ENEM20004
Term 1 - 2022

Profile information current as at 28/04/2024 03:43 pm

All details in this unit profile for ENEM20004 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
No overview text

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 1 - 2022

No offerings for ENEM20004

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 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. **In-class Test(s)**
Weighting: 20%
2. **Portfolio**
Weighting: 30%
3. **Project (applied)**
Weighting: 50%

Assessment Grading

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

Feedback
Conflicting submission dates for some assessments.

Recommendation
Ensure that the submission dates are consistent and uniform in the unit profile and unit Moodle in future offerings.

Feedback from Have Your Say

Feedback
Online learning limits students to using the student version of the software.

Recommendation
Frequent closures of campuses due to COVID-19 forced students to switch to the student edition of ANSYS. This invariably limits problem sizes. Encourage students to understand/recognise the significance of solution methodologies using simple models than large scale models.

Feedback from Have Your Say

Feedback
The unit content is quite vast for a 12 cp unit.

Recommendation
Review the unit content and exclude some content related to design exploration and statistical design methods in FEA.

Unit Learning Outcomes

There are no learning outcomes available for this unit

Alignment of Learning Outcomes, Assessment and Graduate Attributes

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

Textbooks and Resources

Textbooks

There are no required textbooks.

IT Resources

You will need access to the following IT resources:

- CQUniversity Student Email
- Internet
- Unit Website (Moodle)
- Access to Laptop or Desktop Computer (if working remotely)

Referencing Style

All submissions for this unit must use the referencing styles below:

- Harvard (author-date)
- Turabian

For further information, see the Assessment Tasks.

Teaching Contacts

Prasad Gudimetla Unit Coordinator
p.gudimetla@cqu.edu.au

Schedule

Week 1 - 07 Mar 2022

Module/Topic	Chapter	Events and Submissions/Topic
1. Introduction to the unit 2. Introduction to Finite Element Analysis	Lecture Notes	1. Computer lab: Introduction to ANSYS Workbench - Overview + Basic Stress Analysis, motor cover workshop

Week 2 - 14 Mar 2022

Module/Topic	Chapter	Events and Submissions/Topic
Introduction to Linear Stress Analysis	Lecture notes	Computer Lab: Linear Stress analysis procedures, pump assembly workshop

Week 3 - 21 Mar 2022

Module/Topic	Chapter	Events and Submissions/Topic
Review of Structural Mechanics - Displacement, Stress and Strain Relationships	Lecture notes	Computer Lab: 2D and 3D Static Structural stress analysis

Week 4 - 28 Mar 2022

Module/Topic	Chapter	Events and Submissions/Topic
1. Shape Functions for Elements and Interpolation 2. Analysis of 1D, 2D and Beam Elements	Lecture Notes	Computer Lab: Modelling with beam elements, 2D heat transfer problem - steady state thermal analysis Workshop: Pump housing - thermal analysis

Week 5 - 04 Apr 2022

Module/Topic	Chapter	Events and Submissions/Topic
1. Element Technology in ANSYS Workbench 2. Meshing - Guidelines and Rules for Accuracy	Lecture Notes	Computer Lab: Meshing basics, global and local mesh controls, meshing methods Computer workshop: Shell Pressure Vessel

Vacation Week - 11 Apr 2022

Module/Topic	Chapter	Events and Submissions/Topic

Week 6 - 18 Apr 2022

Module/Topic	Chapter	Events and Submissions/Topic

Review of Mechanical Vibrations & Structural Dynamics Free vibration/modal analysis, Prestressed analysis, forced vibrational analysis,	Lecture Notes	Computer workshops: Modal analysis of a frame, Gantry crane, Eigenvalue Buckling of a Pipe **In-class Test** Due: Week 6 Friday (22 Apr 2022) 11:59 pm AEST

Week 7 - 25 Apr 2022

Module/Topic	Chapter	Events and Submissions/Topic
Nonlinear Modelling & Simulation 1 - Large scale deformations, metal plasticity	Lecture Notes	Computer Lab: Large scale deformation, Metal plasticity, localised yielding

Week 8 - 02 May 2022

Module/Topic	Chapter	Events and Submissions/Topic
Nonlinear Modelling & Simulation 2 - Contact modelling	Lecture Notes	Computer Lab: Contact stiffness, symmetric v asymmetric, interface treatment, contact with friction

Week 9 - 09 May 2022

Module/Topic	Chapter	Events and Submissions/Topic
Nonlinear Modelling & Simulation 3 - Advanced Contact + diagnostics	Lecture Notes	Computer workshops: Bolted Flange, nonlinear gasket

