1. General Course Information

1.1 Course Details

Course Code:	1501ENG
Course Name:	Engineering Mechanics
Trimester:	Trimester 1, 2020
	In Person
Program:	Diploma of Engineering
	Mt Gravatt/Gold Coast campus
Credit Points:	10
Course Coordinator:	Dr Nima Talebian
Document modified:	10 January 2020

Course Description

Engineering Mechanics is both a foundation and a framework for most engineering disciplines. This course provides a basic knowledge of Newtonian mechanics, rigid-body mechanics, elasticity and structural analysis. In particular, the principles of statics and their applications in engineering, the methods of static analysis, and techniques of engineering computation are expounded. Students are expected not only to acquire a good grasp of the principles but also to develop the computational and analytical skills which are vital in obtaining correct engineering solutions. In practice, a wrong solution can lead to an engineering disaster. This course is designed to enable students to acquire fundamental knowledge in engineering.

Engineering Mechanics is a 10 credit point course within the Diploma of Engineering. The course is situated within the second trimester of the program. The Diploma of Engineering is designed to provide students with a pathway to further university studies in Engineering and related degrees; or direct employment.

Assumed Knowledge

Students are required to have completed 1018ENG Engineering Science before undertaking this course.

1.2 Teaching Team

Your lecturer/tutor can be contacted via the email system on the portal.

Dr Nima Talebian: nima.talebian@staff.griffithcollege.edu.au

1.3 Staff Consultation

Your lecturer/tutor is available each week for consultation outside of normal class times. Times that your lecturer/tutor will be available for consultation will be given in the first week of lectures. A list of times and rooms will be published on the Griffith College Portal under the “Support and Services/Teacher Consultation Times” link.

1.4 Timetable

Your timetable is available on the Griffith College Portal at Class Timetable in Student and Services.

1.5 Technical Specifications

All students must have access to a computer or suitable mobile device.

2. Aims, Outcomes & Generic Skills

2.1 Course Aims

Engineering mechanics is an elective engineering subject which defines a foundation for most engineering disciplines. This course aims to familiarize students with the principles of static equilibrium by applying Newton’s laws to solve engineering problems. Topics include introduction to statics equilibrium of particles and rigid bodies, center of gravity and centroid, moment of inertia, analysis of truss in 2D, analysis of frames in 3D space, shear forces and bending moment diagrams.

2.2 Learning Outcomes

After successfully completing this course you should be able to:

1. Apply the fundamentals of mechanics to analyse the equilibrium of simple systems.
2. Evaluate structural stability and determinacy to analyse some common structures including beams, trusses, frames and arches.
3. Apply the concepts of sectional properties and internal force characteristics of beams and trusses to solve real world engineering problems;
4. Design simple systems within accuracy and design limitations in teams through project based learning.
5. Explain engineering mechanics concepts and justify solutions using written communication skills.

2.3 Generic skills

For further details on the Generic Skills please refer to the Graduate Generic Skills and Capabilities policy.

Griffith College aims to develop graduates who have an open and critical approach to learning and a capacity for lifelong learning. Through engagement in their studies, students are provided with opportunities to begin the

development of these and other generic skills.

Studies in this course will give you opportunities to begin to develop the following skills:

Generic Skills and Capabilities	Taught	Practised	Assessed
Acquisition of discipline knowledge and skills with critical judgement	✓	✓	✓
Communication and collaboration		✓	✓
Self-directed and active learning	✓	✓	
Creative and future thinking	✓	✓	✓
Social responsibility and ethical awareness	✓	✓	✓
Cultural competence and awareness in a culturally diverse environment		✓	

3. Learning Resources

3.1 Required Resources

Loo, Y.C. and Guan, H. (2016). Statics and Structures, Griffith School of Engineering, Griffith University Gold Coast Campus, 3rd Edition, in conjunction with Loo, Y.C., A Concise Reference Book for Mechanics & Structures, School of Engineering, Griffith University Gold Coast Campus, 2nd Edition, 1998.

Guan, H. (2016), Engineering Mechanics-Supplementary Material & Workbook, Griffith School of Engineering, Griffith University Gold Coast Campus.

3.2 Recommended Resources

Hulse, R. and Cain, J.A., (2000), Structural Mechanics, Palgrave Macmillan, N.Y., 2nd Edition.

Hibbeler, R.C.(2007).Engineering Mechanics - Statics, Prentice-Hall, N.J., 11th Edition

Meriam, J.L. and Kraige, L.G., (2008) Engineering Mechanics, V.1 Statics, Wiley, New York, 6th Edition.

Beer, F. P.; Johnston, Jr., E. R.; Flori, Jr, R. E. (2008). Mechanics for Engineers Statics, McGraw Hill, 5 th Edition.

3.3 College Support Services and Learning Resources

The College provides many facilities and support services to assist students in their studies. Links to information about College support resources that are available to students are included below for easy reference.

Digital Library – Databases to which Griffith College students have access to through the Griffith Library Databases.

MyStudy – there is a dedicated website for this course via MyStudy on the Griffith College Portal.

Academic Integrity Tutorial - this tutorial helps students to understand what academic integrity is and why it matters. You will be able to identify types of breaches of academic integrity, understand what skills you will need in order to maintain academic integrity, and learn about the processes of referencing styles.

Services and Support provides a range of services to support students throughout their studies including personal support such as Counselling; Academic support; and Welfare support.

Jobs and Employment in the Student Hub can assist students with career direction, resume and interview preparation, job search tips, and more.

IT Support provides details of accessing support, information on s numbers and internet access and computer lab rules.

