# ENEC12009 *Engineering Surveying*
## Term 1 - 2017

Profile information current as at 29/04/2024 11:10 am

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.

## Corrections

### Unit Profile Correction added on 31-01-17

This unit have a **Prescribed Textbook** as detailed below.
**Title: ENGINEERING SURVEYING**
Authors: Schofield, W. and Breach, M.
Year: 2007
Edition: 6th Edition
Publisher: Elsevier (Butterworth Heinemann)

# 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 - 2017

- Bundaberg
- Cairns
- Distance
- Gladstone
- Mackay
- 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.

## 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

— N/A Level | ◦ Introductory Level | • Intermediate Level | • Graduate Level | ◦ Professional Level | ◦ Advanced Level

### Alignment of Assessment Tasks to Learning Outcomes

| Assessment Tasks | Learning Outcomes | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| 1 - Written Assessment - 30% | • | | • | • | • | • |
| 2 - Written Assessment - 30% | • | | • | • | • | • |
| 3 - Practical Assessment - 40% | • | • | • | • | | • |

### Alignment of Graduate Attributes to Learning Outcomes

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

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

# Textbooks and Resources

## Textbooks

**There are no required textbooks.**

## 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

**Kumaran Suntharavadivel** Unit Coordinator
t.suntharavadivel@cqu.edu.au

# Schedule

**Week 1 - 06 Mar 2017**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|
| Basic Concepts of Surveying<br>Error and Uncertainty | Chapters 1 & 2 | |

**Week 2 - 13 Mar 2017**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|

| | | |
|---|---|---|
| Levelling (Vertical Control) | Chapter 3 | |

**Week 3 - 20 Mar 2017**

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

**Week 4 - 27 Mar 2017**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|
| Angular measurement<br>Mapping and Detail Surveys | Chapter 5<br>Chapter 8 | |

**Week 5 - 03 Apr 2017**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|
| Traversing & Triangulation | Chapters 6 & 7 | **Residential School for FLEX students** |

**Vacation Week - 10 Apr 2017**

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

**Week 6 - 17 Apr 2017**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|
| Earthworks (Quantities, Sections, Contours) | Chapter 11 | **Assignment 1** Due: Week 6 Monday (17 Apr 2017) 5:00 pm AEST |

**Week 7 - 24 Apr 2017**

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

**Week 8 - 01 May 2017**

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

**Week 9 - 08 May 2017**

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

**Week 10 - 15 May 2017**

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

**Week 11 - 22 May 2017**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|
| Introduction of GPS | Chapter 9 | **Assignment 2** Due: Week 11 Monday (22 May 2017) 5:00 pm AEST |

**Week 12 - 29 May 2017**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|
| Review | | **Surveying Practicals** Due: Week 12 Friday (2 June 2017) 5:00 pm AEST |

**Review/Exam Week - 05 Jun 2017**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|

**Exam Week - 12 Jun 2017**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|

## Term Specific Information

Please read **ENEC12009: General Information** available in the unit Website.
**Practical Classes** for on-campus students will be scheduled from week 3. Detail of the laboratory scheduling will be available in Week 1.Distance students complete the practicals during the residential school.
There will be no face-to-face **lectures** for this unit. A recording of lectures (maximum 1 hour clip) will be available under Echo360.

## 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 (17 Apr 2017) 5:00 pm AEST

**Return Date to Students**
Week 8 Tuesday (2 May 2017)

**Weighting**
30%

**Minimum mark or grade**
50% of the total marks for the assignment are required to pass this unit

**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 (22 May 2017) 5:00 pm AEST

**Return Date to Students**
Review/Exam Week Tuesday (6 June 2017)

**Weighting**
30%

**Minimum mark or grade**
50% of the total marks for the assignment are required to pass this unit

**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 are required for field surveying activities. Details of activities and report requirements will be given on the unit website.
Please note that you may able complete the practical and most of the report tasks during your practical class (or residential school) time, which will conclude by end of week 6. For the administrative purpose the due date is set as last day of the term. This does not mean you need to wait until that date. Therefore, 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 Friday (2 June 2017) 5:00 pm AEST

**Return Date to Students**

After the grade release

**Weighting**
40%

**Minimum mark or grade**
50% of the total marks for the assignment are required to pass this unit

**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