



# ENEX13005 *Machine Design and Vibrations*

## Term 1 - 2020

Profile information current as at 14/12/2025 08:08 am

All details in this unit profile for ENEX13005 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

### General Information

#### Overview

This unit will introduce you to the fundamental synthesis of mechanisms and machines. You will start by carrying out analysis of linkages in terms of their transmission angles, toggle positions and mobility for a certain mechanism. The kinematic analysis of any mechanism requires an acceleration analysis that depends on its position and velocity. You will be able to carry out this position, velocity, and acceleration analysis of these mechanisms (kinematic systems) using analytical equations and graphical methods. This unit will enable you to work on 3D CAD modelling and computer simulation of various mechanisms or machines. You will move on to kinetic analysis of systems thereby discussing static and dynamic balancing of rotating masses. After learning concepts of dynamics, you will study vibrations (free and forced) of single and multi-degree of freedom systems and will be able to carry out analysis of such systems using force and energy methods. Students enrolled online are required to attend a compulsory Residential School and have access to a computer and make frequent use of the internet.

#### Details

Career Level: *Undergraduate*

Unit Level: *Level 3*

Credit Points: 6

Student Contribution Band: 8

Fraction of Full-Time Student Load: 0.125

#### Pre-requisites or Co-requisites

MATH11219 Applied Calculus AND [ENEM12007 Statics & Dynamics OR ENEM12010 Engineering Dynamics].

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

- Mackay
- Mixed Mode

#### 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. **Online Quiz(zes)**

Weighting: 20%

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

Weighting: 15%

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

Weighting: 20%

#### 4. **Practical Assessment**

Weighting: 15%

#### 5. **Portfolio**

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 Unit evaluation

##### Feedback

Students enjoyed the synthesis and analysis of mechanical machines, and vibration/suspension.

##### Recommendation

The lectures will strive to improve the quality of the learning resources.

#### Feedback from Unit evaluation

##### Feedback

Students suggested having a tutorial class in the same week of the corresponding lecture.

##### Recommendation

The lecture and tutorial will cover the same content in the same week. The Unit Coordinator will ensure the lecture will be held prior to the tutorial.

#### Feedback from Unit evaluation

##### Feedback

Students pointed out that most of the assessments are placed at the end of the unit.

##### Recommendation

A new peer-assessment for an interim report of the final project will replace the group assessment to ensure students will start their final project earlier and will check their progress by comparing with their peers.

## Unit Learning Outcomes

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

1. Apply key concepts of kinetics and kinematics to analyse machine design and synthesis
2. Use analytical and graphical techniques to carry out position, velocity, and acceleration analysis
3. Apply concepts of dynamics in balancing of rotating components
4. Analyse vibrations in single and multiple degree of freedom systems
5. Communicate professionally using relevant technical terminology, symbols, and diagrams and effectively document calculations and solutions
6. Work autonomously and as a team member to analyse problems and present solutions.

Learning outcomes will be linked to Engineers Australia stage 1 competency standards 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 - Online Quiz(zes) - 20%	•	•				
2 - Written Assessment - 15%	•	•				

Assessment Tasks	Learning Outcomes					
	1	2	3	4	5	6
3 - Written Assessment - 20%			•	•		
4 - Practical Assessment - 15%					•	•
5 - Portfolio - 30%			•	•	•	•

## 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						
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 - Online Quiz(zes) - 20%	•	•	•			•				
2 - Written Assessment - 15%	•	•	•	•		•				
3 - Written Assessment - 20%	•	•	•			•				
4 - Practical Assessment - 15%	•	•	•		•	•	•			
5 - Portfolio - 30%	•	•	•			•				

## Textbooks and Resources

### Textbooks

ENEX13005

#### Prescribed

##### Design of Machinery

Edition: 5th (2011)

Authors: Robert L. Norton

McGraw-Hill Education

New York

ISBN: 9780077421717

Binding: Hardcover

ENEX13005

#### Supplementary

##### Mechanical Vibrations

Edition: 6th (2018)

Authors: Singiresu S. Rao

Pearson Education

Harlow , United Kingdom

ISBN: 9780134361307

Binding: eBook

#### Additional Textbook Information

The prescribed textbook can be purchased at the CQUni Bookshop here: <http://bookshop.cqu.edu.au> (search on the Unit code)

The supplementary textbook is available online through CQU's library website.

