis (AGTM03-17) Chapter 4 3. Traffic & Highway Engineering by Garber and Hoel SI 5th Edition Chapter 9 pages 465 to 493 	

Week 4:Capacity Analysis II - 01 Apr 2019

Module/Topic	Chapter	Events and Submissions/Topic
Freeway Capacity Analysis:	<ol style="list-style-type: none"> 1. Highway Capacity Manual (2016) Chapters 10 & 11 2. Guide to Traffic Management Part 3: Traffic Studies and Analysis (AGTM03-17) Chapter 4 3. Traffic & Highway Engineering by Garber and Hoel SI 5th Edition Chapter 9 pages 447 to 465 	

Week 5:Capacity Analysis III - 08 Apr 2019

Module/Topic	Chapter	Events and Submissions/Topic
Freeway Capacity Analysis: Merge, Diverge and Weaving Segment	Highway Capacity Manual (2016) Chapters 13 & 14	

Vacation Week - 15 Apr 2019

Module/Topic	Chapter	Events and Submissions/Topic

Week 6:Signalized & Unsignalised Intersection Capacity Analysis - 22 Apr 2019

Module/Topic	Chapter	Events and Submissions/Topic
Signalized & Unsignalised Intersection Capacity Analysis	<ol style="list-style-type: none"> 1. Guide to Traffic Management Part 3: Traffic Studies and Analysis (AGTM03-17) Chapter 6 2. Guide to Traffic Management Part 6: Intersection, Interchanges and Crossing (AGTM06-17) Chapter 4 & 5 3. Traffic & Highway Engineering by Garber and Hoel SI 5th Edition Chapter 8 & 10 	

Week 7:Flexible Pavement Design I - 29 Apr 2019

Module/Topic	Chapter	Events and Submissions/Topic
Flexible Pavement Design I	Australian Guide to Pavement Technology Part 2 (AGPT02-17)	Traffic Engineering Due: Week 7 Friday (3 May 2019) 5:00 pm AEST

Week 8:Flexible Pavement Design II - 06 May 2019

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

Week 9:Rigid Pavement Design I - 13 May 2019

Module/Topic	Chapter	Events and Submissions/Topic

Rigid Pavement Design I [Australian Guide to Pavement Technology Part 2 \(AGPT02-17\): Chapter 9](#)

Week 10: Rigid Pavement Design II - 20 May 2019

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

Week 11: Pavement Overlay Design - 27 May 2019

Module/Topic	Chapter	Events and Submissions/Topic
Pavement Overlay Design	Australian Guide to Pavement Technology Part 5 (AGPT05-11): Chapter 6 & 7	

Week 12: Review - 03 Jun 2019

Module/Topic	Chapter	Events and Submissions/Topic
Review		Pavement Design Due: Week 12 Friday (7 June 2019) 5:00 pm AEST

Review/Exam Week - 10 Jun 2019

Module/Topic	Chapter	Events and Submissions/Topic
		Laboratory Due: Review/Exam Week Tuesday (11 June 2019) 5:00 pm AEST

Exam Week - 17 Jun 2019

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
3. The required length for any assessment item should not exceed 40 pages excluding appendices
4. Obtain all required AUSTRROAD guide from <https://austroroads.com.au/>
5. Highway Capacity Manual (2016) can be obtained from the CQUniversity library
6. All relevant required Laboratory standard can be obtained from the University Library <https://www.saiglobal.com/online/autologin.asp>

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.

Extension Request

Use the official Assessment Extension Request link available in the Unit web-page

<https://moodle.cqu.edu.au/local/extension/index.php>

Assessment Tasks

1 Traffic Engineering

Assessment Type

Portfolio

Task Description

This assessment item relates to the unit learning outcomes 1, 2, 5 and 6. It develops students' ability to understand capacity analysis procedures for both roadways and intersections using current Australian Guidelines and Design Practices. Use of SIDRA software (intersection design software) is highly recommended when applicable. This is an individual submission.

