



# ENAM12004 Dynamics

## Term 1 - 2019

Profile information current as at 24/04/2024 11:33 pm

All details in this unit profile for ENAM12004 have been officially approved by CQU University 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 students to the analysis of the behaviour of objects in motion. They will be able to explain the motion of objects and solve problems involving objects experiencing constant linear and angular acceleration, and constant force and torque; and apply principles of conservation of momentum and energy to solve problems involving moving objects and simple machines. Students will be able to solve problems involving friction, kinematics and dynamics, and oscillatory motion, forced vibration and resonance. They will be able to analyse static and dynamic balance of shafts and determine bearing reactions. They are required to develop a capacity to work and communicate ethically and professionally, as individuals and in teams, to investigate and solve problems and present solutions professionally.

### 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

Pre-Requisites: ENAG11005 Mechanics or ENEG11006 Engineering Statics

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

- Online

### 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 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: 15%

#### 3. **Written Assessment**

Weighting: 50%

#### 4. **Written Assessment**

Weighting: 5%

### 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 "Have your Say' survey

**Feedback**

The weekly quizzes were good and it helped to keep students motivated each week.

**Recommendation**

The weekly quizzes will be continued.

#### Feedback from "Have your Say' survey

**Feedback**

The unit is well structured. Textbook and additional resources were excellent.

**Recommendation**

This practice will be continued.

#### Feedback from "Have your Say' survey

**Feedback**

Weekly Zoom sessions if recorded to be made available to watch later.

**Recommendation**

Recorded Zoom sessions will be made available for all students.

## Unit Learning Outcomes

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

1. Apply kinematics and dynamics to the solution of practical examples of linear and rotational motion of particles and rigid bodies.
2. Apply the principles of conservation of momentum and energy to the solution of problems involving moving objects and simple machines.
3. Solve problems involving the effect of friction on the motion of objects and explain these effects.
4. Solve problems involving oscillating motion and explain the effects of oscillating motion, forced vibration and resonance on rotating machinery.
5. Analyse static and dynamic balance of shafts and flywheels and determine bearing reactions.
6. Communicate professionally and provide evidence of personal reflection on, and critical assessment of, team contributions and professional development.
7. Solve problems and record and communicate, clearly and professionally, the approach used to solve problems and the reasons for adopting such approaches to problems.

The Learning Outcomes for this Unit are linked to Engineers Australia stage one competency standards for Engineering Associates.

## 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	7
1 - Written Assessment - 30%	•		•				•
2 - Written Assessment - 15%	•		•				•
3 - Written Assessment - 50%	•	•	•	•	•		•
4 - Written Assessment - 5%	•	•	•	•	•	•	•

### Alignment of Graduate Attributes to Learning Outcomes

Graduate Attributes	Learning Outcomes						
	1	2	3	4	5	6	7
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						•	
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 - 15%	•	•	•	•		•		•		
3 - Written Assessment - 50%	•	•	•	•		•		•		
4 - Written Assessment - 5%	•	•	•	•		•		•		

## Textbooks and Resources

### Textbooks

ENAM12004

#### Prescribed

#### Engineering Mechanics and Strength of Materials (1986)

Edition: - (1986)

Authors: Roger Kinsky

McGraw-Hill Education - Europe

London , UK

ISBN: 0074521551

Binding: Paperback

#### Additional Textbook Information

Copies are available to purchase 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)
- Interactive Physics 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

**Ramadas Narayanan** Unit Coordinator

[r.narayanan@cqu.edu.au](mailto:r.narayanan@cqu.edu.au)

## Schedule

### Week 1 - 11 Mar 2019

Module/Topic	Chapter	Events and Submissions/Topic
Introduction, Revision of Statics topics, Kinematics	Chapter 7	Tutorials

### Week 2 - 18 Mar 2019

Module/Topic	Chapter	Events and Submissions/Topic
Kinematics	Chapter 7	Tutorials, Weekly Quiz

### Week 3 - 25 Mar 2019

Module/Topic	Chapter	Events and Submissions/Topic
Kinematics	Chapter 7	Tutorials, Weekly Quiz