[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

**Jay Sul** Unit Coordinator

[j.sul@cqu.edu.au](mailto:j.sul@cqu.edu.au)

## Schedule

### Week 1 - 09 Mar 2020

Module/Topic

Chapter

Events and Submissions/Topic

Introduction and Kinematics fundamentals

- Introduction to the unit and information session
- Introduction to the machine design and vibration
- Applications of kinematics
- DoF in 2D and types of motion
- Joints, links and kinematic diagrams

Design of Machinery (R. L. Norton)  
• Chapters 1 and 2

## Week 2 - 16 Mar 2020

Module/Topic	Chapter	Events and Submissions/Topic
Graphical linkage synthesis <ul style="list-style-type: none"> <li>• Linkage synthesis - Graphical, manual and dimensional techniques with examples</li> <li>• Two-position synthesis</li> <li>• Three-position synthesis</li> </ul>	Design of Machinery (R. L. Norton) • Chapter 3	

## Week 3 - 23 Mar 2020

Module/Topic	Chapter	Events and Submissions/Topic
Position analysis of linkages <ul style="list-style-type: none"> <li>• Types of motion</li> <li>• Position analysis - Graphical, algebraic and vector loop methods for four-bar linkages and four-bar-crank slider</li> </ul>	Design of Machinery (R. L. Norton) • Chapter 4	Computer lab session

## Week 4 - 30 Mar 2020

Module/Topic	Chapter	Events and Submissions/Topic
Analytical linkage synthesis <ul style="list-style-type: none"> <li>• 2 and 3 position motion generation by analytical and graphical synthesis</li> <li>• 4 and 5 position motion generation using analytical synthesis</li> </ul>	Design of Machinery (R. L. Norton) • Chapter 5	

## Week 5 - 06 Apr 2020

Module/Topic	Chapter	Events and Submissions/Topic
Velocity analysis of linkages <ul style="list-style-type: none"> <li>• Recap of Engineering Dynamics</li> <li>• Graphical (vector) and instant centre methods (Kennedy's theorem)</li> <li>• Mechanical advantages</li> </ul>	Design of Machinery (R. L. Norton) • Chapter 6	

## Vacation Week - 13 Apr 2020

Module/Topic	Chapter	Events and Submissions/Topic
		<b>Assignment#1 - Kinematic analysis of linkages</b> Due: Vacation Week Friday (17 Apr 2020) 11:59 pm AEST

## Week 6 - 20 Apr 2020

Module/Topic	Chapter	Events and Submissions/Topic
Acceleration analysis of linkages <ul style="list-style-type: none"> <li>• Graphical (vector) and analytical methods</li> <li>• Coriolis acceleration</li> </ul>	Design of Machinery (R. L. Norton) • Chapter 7	Computer lab session  <b>Interim report for Design of a walking mechanism with minimum imbalance and vibration</b> Due: Week 6 Friday (24 Apr 2020) 11:59 pm AEST

## Week 7 - 27 Apr 2020

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

## Dynamics fundamentals

- Lumped models
- Kinetics
- Virtual work

Design of Machinery (R. L. Norton)  
• Chapter 10

Peer- and self-assessment for Interim report for Design of a walking mechanism with minimum imbalance and vibration Due: Week 7 Monday (27 Apr. 2020) 11:59 pm AEST