Quizzes (6 Marks):

Complete Moodle quizzes

Roadway Capacity Analysis Task (10 Marks):

Road Authority in Victoria is currently considering to upgrade an existing suburban multilane road to a freeway in Melbourne due to severe traffic delays (based on the public complaints) during peak periods. As a traffic engineer working at Road Authority in Victoria, you were asked to collect data for the existing condition, analyse the existing condition and recommend whether converting the multi lane road to the freeway improves capacity and level of service. Over several months, you collected the following data:

Existing multilane road:

- Lane width of 3.6m (12ft), total lateral clearance 1.8m (6ft) and about 6.25 access points per km (10 points per mile)
- Two lanes per direction, divided multilane road in rolling terrain
- Observed base free flow speed of approximately 80km/hr (50mi/hr)
- Observed directional flow of $(3000 + \text{last four digits of your student ID} \div 10)$ with corresponding PHF=0.90 and 2% trucks.
- All motorists seem to be commuters or regular facility users.

Proposed freeway data:

- Lane width of 3.6m (12ft), left side lateral clearance 0.9m (3ft) and about 2.5 ramps per km (4 ramps per mile)
- Two lanes per direction, freeway in rolling terrain
- Observed base free flow speed of approximately 110km/hr (70mi/hr)
- Directional traffic flow is expected to increase by 25% including trucks but PHF is expected to remain the same.
- All motorists are expected to be commuters or regular facility users.

Consider the following types for analysis (ignore the costs of converting multilane road to freeway):

- Multilane road- existing case **(4 marks)**
- Freeway **(4 marks)**

Also, compare and provide a detailed discussions on analysis outcomes. **(2 marks)**.

Intersection Capacity Analysis Task (14 Marks)

A City Council received a number of complaints about excessive delays at one of their local street intersection during morning peak period at the City Centre. As a traffic engineer working for the City Council, you were tasked with providing the best engineering solution to remedy the problem (if there is a problem). You performed a site visit and the following observations were made:

- The intersection connects two-lane two-way cross-roads at approximately 90 degree angle.
- There are right-turning lanes on North-South road. But site condition is such that one right- turn lane could be added on East-West road too but there is no space for left-turning slip lanes or additional through lanes. Small roundabout could also be considered.
- There were virtually no trucks during morning peak period.
- Currently, the intersection is un-signalised and East-West road needs to GIVE WAY to North- South traffic.
- Speed limit is 60km/hr at all approaches.
- There is not much variation of traffic flow rate within morning peak hour.
- Traffic volumes (veh/hr) during the peak period were observed as follows:
 - From South: 200 (left turn), 500 (through) & 100 (right turn)
 - From East: 150 (left turn), 100 (through) & 400 (right turn)
 - From North: 100 (left turn), 500 (through) & 100 (right turn)
 - From West: 150 (left turn), 100 (through) & 200 (right turn)
- No annual traffic growth is expected for foreseeable future.
- Other information can be assumed within Australian Standards and guides.

Consider the following types of intersections for manual analysis and design:

- Un-signalised intersection- existing case **(2 marks)**
- Un-signalised intersection- modified **(2 marks)**
- Roundabout **(2 marks)**
- Signalised intersection **(2 marks)**

Compare your manual analytical solutions with the outputs from SIDRA. Provide reason/s if there are any variations in the outputs. **(4 marks)**

Also compare alternative intersection controls and recommend the best intersection type **(2 marks)**.

Assessment Due Date

Week 7 Friday (3 May 2019) 5:00 pm AEST

Return Date to Students

After 10 working day

Weighting

30%

Minimum mark or grade

50%

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 preceding steps are inaccurate. Partial 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

Prepare (sequentially organise, properly format and scan if necessary) and upload a single PDF file (only one file per assignment item with your Student ID as file name, for example, 21111111.pdf) online. Note: Softcopy docs (Excel, Word, AutoCAD etc) and multiple files for one assessment item will not be assessed or referenced!

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

Assessment Type

Portfolio

Task Description

This assessment item relates to the unit learning outcomes 3, 4, 5 and 6. It develops students' ability to understand Australian pavement design system, materials and tests and design of alternative pavement configurations (flexible pavements, rigid pavements and structural overlays) using current Australian Guidelines and Design Practices. Use of CIRCLY software (pavement design software) is highly recommended when required.

Quiz (6 Marks)

Complete quizzes online.

