ENAM12004 *Dynamics*
Term 1 - 2022

Profile information current as at 02/05/2024 09:26 pm

General Information

Overview
This unit introduces students to the analysis of the behaviour of objects in motion. You 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. You will be able to solve problems involving friction, kinematics and dynamics, and oscillatory motion, forced vibration and resonance. You will be able to analyse static and dynamic balance of shafts and determine bearing reactions. Students 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 - 2022

- 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 Student's Feedback.

Feedback
The textbook is very difficult to understand.

Recommendation
We will review the textbook in the next offering.

Feedback from Have your say

Feedback
The addition of the weekly quizzes was well supported in the students' learning.

Recommendation
We will follow the same practice in future offerings to maintain this.

Feedback from Have your say

Feedback
Students suggested adding more tutorial examples.

Recommendation
We will add more relevant tutorial problems in future offerings.

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 with the Engineers Australia Stage 1 Competency Standards for Engineering Associates in the areas of 1. Knowledge and Skill Base, 2. Engineering Application Ability and 3. Professional and Personal Attributes at the following levels:

Introductory

2.2 Application of technical and practical techniques, tools and resources to well-defined engineering problems. (LO: 1N 2N 3N 4N 5N)

2.3 Application of systematic design processes to well-defined engineering problems. (LO: 1N 2N)

3.1 Ethical conduct and professional accountability. (LO: 6N 7N)

Intermediate

1.1 Descriptive, formula-based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the practice area. (LO: 1I 2I 3I 4I 5I 6I 7I)

1.2 Procedural-level understanding of the mathematics, numerical analysis, statistics, and computer and information sciences which underpin the practice area. (LO: 1I 2I 3I 4I 5I 7I)

1.3 In-depth practical knowledge and skills within specialist sub-disciplines of the practice area. (LO: 1I 2I 3I 4I 5I 7I)

1.4 Discernment of engineering developments within the practice area. (LO: 1I 2I 3I 4I 5I 7I)

1.5 Knowledge of engineering design practice and contextual factors impacting the practice area. (LO: 1I 2I 3I 4I 5I)

1.6 Understanding of the scope, principles, norms, accountabilities and bounds of sustainable engineering practice in the specific discipline. (LO: 1I 2I 3I 4I 5I)

2.1 Application of established technical and practical methods to the solution of well-defined engineering problems. (LO: 1I 2I 3I 4I 5I)

3.2 Effective oral and written communication in professional and lay domains. (LO: 6N 7I)

3.5 Orderly management of self, and professional conduct. (LO: 6I 7I)

Note: LO refers to the Learning Outcome number(s) which link to the competency and the levels: N – Introductory, I – Intermediate and A - Advanced.

Refer to the Engineering Undergraduate Course Moodle site for further information on the Engineers Australia's Stage 1 Competency Standard for Professional Engineers and course level mapping information
https://moodle.cqu.edu.au/course/view.php?id=1511

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	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							

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

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

Kalam Azad Unit Coordinator
a.k.azad@cqu.edu.au

Schedule

Week 1 - 07 Mar 2022

Module/Topic	Chapter	Events and Submissions/Topic
Introduction; Revision of statics topics; Kinematics.	Chapter 7	Tutorials

Week 2 - 14 Mar 2022

Module/Topic	Chapter	Events and Submissions/Topic
Kinematics; Rigid body motion; Relative velocity and acceleration.	Chapter 7	Tutorials Weekly Quiz Due

Week 3 - 21 Mar 2022

Module/Topic	Chapter	Events and Submissions/Topic
Centripetal and tangential acceleration; Special cases of motion; Coriolis acceleration.	Chapter 7	Tutorials Weekly Quiz Due

Week 4 - 28 Mar 2022

Module/Topic	Chapter	Events and Submissions/Topic

Newton’s laws of motion; equations of motion; and equations of motion for a system of particles.	Chapter 8	Tutorials Weekly Quiz Due

Week 5 - 04 Apr 2022

Module/Topic	Chapter	Events and Submissions/Topic
Application of the equation of motion.	Chapter 8	Tutorials Weekly Quiz Due

Vacation Week - 11 Apr 2022

Module/Topic	Chapter	Events and Submissions/Topic
No teaching material will be delivered during the vacation week.		**Assignment 1** Due: Vacation Week Monday (11 Apr 2022) 12:00 am AEST

Week 6 - 18 Apr 2022

Module/Topic	Chapter	Events and Submissions/Topic
Inertia force; Centrifugal force; Rotation on the inclined plane; Mass moment of inertia and torque.	Chapter 8	Tutorials Weekly Quiz Due

Week 7 - 25 Apr 2022

Module/Topic	Chapter	Events and Submissions/Topic
Impulse and momentum equation and its applications.	Chapter 9	Tutorials Weekly Quiz Due

Week 8 - 02 May 2022

Module/Topic	Chapter	Events and Submissions/Topic
Work energy equation; Power and efficiency; Energy conservation.	Chapter 9	Tutorials Weekly Quiz Due

Week 9 - 09 May 2022

Module/Topic	Chapter	Events and Submissions/Topic
Power; Mechanical efficiency; Energy conservation.	Chapter 9	Tutorials Weekly Quiz Due

Week 10 - 16 May 2022

Module/Topic	Chapter	Events and Submissions/Topic
Mechanical vibration; Simple harmonic motion; Vibrating spring-mass system.	Chapter 10	Tutorials Weekly Quiz Due

Week 11 - 23 May 2022

Module/Topic	Chapter	Events and Submissions/Topic
Simple force vibration; Balancing and reaction of rotating masses.	Chapter 11	Tutorials

Week 12 - 30 May 2022

Module/Topic	Chapter	Events and Submissions/Topic
Review of previous week materials.	Review of previous week materials.	Review of previous week materials.

Review/Exam Week - 06 Jun 2022

Module/Topic	Chapter	Events and Submissions/Topic
		Assignment 2 Due: Review/Exam Week Monday (6 June 2022) 12:00 am AEST **Workbook** Due: Review/Exam Week Monday (6 June 2022) 12:00 am AEST

Exam Week - 13 Jun 2022

Module/Topic	Chapter	Events and Submissions/Topic

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
40%

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.

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 (11 Apr 2022) 12:00 am AEST
Two weeks after the submission.

Return Date to Students
Week 7 Monday (25 Apr 2022)
Two weeks after the submission

Weighting
15%

Minimum mark or grade
50%

Assessment Criteria
Each question in this assignment will be assessed separately for the each of the following criteria.
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.

3 Assignment 2

Assessment Type
Written Assessment

Task Description
Assessment item covers the contents from week 5 to week 12
Full assignment details are on the unit website.

Assessment Due Date
Review/Exam Week Monday (6 June 2022) 12:00 am AEST
Submission via Moodle site.

Return Date to Students

Two weeks after the submission.

Weighting
50%

Minimum mark or grade
50%

Assessment Criteria
Each question in this assignment will be assessed separately for the each of the following criteria.
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 formula, 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.

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.

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.
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 handwritten workbook can be submitted electronically after scanning all the pages.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
Review/Exam Week Monday (6 June 2022) 12:00 am AEST
Submission via Moodle site.

Return Date to Students

Two weeks after submission

Weighting
5%

Minimum mark or grade
50%

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 mathematics.
• Answers clearly identified (please underline or highlight answers)
• Correct results
Evidence of correct procedures
• All necessary steps in the analysis are clearly shown.
• Clear presentation of mathematical 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 is clearly identified (problem, date)
• 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.

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