



# ENER20001 *Introduction to Railway Engineering*

## Term 2 - 2019

Profile information current as at 05/07/2022 03:41 pm

All details in this unit profile for ENER20001 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

In this unit, you will engage in a project that offers opportunities for you to explore issues in the design, modelling and analysis of railway vehicle/ track systems. Depending on your previous knowledge and experience, you may choose to investigate traction and braking, vehicle dynamics or structural engineering aspects. You will examine real world problems and apply state-of-the-art simulation and analysis tools. In the context of a train system (large mining heavy haul, mixed freight or passenger rail) you may solve problems such as control, electrical machines, contact mechanics, multi-body dynamics, stress and strain and vibrations.

### Details

Career Level: *Postgraduate*

Unit Level: *Level 8*

Credit Points: *12*

Student Contribution Band: *8*

Fraction of Full-Time Student Load: *0.25*

### Pre-requisites or Co-requisites

There are no requisites for this unit.

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 2 - 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: 100%

### 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 Lecturer

**Feedback**

It was suggested that besides the five existing brief reports, a reflection (800 ~ 1000 words) should be added in each brief report for the existing assessment scheme.

**Recommendation**

The reflections should be added in each existing brief report. This would allow extending formative assessment to include reflective writing tasks.

## Unit Learning Outcomes

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

1. Apply discipline knowledge to a complex rail engineering subsystem
2. Conduct advanced analysis and sensitivity analysis of design parameter(s) in a design/ optimisation process
3. Specify and justify effective design that meets stakeholder requirements
4. Identify and use appropriate techniques to review a design
5. Determine state-of-the-art rail engineering subsystems
6. Reflect on the contribution of this project to your professional development

The learning outcomes are linked to Engineers Australia Stage 1 Competencies.



## Textbooks and Resources

### Textbooks

ENER20001

#### Prescribed

##### **DESIGN AND SIMULATION OF RAIL VEHICLES**

1st Edition (2014)

Authors: Maksym Spiryagin, Colin Cole, Yan Quan Sun, Mitchell McClanachan, Valentyn Spiryagin, Tim McSweeney

CRC Press

Boca Raton , FL , USA

ISBN: 9781138073708

Binding: Other

ENER20001

#### Supplementary

##### **HANDBOOK OF RAILWAY VEHICLE DYNAMICS**

1st Edition (2006)

Authors: Simon Iwnicki

CRC Press

Boca Raton , FL , USA

ISBN: 9780849333217

Binding: Other

#### Additional Textbook Information

Hardback, eBook or Paperback versions of the books are acceptable for this unit.

### IT Resources

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

- CQUniversity Student Email
- Internet
- Unit Website (Moodle)
- Simpack Multibody Software
- MATLAB and Simulink Suite 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

**Maksym Spiryagin** Unit Coordinator

[m.spiryagin@cqu.edu.au](mailto:m.spiryagin@cqu.edu.au)

## Schedule

### Week 1 - 15 Jul 2019

Module/Topic	Chapter	Events and Submissions/Topic
Unpowered Rail Vehicle Design	Chapter 2	

### Week 2 - 22 Jul 2019

Module/Topic	Chapter	Events and Submissions/Topic
Design of Locomotives	Chapter 3	

<b>Week 3 - 29 Jul 2019</b>		
<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
General Modelling Techniques	Chapter 4	
<b>Week 4 - 05 Aug 2019</b>		
<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
General Modelling Techniques	Chapter 4	Submit Brief Report 1 that includes the list of learning requirements and plan for completion of the project
<b>Week 5 - 12 Aug 2019</b>		
<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
Multibody Dynamics	Chapter 5	
<b>Vacation Week - 19 Aug 2019</b>		
<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
<b>Week 6 - 26 Aug 2019</b>		
<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
Multibody Dynamics	Chapter 5	Submit Brief Report 2 that includes the list of learning requirements and plan for completion of the project
<b>Week 7 - 02 Sep 2019</b>		
<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
Longitudinal Train Dynamics	Chapter 6	
<b>Week 8 - 09 Sep 2019</b>		
<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
Rail Vehicle-Track Interaction Dynamics	Chapter 7	Submit Brief Report 3 that includes the list of learning requirements and plan for completion of the project
<b>Week 9 - 16 Sep 2019</b>		
<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
Rail Vehicle-Track Interaction Dynamics	Chapter 7	
<b>Week 10 - 23 Sep 2019</b>		
<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
Rail Vehicle-Track Interaction Dynamics	Chapter 7	Submit Brief Report 4 that includes the list of learning requirements and plan for completion of the project
<b>Week 11 - 30 Sep 2019</b>		
<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
Rail Vehicle-Track Interaction Dynamics	Chapter 7	
<b>Week 12 - 07 Oct 2019</b>		
<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
Rail Vehicle-Track Interaction Dynamics	Chapter 7	
<b>Review/Exam Week - 14 Oct 2019</b>		
<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>

Complete project and submit portfolio (including Brief Report 5).  
Portfolio Due Friday (18 Oct 2019)  
09:00 PM AEST

**The Portfolio consists of learning activities, all models and reports (five brief reports) required for the finalisation of a project on the design, behaviour and analysis of rail vehicle.** Due: Review/Exam Week Friday (18 Oct 2019) 9:00 pm AEST

**Exam Week - 21 Oct 2019**

Module/Topic

Chapter

Events and Submissions/Topic

## Assessment Tasks

1 The Portfolio consists of learning activities, all models and reports (five brief reports) required for the finalisation of a project on the design, behaviour and analysis of rail vehicle.

### Assessment Type

Portfolio

### Task Description

Formal assessment is by submission of an individual portfolio, which contains all of the student's work for the semester. Compulsory pieces of work to be included in the learning portfolio are a record of all learning activities, all models, reports including the description of models and simulation outcomes, and the final project submission.

### Assessment Due Date

Review/Exam Week Friday (18 Oct 2019) 9:00 pm AEST

### Return Date to Students

Exam Week Friday (25 Oct 2019)

### Weighting

100%

### Assessment Criteria

see Moodle

### Referencing Style

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

### Submission

Online

### Submission Instructions

Submission should be done through the ENER20001 Moodle website

### Learning Outcomes Assessed

- Apply discipline knowledge to a complex rail engineering subsystem
- Conduct advanced analysis and sensitivity analysis of design parameter(s) in a design/ optimisation process
- Specify and justify effective design that meets stakeholder requirements
- Identify and use appropriate techniques to review a design
- Determine state-of-the-art rail engineering subsystems
- Reflect on the contribution of this project to your professional development

### Graduate Attributes

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



## 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