### Week 4 - 01 Apr 2019

Module/Topic	Chapter	Events and Submissions/Topic
Kinetics	Chapter 8	Tutorials, Weekly Quiz

### Week 5 - 08 Apr 2019

Module/Topic	Chapter	Events and Submissions/Topic
Kinetics	Chapter 8	Tutorials, Weekly Quiz

### Vacation Week - 15 Apr 2019

Module/Topic	Chapter	Events and Submissions/Topic
Use this time to catch up on uncompleted activities and to work ahead	Chapter 7& 8	No Tutorials <b>Assignment 1</b> Due: Vacation Week Monday (15 Apr 2019) 11:45 pm AEST

### Week 6 - 22 Apr 2019

Module/Topic	Chapter	Events and Submissions/Topic
Kinetics	Chapter 8	Tutorials, Weekly Quiz

### Week 7 - 29 Apr 2019

Module/Topic	Chapter	Events and Submissions/Topic
<a href="http://my-courses.cqu.edu.au/sam/login?goto=https://my-courses.cqu.edu.au/pub%2Fprofiles%3Foffering_id%3D20227%26refresh_cache%3D1%26staff%3D1">http://my-courses.cqu.edu.au/sam/login?goto=https://my-courses.cqu.edu.au/pub%2Fprofiles%3Foffering_id%3D20227%26refresh_cache%3D1%26staff%3D1</a>	Chapter 9	Tutorials, Weekly Quiz

### Week 8 - 06 May 2019

Module/Topic	Chapter	Events and Submissions/Topic
Work, Energy and power	Chapter 9	Tutorials, Weekly Quiz

### Week 9 - 13 May 2019

Module/Topic	Chapter	Events and Submissions/Topic
Power, Mechanical efficiency	Chapter 9	Tutorials, Weekly Quiz

### Week 10 - 20 May 2019

Module/Topic	Chapter	Events and Submissions/Topic
Mechanical Vibration, Simple harmonic motion, Vibrating spring mass system	Chapter 10	Tutorials, Weekly Quiz

### Week 11 - 27 May 2019

Module/Topic	Chapter	Events and Submissions/Topic
Balancing and reaction of rotating masses	Chapter 11	Tutorials, Weekly Quiz

### Week 12 - 03 Jun 2019

Module/Topic	Chapter	Events and Submissions/Topic
Revision	Chapter 7-11	Revision

### Review/Exam Week - 10 Jun 2019

Module/Topic	Chapter	Events and Submissions/Topic
		<b>Assignment 2</b> Due: Review/Exam Week Monday (10 June 2019) 11:45 pm AEST

### Exam Week - 17 Jun 2019

Module/Topic	Chapter	Events and Submissions/Topic
		<b>Workbook</b> Due: Exam Week Monday (17 June 2019) 11:45 pm AEST

## Assessment Tasks

### 1 Weekly online quizzes

#### Assessment Type

Written Assessment

#### Task Description

These weekly quizzes assess contents from each week. There will be 10 quizzes starting from week 2 extending up to

week 11. All quizzes together will have 30% weighting of the unit. The assessment task can be accessed from the unit Moodle site on a weekly basis. Each quiz will be open for a week and students need to attempt within the open period.

### **Assessment Due Date**

Weekly due dates will be given in the Moodle

### **Return Date to Students**

Students will be getting feedback immediately after the submission of the quizzes.

### **Weighting**

30%

### **Minimum mark or grade**

Quizzes all together must get 50% marks to get a pass in this assessment.

### **Assessment Criteria**

The correct answer will get full marks and the incorrect answer will be given zero marks. No negative marks for wrong answers.

### **Referencing Style**

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

### **Submission**

Online

### **Learning Outcomes Assessed**

- Apply kinematics and dynamics to the solution of practical examples of linear and rotational motion of particles and rigid bodies.
- Solve problems involving the effect of friction on the motion of objects and explain these effects.
- Solve problems and record and communicate, clearly and professionally, the approach used to solve problems and the reasons for adopting such approaches to problems.

