



# ENEC12009 *Engineering Surveying*

## Term 1 - 2020

Profile information current as at 02/05/2024 02:00 pm

All details in this unit profile for ENEC12009 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

This unit introduces you to engineering surveying techniques and practical skills. It outlines the practice in plane and geodetic surveying such as measurements of distances, elevations and angles. You are also expected to demonstrate an understanding of surveying methods which include triangulation, traversing and transfer of true meridian to an underground base. Concepts are also introduced in relation to automated survey instruments, errors and survey adjustments, and computerised processing of survey data. You will also need to demonstrate teamwork and communication skills necessary to implement such systems in the civil construction and mining industries. Students enrolled in distance mode are required to attend a compulsory Residential School.

### Details

Career Level: *Undergraduate*

Unit Level: *Level 2*

Credit Points: 6

Student Contribution Band: 8

Fraction of Full-Time Student Load: 0.125

### Pre-requisites or Co-requisites

Prerequisite: MATH11218 Applied Mathematics or MATH11160 Technology Mathematics

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 - 2020

- Bundaberg
- Cairns
- Gladstone
- Mackay
- Mixed Mode
- 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 6-credit Undergraduate unit at CQUniversity requires an overall time commitment of an average of 12.5 hours of study per week, making a total of 150 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. **Written Assessment**

Weighting: 30%

#### 2. **Written Assessment**

Weighting: 30%

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

Weighting: 40%

### 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 Moodle website

**Feedback**

The content of this unit was fantastic and helped students to understand surveying.

**Recommendation**

Continue to add more useful and practical materials for Term 1, 2020.

#### Feedback from Moodle website

**Feedback**

Assignment questions were completely referring to the unit content and examples.

**Recommendation**

Continue to add more worked-out examples to the unit content for Term 1, 2020.

#### Feedback from Moodle website

**Feedback**

The lecturer/coordinator was very skilled and organised. The unit was presented very well.

**Recommendation**

Continue to keep the same quality every year.

#### Feedback from Moodle website

**Feedback**

The practical works and assignment one were very interesting and insightful. Both helped in better understanding of the unit.

**Recommendation**

Continue to keep the same or even better quality every year.

#### Feedback from Moodle Website

**Feedback**

The lecturer was really helpful through quick and comprehensive responses.

**Recommendation**

Quick response to students is of high importance and the same quality of support is recommended in the future offerings.

#### Feedback from Moodle Website

**Feedback**

The practicals are better to move to later weeks (near mid sem). This way students have more of an understanding of surveying.

**Recommendation**

Will run the practical classes in Week 5 and 6 if possible.

#### Feedback from Moodle Website

**Feedback**

For res school students, the practicals are better to run earlier - week 7 is quite late for something worth 50%.

**Recommendation**

Will run the practical classes in Week 5 and 6 if possible.

## Unit Learning Outcomes

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

1. Recognise and discuss basic concepts and principles of Engineering Surveying
2. Carry out basic surveying and mapping activities such as measurement of ground elevation, angle and distance measurements and detailed surveying using appropriate surveying equipment
3. Select and apply appropriate computing techniques to analyse and process surveying field measurement data
4. Apply surveying principles in civil and mining engineering works such as setting-out, earth work calculations and underground surveying
5. Explain and demonstrate the concepts, techniques and technologies used in mass surveying
6. Demonstrate a professional level of communication and teamwork

All the learning outcomes are linked and comply with the **Engineers Australia's Stage 1 Competency Standard**.

## 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
<b>1 - Written Assessment - 30%</b>	•		•	•	•	•
<b>2 - Written Assessment - 30%</b>	•		•	•	•	•
<b>3 - Practical Assessment - 40%</b>	•	•	•	•		•

### Alignment of Graduate Attributes to Learning Outcomes

Graduate Attributes	Learning Outcomes					
	1	2	3	4	5	6
<b>1 - Communication</b>	•	•	•	•	•	•
<b>2 - Problem Solving</b>	•	•	•	•	•	•
<b>3 - Critical Thinking</b>		•	•	•	•	•
<b>4 - Information Literacy</b>	•	•	•	•	•	•
<b>5 - Team Work</b>	•	•	•	•	•	•
<b>6 - Information Technology Competence</b>	•	•	•	•	•	•
<b>7 - Cross Cultural Competence</b>	•	•	•	•	•	•
<b>8 - Ethical practice</b>	•	•		•	•	•

Graduate Attributes	Learning Outcomes					
	1	2	3	4	5	6
<b>9 - Social Innovation</b>						
<b>10 - 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	9	10
<b>1 - Written Assessment - 30%</b>	•	•	•	•	•	•	•	•		
<b>2 - Written Assessment - 30%</b>	•	•	•	•	•	•	•	•		
<b>3 - Practical Assessment - 40%</b>	•	•	•	•	•	•	•	•		

## Textbooks and Resources

### Textbooks

ENEC12009

#### Prescribed

#### ENGINEERING SURVEYING

Edition: 6th (2007)

Authors: W. Schofield and M. Breach

Taylor and Francis

London , United Kingdom

ISBN: 978-0-7506-6949-8

Binding: Other

#### Additional Textbook Information

Copies can be purchased from 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)

## Referencing Style

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

For further information, see the Assessment Tasks.