**Week 8 - 04 May 2020****Module/Topic****Chapter****Events and Submissions/Topic**

Static and Dynamic balancing

- Static and dynamic balancing on rotating masses
- Effect of balancing on shaking and input torque

Design of Machinery (R. L. Norton)  
• Chapter 12

**Week 9 - 11 May 2020****Module/Topic****Chapter****Events and Submissions/Topic**

Basic concepts of vibration

- Importance and types of vibration
- Natural frequency
- Critical damping and damping ratio
- Introduction to mathematical modeling and Laplace transform

Mechanical Vibrations (S. S. Rao)  
• Chapters 1

Computer lab session

**Week 10 - 18 May 2020****Module/Topic****Chapter****Events and Submissions/Topic**

Free and forced vibration

- Forced harmonic vibration and resonance
- Logarithmic decrement
- Support motion
- Rotating unbalance

Mechanical Vibrations (S. S. Rao)  
• Chapters 2 and 3

Residential School 18 May (Mandatory for mixed-mode students)

**Week 11 - 25 May 2020****Module/Topic****Chapter****Events and Submissions/Topic**

Transient vibration

- Stability of a system
- Poles and Zeros
- Root Locus
- Bode plot

Mechanical Vibrations (S. S. Rao)  
• Chapter 4

**Laboratory worksheet** Due: Week 11 Friday (29 May 2020) 11:59 pm AEST

**Week 12 - 01 Jun 2020****Module/Topic****Chapter****Events and Submissions/Topic**

Two degree-of-freedom system

- 2 DoF undamped free vibration
- 2 DoF damped free vibration
- 2 DoF forced vibration
- 2 DoF translational and rotational

Mechanical Vibrations (S. S. Rao)  
• Chapter 5

Computer lab session

**Assignment#2 - Design of a suspension system** Due: Week 12 Friday (5 June 2020) 11:45 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**

**Final report for Design of a walking mechanism with minimum imbalance and vibration** Due: Exam Week Friday (19 June 2020) 11:59 pm AEST

## Term Specific Information

Its laboratory schedule will be discussed among on-campus students.

## Assessment Tasks

### 1 Assignment#1 - Kinematic analysis of linkages

**Assessment Type**

Online Quiz(zes)

**Task Description**

This assignment assesses students with the content from Week 1 to Week 5. You must provide detailed solutions to the problems given in the assignment in order to demonstrate your knowledge and understanding of the concepts and processes incorporating relevant sketches, clear step-by-step solution and conclusion/judgement on answers.

**Number of Quizzes****Frequency of Quizzes****Assessment Due Date**

Vacation Week Friday (17 Apr 2020) 11:59 pm AEST

**Return Date to Students**

Week 6 Friday (24 Apr 2020)

Students will get their results immediately after the due time, except for their sketch.

**Weighting**

20%

**Minimum mark or grade**

50

**Assessment Criteria**

- Correctly identify the problem to be solved (key terms, units, elements or parts of a problem)
- Choose the most appropriate approach to solving the problem
- Clearly present the solutions with sketches (if necessary) for the problems
- Attempt logical alternative approaches to solving the problem

**Referencing Style**

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

**Submission**

Online

**Submission Instructions**

Students to finish their unlimited attempts for online quizzes through unit's Moodle site

**Learning Outcomes Assessed**

- Apply key concepts of kinetics and kinematics to analyse machine design and synthesis
- Use analytical and graphical techniques to carry out position, velocity, and acceleration analysis

**Graduate Attributes**

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

### 2 Interim report for Design of a walking mechanism with minimum imbalance and vibration



## Assessment Type

Written Assessment

## Task Description

**Task 1:** Design (or find) a 1 (or 2) DOF walking mechanism that is reasonably simple but still functional. You will need to assume the working condition of the walking mechanism, such as its walking speed, motor speed, and weight and materials of each link and the main body. This task will need to be completed concurrently with Task 2.