Design Task 1: Flexible pavement design (12 marks)

Geometric design, earth moving and subgrade evaluation of a new two-lane two-way road has been recently completed and now it is time for design of pavement in rural Victoria. A new flexible pavement is to be designed and you are tasked to develop flexible pavement alternatives for further consideration. The following are the project specific information supplied by the client (Road Authority in Victoria):



- Two way total AADT=4000+(the last four digits of your student ID)/10
- Pavement design period 30 years.
- Project reliability 95%.
- Lane width= 3.5m.
- Directional distribution 60/40
- Subgrade CBR value = 3 (if the last four digits of your student ID is < 3000), 5 (if the last four digits of your student ID is \geq 3000 but < 6000) and 7 (if the last four digits of your student ID is \geq 6000)
- Heavy vehicles = 8% (if the last four digits of your student ID is < 3000), 9% (if the last four digits of your student ID is \geq 3000 but < 6000) and 10% (if the last four digits of your student ID is \geq 6000)
- Annual heavy vehicle growth is 1% throughout the design period
- Other required information can be assumed within Australian Standard (Austroads Guides)
 - Summarise and calculate required flexible pavement design input parameters **(2 marks)**
 - Design the following flexible pavement alternatives using mechanistic or graphical methods (as applicable, appropriate or preferred!). You need to draw final design drawings for all cases (not to scale is acceptable but indicate all required dimensions and units of measurements). You must discuss/interpret everything you calculate or present.
 - Alternative 1: Unbound granular pavement with thin bituminous surfacing **(2 marks)**
 - Alternative 2: Full depth asphalt (E=2500MPa) **(2 marks)**
 - Alternative 3: Asphalt (E=3500MPa) with granular base (E=550MPa) **(3 marks)**
 - Alternative 4: Asphalt (E=2200MPa), granular base (E=550MPa), cemented subbase (E=5000MPa) **(3 marks)**

Design Task 2: Rigid Pavement design (9 Marks)

For the same road location and information (described above in Design Task 1), Road Authority in Victoria also asked you to develop rigid pavement design alternatives.

- Summarise and calculate required rigid pavement design input parameters **(1 marks)**
- Design the following rigid pavement alternatives using analytical or graphical methods (as applicable or appropriate or preferred!). You need to draw final design drawings for all cases (not to scale is acceptable but indicate all required dimensions and units of measurements). You must discuss/interpret everything you calculate or present.
 - Alternative 1: PCP pavement *without* concrete shoulder **(4 marks)**
 - Alternative 2: CRCP pavement *with* concrete shoulder **(4 marks)**

Design Task 3: Design of Flexible Asphalt Overlay (3 Marks)

A homogeneous section of a cracked asphalt surfaced granular pavement is situated in Melbourne where the WMAPT is 24°C. As the existing asphalt is cracked, it is proposed to mill 25 mm from the existing 50 mm thick asphalt prior to asphalt overlay. The following characteristic values were calculated from deflectograph deflection testing undertaken at a pavement temperature of 25 °C:

- Measured Characteristic Deflection at 25°C = 0.87 mm
- Measured Characteristic Curvature at 25°C = 0.30 mm.

Based on experience, the client (Road Authority in Victoria) advised that the designer considered that there was no need to apply a Seasonal Moisture Correction Factor to these measured deflections and curvatures. The design traffic loading (ESA) for this section is the same as described above (Design Task 1).

- Design asphalt overlay on asphalt surfaced granular pavement using design charts. You need to draw final design drawings (not to scale is acceptable but indicate all required dimensions and units of

measurements). You must discuss/interpret everything you calculate **(6 marks)**

Assessment Due Date

Week 12 Friday (7 June 2019) 5:00 pm AEST

Return Date to Students

10 working days

Weighting

30%

Minimum mark or grade

50%

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 preceding steps are inaccurate. Partial 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

Prepare (sequentially organise, properly format and scan if necessary) and upload a single PDF file (only one file per assignment item with your Student ID as file name, for example, 211111111.pdf) online. Note: Softcopy docs (Excel, Word, AutoCAD etc) and multiple files for one assessment item will not be assessed or referenced!

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

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. Preparation of disturbed soil sample for testing

2. Soil Compaction and density test [AS1289.5.2.2017](#)
3. Determination of Permanent deformation of unbound granular materials under undrained conditions [AGTP-T053-07](#)
4. Determination of Resilience Modulus characteristics of unbound granular materials under undrained conditions [AGTP-T053-07](#)
5. Lime Saturation Point of Soil (pH Method) [RC131.01 2018](#)

Assessment Due Date

Review/Exam Week Tuesday (11 June 2019) 5:00 pm AEST

Return Date to Students

10 working days

Weighting

10%

Minimum mark or grade

5

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 preceding steps are inaccurate. Partial mark be awarded for subsequent answers.

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

Referencing Style

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

Submission

Online

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

Closed 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