## Teaching Contacts

**Farzaneh Tahmoorian** Unit Coordinator  
[f.tahmoorian@cqu.edu.au](mailto:f.tahmoorian@cqu.edu.au)

## Schedule

### Week 1 - 09 Mar 2020

Module/Topic	Chapter	Events and Submissions/Topic
Basic Concepts of Surveying Error and Uncertainty	Chapter 1 Chapter 2	

### Week 2 - 16 Mar 2020

Module/Topic	Chapter	Events and Submissions/Topic
Vertical Control (Levelling)	Chapter 3	

### Week 3 - 23 Mar 2020

Module/Topic	Chapter	Events and Submissions/Topic
Distance Measurement	Chapter 4	

### Week 4 - 30 Mar 2020

Module/Topic	Chapter	Events and Submissions/Topic
Angle Measurement Mapping and Detail Survey	Chapter 5 Chapter 8	

### Week 5 - 06 Apr 2020

Module/Topic	Chapter	Events and Submissions/Topic
Traversing & Triangulation	Chapters 6 & 7	

### Vacation Week - 13 Apr 2020

Module/Topic	Chapter	Events and Submissions/Topic
MID-TERM BREAK		

### Week 6 - 20 Apr 2020

Module/Topic	Chapter	Events and Submissions/Topic
Earthworks (Quantities, Sections, Contours)	Chapter 11	Residential School for FLEX students <b>Assignment 1</b> Due: Week 6 Monday (20 Apr 2020) 5:00 pm AEST

### Week 7 - 27 Apr 2020

Module/Topic	Chapter	Events and Submissions/Topic
Curves	Chapter 10	

### Week 8 - 04 May 2020

Module/Topic	Chapter	Events and Submissions/Topic
Setting out Works	Chapter 12	

### Week 9 - 11 May 2020

Module/Topic	Chapter	Events and Submissions/Topic
Mine and Underground Surveying	Chapter 13	

### Week 10 - 18 May 2020

Module/Topic	Chapter	Events and Submissions/Topic
Digital and Mass Survey Methods	Chapter 14	

### Week 11 - 25 May 2020

Module/Topic	Chapter	Events and Submissions/Topic

Introduction of GPS

Chapter 9

**Assignment 2** Due: Week 11 Monday  
(25 May 2020) 5:00 pm AEST

### Week 12 - 01 Jun 2020

Module/Topic

Chapter

Events and Submissions/Topic

Review

**Surveying Practicals** Due: Week 12  
Thursday (4 June 2020) 5:00 pm AEST

### Review/Exam Week - 08 Jun 2020

Module/Topic

Chapter

Events and Submissions/Topic

### Exam Week - 15 Jun 2020

Module/Topic

Chapter

Events and Submissions/Topic

## Assessment Tasks

### 1 Assignment 1

#### Assessment Type

Written Assessment

#### Task Description

The assignment will cover the unit content scheduled for Weeks 1 to 5. Details will be provided on the unit website

#### Assessment Due Date

Week 6 Monday (20 Apr 2020) 5:00 pm AEST

#### Return Date to Students

Week 8 Monday (4 May 2020)

#### Weighting

30%

#### Assessment Criteria

**Each question in this assignment will be assessed separately for the criterion *accuracy and correct results*.**

- Correct application of mathematics and arithmetic
- Answers clearly identified
- Correct results

**In addition, the assignment as a whole will be assessed against the following criteria:**

#### Evidence of correct procedures

- All necessary steps in analysis are present in correct order
- Clear presentation of mathematical and arithmetical working linking given details of the problem to the results obtained
- Evidence of checking results (mathematical, graphical, logic-common sense)

#### Evidence of understanding of the topic

- Explanation of choices made in the analysis (why is procedure required, why this particular procedure)
- Interpretation of results, eg limitations, direction of vectors

#### Professional presentation

- The work (job) is clearly identified (problem, date, analyst)
- Clear statement of each problem and its details and requirements
- Logical layout of analysis
- Appropriate use of diagrams, clear diagrams
- Correct use of terminology, conventions
- Clear English in the explanation of procedure and interpretation of results.