Design requirement

- A 1 (or 2) degree-of-freedom walking mechanism with at least three planar links per leg
- Constant horizontal walking speed from a constant input motor speed with an ovoid foot-path to step over obstacles
- Provide a reasonable assumption of the mass of each link
- Only one leg may be considered with a clear explanation about which type of full walking mechanism your design is part of
- The foot in your design needs to touch the supporting surface for at least a half of the cycle for a 2-leg mechanism

**Task 2:** Demonstrate the kinematic and kinetic analysis of the design of your choice. This task will need to be completed concurrently with Task 1.

- Simplify the mechanism of your choice and provide a schematic diagram
- Conduct position, velocity and acceleration analyses of each link in the system
- Present the trajectory of foot-paths and changes in velocity and acceleration for one complete cycle
- Analyse how fast it can walk and how speed varies with the input speed
- Verify your analytical approach using Dynamic Simulation in Autodesk Inventor

## Assessment Due Date

Week 6 Friday (24 Apr 2020) 11:59 pm AEST

Peer and self-assessment task to be completed by Week 7.

## Return Date to Students

Week 8 Friday (8 May 2020)

Students to see feedback through the submission link

## Weighting

15%

## Minimum mark or grade

50

## Assessment Criteria

You are required to assess your peers' interim reports as well as your own according to the following marking guideline and expected to provide sincere feedback and accurate marks for your peers. This is a valuable change for reflection after viewing other submissions. 67% of this assessment will be from the marks from your peers and the rest will be from the quality of your feedback to your peers.

- Presentation (/20)

Judge the overall report presentation. Consider:

- Does the report overall give you a good impression?
- Does the quality of the presentation give you confidence in the quality of the content?
- What is the overall quality of English expression? Is technical jargon correctly used? Is the language clear and concise?
- Is the report correctly sectioned? Do the sections flow correctly and aid the overall argument?
- Are figures presented in a clear way that maximises the communication of information?
- Is the referencing consistent and easy to follow?
- Does the abstract/executive summary cover all aspects of the report while maintaining its conciseness?
- Overall, is the contained information efficiently communicated to the reader?

- Context and aims (/20)

Judge how well the project has been put into context. Consider:

- What background information has been provided to justify that the project is meaningful/achievable?
- Do you, as a reader, understand the context of the problem and how solving it makes a valuable contribution to knowledge?

- Design of walking mechanism and kinematic diagram (/20)

Judge how well the biped mechanism has been modelled and how accurate kinematic analysis is. Consider:

- A kinematic diagram that clearly describes the walking mechanism
- Its design meets the requirement specified in the assignment document
- Reasonable assumptions for its dimensions and materials; therefore, the mass of each link and the entire system is justified.

- Kinematic analysis and verification process (/20)

Judge how accurate the kinematic analysis has been conducted to describe its correct motion. Consider:

- Good position, velocity and acceleration analysis with relevant diagrams
- The relationship between the input motor speed and walking speed has been defined.
- Presentation of Autodesk Inventor model
- Hand calculations have been verified with Dynamic Simulation in Autodesk Inventor

- Discussions and conclusions (/10)

Judge how well results have been described and if a good summary is provided.

- Correct interpretations and descriptions of the design and results
- A good summary of the report and clear statements of meeting aims and objectives defined in the introductory part
- Identification of items to improve in the final report

- Progress (/10)

Judge if its progress is as expected up to Task 2

- Completion of Task 1 with all required deliverables
- Completion of Task 2 with all required deliverables

### Referencing Style

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

### Submission

Online

### Submission Instructions

Submission to be made through a link provided in unit's Moodle site

### Learning Outcomes Assessed

- Apply key concepts of kinetics and kinematics to analyse machine design and synthesis
- Use analytical and graphical techniques to carry out position, velocity, and acceleration analysis

### Graduate Attributes

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

## 3 Laboratory worksheet

### Assessment Type

Written Assessment

### Task Description

You are going to conduct three labs, namely Free vibration, Forced vibration and Mass balance. After conducting these labs, you will complete each task given in the lab worksheet template. You don't need to give lengthy answers for the discussion tasks. You must show all workings where applicable. You must cite the sources of your argument and discussions as per the referencing style specified in the unit profile. This lab worksheet must NOT exceed 15 pages. You will submit it to the submission link provided in Moodle.