### **Graduate Attributes**

- Communication
- Problem Solving
- Critical Thinking
- Information Literacy
- Information Technology Competence
- Ethical practice

## **2 Assignment 1**

### **Assessment Type**

Written Assessment

### **Task Description**

Assessment item covers the topics from week 1-4.

Full assignment details are on the unit website.

### **Assessment Due Date**

Vacation Week Monday (15 Apr 2019) 11:45 pm AEST

### **Return Date to Students**

Two weeks after the submission

### **Weighting**

15%

### **Minimum mark or grade**

You must get 50% marks for get a pass in this assessment

### **Assessment Criteria**

Each question in this assignment will be assessed separately for the each of criteria given below.

*Criteria 1 Correct interpretation of the question (10%)*

This criterion may include the identification of the data given in the question and finding solution requirements

*Criteria 2 Correct choice of solution procedures (20%)*

This criterion includes statement of any assumptions if needed, relevant formulae, method and explanation of choices

*Criteria 3 Evidence of correct procedures (40%)*

Use of appropriate use of diagrams and logical development of appropriate mathematical /descriptive solutions are addressed here.

*Criteria 4: Results (20%)*

This criterion addresses accuracy of results, answers clearly stated, interpretation of results and evidence of checking results

*Criteria 5 Presentation (10%)*

This criterion includes the correct use of terminology, conventions, clear communication, logical layout referencing of authoritative sources of equations and data.

**Referencing Style**

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

**Submission**

Online

**Submission Instructions**

Scan your assignment and submit via the moodle course website

**Learning Outcomes Assessed**

- Apply kinematics and dynamics to the solution of practical examples of linear and rotational motion of particles and rigid bodies.
- Solve problems involving the effect of friction on the motion of objects and explain these effects.
- Solve problems and record and communicate, clearly and professionally, the approach used to solve problems and the reasons for adopting such approaches to problems.

**Graduate Attributes**

- Communication
- Problem Solving
- Critical Thinking
- Information Literacy
- Information Technology Competence
- Ethical practice

## 3 Assignment 2

**Assessment Type**

Written Assessment

**Task Description**

Assessment item covers the topics of week 5-12

Full assignment details are on the unit website.

**Assessment Due Date**

Review/Exam Week Monday (10 June 2019) 11:45 pm AEST

**Return Date to Students**

Two weeks after the submission.

**Weighting**

50%

**Minimum mark or grade**

You must get 50% marks for get a pass in this assesment

**Assessment Criteria**



Each question in this assignment will be assessed separately for the each of criteria given below.

*Criteria 1 Correct interpretation of the question (10%)*

This criterion may include the identification of the data given in the question and finding solution requirements

*Criteria 2 Correct choice of solution procedures (20%)*

This criterion includes statement of any assumptions if needed, relevant formulae, method and explanation of choices

*Criteria 3 Evidence of correct procedures (40%)*

Use of appropriate use of diagrams and logical development of appropriate mathematical /descriptive solutions are addressed here.

*Criteria 4: Results (20%)*

This criterion addresses accuracy of results, answers clearly stated, interpretation of results and evidence of checking results

*Criteria 5 Presentation (10%)*

This criterion includes the correct use of terminology, conventions, clear communication, logical layout referencing of authoritative sources of equations and data.

**Referencing Style**

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

**Submission**

Online

**Submission Instructions**

Scan your assignment and submit via unit website

**Learning Outcomes Assessed**

- Apply kinematics and dynamics to the solution of practical examples of linear and rotational motion of particles and rigid bodies.
- Apply the principles of conservation of momentum and energy to the solution of problems involving moving objects and simple machines.
- Solve problems involving the effect of friction on the motion of objects and explain these effects.
- Solve problems involving oscillating motion and explain the effects of oscillating motion, forced vibration and resonance on rotating machinery.
- Analyse static and dynamic balance of shafts and flywheels and determine bearing reactions.
- Solve problems and record and communicate, clearly and professionally, the approach used to solve problems and the reasons for adopting such approaches to problems.