#### Referencing Style

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

**Submission**

Online

**Learning Outcomes Assessed**

- Recognise and discuss basic concepts and principles of Engineering Surveying
- Select and apply appropriate computing techniques to analyse and process surveying field measurement data
- Apply surveying principles in civil and mining engineering works such as setting-out, earth work calculations and underground surveying
- Explain and demonstrate the concepts, techniques and technologies used in mass surveying
- Demonstrate a professional level of communication and teamwork

**Graduate Attributes**

- Communication
- Problem Solving
- Critical Thinking
- Information Literacy
- Team Work
- Information Technology Competence
- Cross Cultural Competence
- Ethical practice

## 2 Assignment 2

**Assessment Type**

Written Assessment

**Task Description**

The assignment will cover the unit content scheduled for Weeks 6 to 10. Details will be provided on the unit website.

**Assessment Due Date**

Week 11 Monday (25 May 2020) 5:00 pm AEST

**Return Date to Students**

Review/Exam Week Monday (8 June 2020)

**Weighting**

30%

**Assessment Criteria**

**Each question in this assignment will be assessed separately for the criterion *accuracy and correct results*.**

- Correct application of mathematics and arithmetic
- Answers clearly identified
- Correct results

**In addition, the assignment as a whole will be assessed against the following criteria:**

**Evidence of correct procedures**

- All necessary steps in analysis are present in correct order
- Clear presentation of mathematical and arithmetical working linking given details of the problem to the results obtained
- Evidence of checking results (mathematical, graphical, logic-common sense)

**Evidence of understanding of the topic**

- Explanation of choices made in the analysis (why is procedure required, why this particular procedure)
- Interpretation of results, eg limitations, direction of vectors

**Professional presentation**

- The work (job) is clearly identified (problem, date, analyst)
- Clear statement of each problem and its details and requirements
- Logical layout of analysis
- Appropriate use of diagrams, clear diagrams
- Correct use of terminology, conventions
- Clear English in the explanation of procedure and interpretation of results.



## Referencing Style

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

## Submission

Online

## Learning Outcomes Assessed

- Recognise and discuss basic concepts and principles of Engineering Surveying
- Select and apply appropriate computing techniques to analyse and process surveying field measurement data
- Apply surveying principles in civil and mining engineering works such as setting-out, earth work calculations and underground surveying
- Explain and demonstrate the concepts, techniques and technologies used in mass surveying
- Demonstrate a professional level of communication and teamwork

## Graduate Attributes

- Communication
- Problem Solving
- Critical Thinking
- Information Literacy
- Team Work
- Information Technology Competence
- Cross Cultural Competence
- Ethical practice

## 3 Surveying Practicals

### Assessment Type

Practical Assessment

### Task Description

Practical Report is required for field surveying activities. Details of activities and report requirements will be given on the unit website.

Please note that you may be able to complete the practical and most of the report tasks during your practical class (or residential school) time, which will conclude by the end of Week 6. For the administrative purpose, the due date is set as the last day of the term. This does not mean you need to wait until that date. Therefore, the extension will not be considered unless in a very extreme circumstance (as you have almost 6 weeks after the completion of the practicals).

### Assessment Due Date

Week 12 Thursday (4 June 2020) 5:00 pm AEST

### Return Date to Students

After the grade release

### Weighting

40%

### Minimum mark or grade

50% of the practical report marks

### Assessment Criteria

**Each question in this assignment will be assessed separately for the criterion *accuracy and correct results*.**

- Correct application of mathematics and arithmetic
- Answers clearly identified
- Correct results/explanation

**In addition, the assignment as a whole will be assessed against the following criteria:**

#### Evidence of correct procedures

- All necessary steps in analysis are present in correct order
- Clear presentation of mathematical and arithmetical working linking given details of the problem to the results obtained
- Evidence of checking results (mathematical, graphical, logic-common sense)

#### Evidence of understanding of the topic

- Explanation of choices made in the analysis (why is procedure required, why this particular procedure)

- Interpretation of results, eg limitations, direction of vectors

### **Professional presentation**

- The work (job) is clearly identified (problem, date, analyst)
- Logical layout of analysis
- Appropriate use of diagrams, clear diagrams
- Correct use of terminology, conventions
- Clear English in the explanation of procedure and interpretation of results.

### **Referencing Style**

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

### **Submission**

Online

### **Learning Outcomes Assessed**

- Recognise and discuss basic concepts and principles of Engineering Surveying
- Carry out basic surveying and mapping activities such as measurement of ground elevation, angle and distance measurements and detailed surveying using appropriate surveying equipment
- Select and apply appropriate computing techniques to analyse and process surveying field measurement data
- Apply surveying principles in civil and mining engineering works such as setting-out, earth work calculations and underground surveying
- Demonstrate a professional level of communication and teamwork

### **Graduate Attributes**

- Communication
- Problem Solving
- Critical Thinking
- Information Literacy
- Team Work
- Information Technology Competence
- Cross Cultural Competence
- Ethical practice

## 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