### Assessment Due Date

Week 11 Friday (29 May 2020) 11:59 pm AEST

Mixed-mode students to submit their lab worksheet in the following week (Week 12)

**Return Date to Students**

Review/Exam Week Friday (12 June 2020)

Students to see feedback through the submission link

**Weighting**

20%

**Minimum mark or grade**

50

**Assessment Criteria**

Each of the tasks given in the lab worksheet template will be assessed by

- Accurate results
- Accurate plots with correct axis titles and legends
- Reasonable discussions with supporting references

**Referencing Style**

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

**Submission**

Online

**Submission Instructions**

Submission to be made through a link provided in unit's Moodle site

**Learning Outcomes Assessed**

- Apply concepts of dynamics in balancing of rotating components
- Analyse vibrations in single and multiple degree of freedom systems

**Graduate Attributes**

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

## 4 Assignment#2 - Design of a suspension system

**Assessment Type**

Practical Assessment

**Task Description**

**Task 1:** Design of a shock absorber system for a Segway patroller - Find the necessary stiffness and damping constant of the shock absorber system under the given conditions.

- The current Segway patroller weighs 55 kg. The total weight of the new system and its rider is expected to be  $A \times 10$  kg.

- The new suspension system is expected to reduce the vibration amplitude to  $1/B$  and  $C$  cycles when the Segway patroller is subjected to an initial vertical displacement due to a road bump.

**Task 2:** Demonstrate the performance of your design - The new Segway patroller with the suspension system of yours is to be tested on a rough road whose surface varies sinusoidally with an amplitude of  $Y = 0.05$  m and a wavelength of 3 m. If the Segway patroller travels at  $D$  km/h, what is the displacement amplitude of the new Segway patroller with the suspension system from Task 1.

**Assessment Due Date**

Week 12 Friday (5 June 2020) 11:45 pm AEST

**Return Date to Students**

Exam Week Friday (19 June 2020)

Students to see feedback through the submission link

**Weighting**

15%

**Minimum mark or grade**

50

## Assessment Criteria

### - Presentation (/25%)

- The report is in a professional and consistent format.
- The report needs the proposed specification (file format, length, etc.)
- Good quality of English expression is demonstrated, and its language is clear and concise.
- The report is sectioned properly to aid the overall argument
- All figures and tables are labelled properly and discussed in the text.
- Figures and tables are relevant and informative.
- Correct citation and reference styles are used in accordance with the suggested referencing system.
- Good use of visual aids is demonstrated.

### - Introduction and background (/15%)

- A clear statement about why the report was commissioned in the first place.
- Comprehensive, detailed and focused context about the presented work is given.
- Succinctly lead the reader to the purpose of the work being documented.
- The objectives of the work are expressed well.
- Previous reports and research, if the present report builds on, are included.

### - Methods and results (/25%)

- Detailed information on the approach and/or materials used in the study
- Sufficient references are provided to support the methodology used in the report.
- Results are presented in a logical way.
- Clear but concise evidence in the form of statistics, graphs and tables
- Justification for conclusions and recommendations

### - Discussion (/20%)

- Analysis using your own words on the method and results
- Good interpretation and explanation of the results
- Relation of the results with the literature
- Examine whether and how the questions raised in the introduction have been answered.