Week 10 - 16 May 2022

Module/Topic	Chapter	Events and Submissions/Topic
1. Rigid body Dynamic Analysis, Flexible Dynamic analysis 2. Fatigue Analysis - Theory and approach (Stress and Strain based approaches)	Lecture Notes	Computer workshops: Landing gear - rigid and flexible dynamic analysis Computer Lab: Stress and Strain based Fatigue Analysis

Week 11 - 23 May 2022

Module/Topic	Chapter	Events and Submissions/Topic
Parametric Modelling, Parametric Correlation	Lecture notes	Computer Lab: ANSYS Parameter Manager,

Week 12 - 30 May 2022

Module/Topic	Chapter	Events and Submissions/Topic
Design of Experiments - Response surface methodology Design Optimization	Lecture Notes	Computer workshop: Design optimization of a crane hook **Portfolio** Due: Week 12 Friday (3 June 2022) 11:59 pm AEST

Review/Exam Week - 06 Jun 2022

Module/Topic	Chapter	Events and Submissions/Topic

Exam Week - 13 Jun 2022

Module/Topic	Chapter	Events and Submissions/Topic
		Individual Applied Project Due: Exam Week Friday (17 June 2022) 11:59 pm AEST

Assessment Tasks

1 In-class Test

Assessment Type
In-class Test(s)

Task Description
This in-class test will be held in Week 6. It will comprise of 20 short answer and multiple choice questions based on the content delivered in the first 6 weeks of the term. The test will run for 2 hours. Refer to the unit Moodle site for more information.

Assessment Due Date
Week 6 Friday (22 Apr 2022) 11:59 pm AEST
Online Submission

Return Date to Students
Week 7 Friday (29 Apr 2022)
Online

Weighting
20%

Assessment Criteria
Refer to the detailed criteria referenced assessment sheets provided on the unit Moodle site.

Referencing Style

- Harvard (author-date)
- Turabian

Submission
Online

Learning Outcomes Assessed

- Apply finite element methods to model advanced multidisciplinary engineering problems

Graduate Attributes

- Knowledge
- Communication

2 Portfolio

Assessment Type
Portfolio

Task Description
You will compile a portfolio of selected workshops and showcase your skills in using ANSYS Workbench. The portfolio will comprise of 6 workshops each worth 5%.

Assessment Due Date
Week 12 Friday (3 June 2022) 11:59 pm AEST
Online submission

Return Date to Students
Exam Week Friday (17 June 2022)

Weighting
30%

Minimum mark or grade
50%

Assessment Criteria
Refer to the unit moodle site for more details and criteria referenced assessment sheets.

Referencing Style

- Harvard (author-date)
- Turabian

Submission
Online

Learning Outcomes Assessed

- Formulate finite element models to solve complex linear and nonlinear engineering problems

- Critically assess the applicability of advanced non-linear computational design tools and utilise them in several engineering contexts
- Analyse and solve multidisciplinary problems in structural, thermal, thermomechanical and electromechanical systems using advanced modelling and simulations methods
- Write and present high quality technical and professional reports that demonstrate information retrieval and processing.

Graduate Attributes

- Communication
- Cognitive, technical and creative skills
- Research
- Ethical and Professional Responsibility

3 Individual Applied Project

Assessment Type
Project (applied)

Task Description
This is an individual assessment where you will select two problems from a list that will be provided to you via the unit Moodle site. You will apply your engineering and finite element skills to model and simulate the problems, and verify and validate your solutions.

Assessment Due Date
Exam Week Friday (17 June 2022) 11:59 pm AEST
Online submission

Return Date to Students
Exam Week Friday (17 June 2022)

Weighting
50%

Minimum mark or grade
50%

Assessment Criteria
The following assessment criteria shall apply:
1. The problem will be clearly interpreted using relevant theory
2. You will state all the assumptions you have made and the scope of your solution methodology
3. You will clearly specify your modelling approach with appropriate and relevant figures of the meshing, boundary conditions and loads
4. You will postprocess your results and present them in a logical fashion
5. You will discuss all your results and draw appropriate comparison with relevant analytical calculations and provide valid conclusions
6. Your entire body of work will be properly formatted and referenced in Harvard/Turabian style
Refer to the assessment handout for more specific details on the assessment criteria

Referencing Style

- Harvard (author-date)
- Turabian

Submission
Online

Submission Instructions
Submit one PDF and any model files separately via the appropriate submission link

Learning Outcomes Assessed

- Apply finite element methods to model advanced multidisciplinary engineering problems
- Formulate finite element models to solve complex linear and nonlinear engineering problems
- Critically assess the applicability of advanced non-linear computational design tools and utilise them in several engineering contexts
- Analyse and solve multidisciplinary problems in structural, thermal, thermomechanical and electromechanical systems using advanced modelling and simulations methods
- Solve multivariate and parametric design optimisation problems
- Write and present high quality technical and professional reports that demonstrate information retrieval and

processing.

Graduate Attributes

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

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