**Graduate Attributes**

- Communication
- Problem Solving
- Critical Thinking
- Information Literacy
- Information Technology Competence
- Ethical practice

## 4 Workbook

**Assessment Type**

Written Assessment

**Task Description**

The Workbook provides a record and detailed diary of your learning and completed activities throughout the course. Preparation of a Workbook should be understood as a good study technique. It also provides evidence that you have adequately studied the whole course and achieved the course learning outcomes. It is worthwhile doing a good attempt at the workbook as, if at the end of the course you are on the borderline between two final grades the workbook can be used to determine if the higher grade should be awarded.

The Workbook is best handwritten and then scanned and submitted electronically. A handwritten Workbook is most

appropriate and most time effective as the course involves many equations and diagrams. It is much quicker to write and sketch freehand. The presentation of the workbook is not as crucial as an assignment as it is recognised you will make mistakes during your learning. Rough sketches and partial attempts/re-attempts of questions are acceptable and may add to your grade. The start of each section of work should be dated and all pages should be numbered. It should be prepared week by week, not at the end of the term. Show rough attempts at problems including failures and fixes, brainstorming, draft notes and developing ideas.

In the Workbook students must record:

- Tutorials of each week and other problems/activities given in the Moodle

In the Workbook students may also record:

- study notes taken while studying textbooks and course resources
- personal study summaries of key concepts
- notes, sketches/ drawings

### **Assessment Due Date**

Exam Week Monday (17 June 2019) 11:45 pm AEST

### **Return Date to Students**

Two weeks after submission

### **Weighting**

5%

### **Minimum mark or grade**

50%, Successful completion of this assessment is a requirement for passing this unit.

### **Assessment Criteria**

#### **Workbook activities guidelines:**

Workbook activities are set for each week and are detailed in the Moodle.

As mentioned in the task description the presentation and accuracy of results of the workbook activities are not as crucial as an assignment as it is recognised you will make mistakes during your learning. Rough sketches and partial attempts/re-attempts of questions are acceptable and may add to your grade. Workbook activities are seen as ways to stimulate your own learning rather than final work you would submit to a colleague. However there should be some attempt to set out and document your work to show your understanding. Set out and document the activities in a way you could revisit them at a later date if required. The following repeated assignment criteria will help guide the layout of your workbook activities but should not be viewed as rigid.

Accuracy and correct results

- Correct application of maths and arithmetic
- Answers clearly identified (please underline or highlight answers)
- Correct results

Evidence of correct procedures

- All necessary steps in analysis are present
- Clear presentation of mathematical and arithmetical working linking the given details of the problem to the results obtained
- Indication of the equations used when using spreadsheets (eg Microsoft Excel) or other software

- Evidence of checking results (mathematical, graphical, logic-common sense)

Evidence of understanding of the topic

- Explanation of any assumptions made
- Explanation of choices made in the analysis (why is this procedure is required)
- 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
- Clear statement of equations and theory used
- Appropriate use of diagrams, clear diagrams, adequately labelled
- Correct use of terminology, conventions
- Clear English in the explanation of procedure and interpretation of results
- Referencing of authoritative sources of equations and data

## Referencing Style

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

## Submission

Online

## Submission Instructions

Scan your workbook and submit via the moodle course website

## Learning Outcomes Assessed

- Apply kinematics and dynamics to the solution of practical examples of linear and rotational motion of particles and rigid bodies.
- Apply the principles of conservation of momentum and energy to the solution of problems involving moving objects and simple machines.
- Solve problems involving the effect of friction on the motion of objects and explain these effects.
- Solve problems involving oscillating motion and explain the effects of oscillating motion, forced vibration and resonance on rotating machinery.
- Analyse static and dynamic balance of shafts and flywheels and determine bearing reactions.
- Communicate professionally and provide evidence of personal reflection on, and critical assessment of, team contributions and professional development.
- Solve problems and record and communicate, clearly and professionally, the approach used to solve problems and the reasons for adopting such approaches to problems.

## Graduate Attributes

- Communication
- Problem Solving
- Critical Thinking
- Information Literacy
- Information Technology 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