### - Conclusions (/15%)

- Clear agreement with all the objectives that were set out in the introduction is made.
- The significant findings and elements from the report are highlighted.
- The main points of the report are drawn.
- A clear statement about how the topic relates to its context (an evaluation of the importance of the topic, implication and/or recommendation for future studies)

## Referencing Style

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

## Submission

Online

### Submission Instructions

Submission to be made through a link provided in unit's Moodle site

### Learning Outcomes Assessed

- Communicate professionally using relevant technical terminology, symbols, and diagrams and effectively document calculations and solutions
- Work autonomously and as a team member to analyse problems and present solutions.

### Graduate Attributes

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

## 5 Final report for Design of a walking mechanism with minimum imbalance and vibration

### Assessment Type

Portfolio

### Task Description

Your final report will include Tasks 1 and 2 with further improvement from your interim report.

**Task 3:** Conduct vibration analysis of your design

- Isolate the walking mechanism including its body with a housing and motor from its surrounding
- Assume its motor is placed right in the middle of the housing on top of a beam. You will need to assume for the length, width, thickness and material of the beam, based on the size of your mechanism.
- Determine the global mass centre of your design and demonstrate an analytical approach to determine the forced amplitude of the motor under the operating condition defined earlier.
- Suggest how the forced amplitude can be minimised and prove your solutions

**Task 4:** Verification of your analysis and Evaluation of your design

- Replicate your design in Autodesk Inventor
- Verify your analysis in Task 2 using Dynamic Simulation in Autodesk Inventor
- Verify your analysis in Task 3 using Dynamic Simulation in Autodesk Inventor

### Assessment Due Date

Exam Week Friday (19 June 2020) 11:59 pm AEST

### Return Date to Students

Students will receive their mark in 2 weeks of their submission.

### Weighting

30%

### Minimum mark or grade

50

### Assessment Criteria

The following criteria will be used to grade your report. This is not the suggest structure of your report.

- Innovation and creativity (/20%)

- The demonstrated mechanism is designed by oneself or an effort is made to improve the current design.
- How complex or simple the chosen design is.
- How accurate the chosen mechanism is interpreted.

- Presentation (/20%)

- The report is in a professional and consistent format.
- The report meets the proposed specification (file format, length, etc.)
- Good quality of English expression is demonstrated, and its language is clear and concise.
- The report is sectioned properly to aid the overall argument.
- All figures and tables are labelled properly and discussed in the text.
- Figures and tables are relevant and informative.
- Correct citation and reference styles are used in accordance with the suggested referencing system
- Good use of visual aids is demonstrated.

- Introduction and background (/15%)

- A clear statement about why the report was commissioned in the first place.
- Comprehensive, detailed and focused context about the presented work is given.
- Succinctly lead the reader to the purpose of the work being documented.
- The objectives of the work are expressed well.
- Previous reports and research, if the present report builds on, are included.

- Methods and results (/20%)

- Detailed information on the approach and/or materials used in the study
- Sufficient references are provided to support the methodology used in the report.
- Results are presented in a logical way.
- Clear but concise evidence in the form of statistics, graphs and tables

- Justification for conclusions and recommendations

- Discussion (/15%)

- Analysis using your own words on the method and results
- Good interpretation and explanation of the results
- Relation of the results with the literature
- Examine whether and how the questions raised in the introduction have been answered.

- Conclusions (/10%)

- Clear agreement with all the objectives that were set out in the introduction is made.
- The significant findings and elements from the report are highlighted.
- The main points of the report are drawn.
- A clear statement about how the topic relates to its context (an evaluation of the importance of the topic, implication and/or recommendation for future studies)

### Referencing Style

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

### Submission

Online

### Submission Instructions

Submission to be made through a link provided in unit's Moodle site

### Learning Outcomes Assessed

- Apply concepts of dynamics in balancing of rotating components
- Analyse vibrations in single and multiple degree of freedom systems
- Communicate professionally using relevant technical terminology, symbols, and diagrams and effectively document calculations and solutions
- Work autonomously and as a team member to analyse problems and present solutions.

### Graduate Attributes

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

## 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