3.4 Other Learning Information

Attendance

You are expected to attend all lectures and tutorials and to actively engage in learning during these sessions. You are expected to bring all necessary learning resources to class such as the required textbook and /or Workbook. In addition, you may BYOD (bring your own device) to class such as a laptop or tablet. This is not a requirement as computer lab facilities are available on campus, however, the use of such devices in the classroom is encouraged with appropriate and considerate use principles being a priority.

Preparation and Participation in Class

In order to enhance learning, prepare before lectures and tutorials. Read the relevant section of your text book before a lecture, and for a tutorial read both the textbook and the relevant lecture notes. If you have been given tutorial exercises, make sure you complete them. Active participation in lectures and tutorials will improve your learning. Ask questions when something is unclear or when you want to bring some issue to your lecturer or tutor's attention; respond to questions to test your knowledge and engage in discussion to help yourself and others learn.

Consultation Sessions

Teachers offer extra time each week to assist students outside the classroom. This is known as 'consultation time.' You may seek assistance from your teacher on email or in person according to how the teacher has explained this to the class. Attendance during consultation time is optional but you are encouraged to use this extra help to improve your learning outcomes.

Course Materials

Lecture notes will be made available to you in MyStudy on the Griffith College Portal and you are advised to either print these out and bring them to each class so that extra notes can be added or BYOD (bring your own device) and add extra notes digitally.

Self-Directed Learning

You will be expected to learn independently. This means you must organise and learn the course content even when you are not specifically asked to do so by your lecturer or tutor. This involves revising the weekly course material. It also means you will need to find additional information for some assessment items beyond that given to you in textbooks and lecture notes, and to construct your own response to a question or topic. All of this requires careful planning of your time. Expect to spend, on average, at least 10 hours per week including class time for each of your courses.

Program Progression

You are reminded that satisfactory Program Progression requires that attendance in classes is maintained at equal to or greater than 80%, and that GPA is maintained at equal to or greater than 3.5 [please see Griffith College Policy Library - Program Progression Policy - for more information].

Teacher and course Evaluation

Your feedback is respected and valued by your lecturers and tutors. You are encouraged to provide your thoughts on the course and teaching, both positive and critical, directly to your lecturer and tutor or by completing course and lecturer evaluations via Griffith College's evaluation tool whenever these are available.

4. Learning and Teaching Activities

4.1 Weekly Learning Activities

Week	Topic	Activity	Readings	Learning Objectives
1	Introduction to Engineering Mechanics, Fundamentals of statics (I) (rigid body, moment, structures and elements and loading)	Lecture	Loo and Guan Chapter 1	1
	Tutorial problems on forces and moments. Workshop with simple models on moments.	Tutorial/Workshop		1
2	Fundamentals of statics (II) (equilibrium equations, component and resultant forces)	Lecture	Loo and Guan Chapter 2	1, 2
	Tutorial problems on equilibrium. Workshop with simple models on equilibrium of forces.	Tutorial/Workshop		1, 2
3	Supports and support reactions, determinacy and stability, freebody diagram	Lecture	Loo and Guan Chapter 3	1, 2
	Tutorial problems on supports reactions and free body diagram. Workshop with simple models on free body diagram.	Tutorial/Workshop		1, 2
4	Analysis of trusses (I): determinacy and stability, zero-force members, method of joints	Lecture	Loo and Guan Chapter 4	1, 2,3
	Tutorial problems on 2D trusses and method of joints. Workshop problems on 2D trusses.	Tutorial/Workshop		1, 2,3
5	Analysis of truss (II): Method of sections	Lecture	Loo and Guan Chapter 4	1, 2,3, 4, 5
	Tutorial problems on 2D trusses and method of section.	Tutorial		
	Truss project –Introduction	Workshop		1, 2,3, 4, 5
	Truss laboratory sessionwith tecQuipment system and software	**Laboratory**		1, 2,3, 4, 5
	Statics quiz 1	Quiz	Loo and Guan Chapter 1-4	1, 2,3
6	Truss project	Workshop	Loo and Guan Chapters 1-4	1, 2,3, 4, 5
	Working on truss project	Workshop		1, 2,3, 4, 5

7	Analysis of forces and moments in three-dimensional space	Lecture	Loo and Guan Chapter 5	1, 2,3
	Tutorial problems on forces and moments in three-dimensional space Workshop problems on 3D forces and moments	Tutorial/Workshop		1, 2,3
8	Centroids, center of gravity and moments of inertia, Deflection of simply supported beams	Lecture	Loo and Guan Chapters 6 & 7	1, 2,3
	Tutorial problems on center of gravity, moments of inertia and on properties of beams. Workshop with simple models on properties of beams	Tutorial/Workshop		1, 2,3
9	Shear force and bending moment in beams	Lecture	Loo & Guan Chapter 8	1, 2,3
	Beam laboratory session with tecQuipment software	**Laboratory**		1, 2,3
10	Shear force and bending moment diagram	Lecture	Loo & Guan Chapter 8	1, 2,3, 4, 5
	Tutorial problems on shear forces and bending moment diagrams	Tutorial	Loo & Guan Chapter 8	1, 2,3, 4, 5
	Beam project	Workshop		1, 2,3, 4, 5
	Statics quiz 2	Quiz	Loo and Guan Chapters 5 - 8	1, 2,3
11	Introduction to stress	Lecture	Loo & Guan Chapter 9	1, 2,3
	Working on beam project	Workshop		1, 2,3, 4, 5
12	Revision	Lecture	Loo and Guan Chapters 6-9	1, 2,3,
	Extra practice problems	Workshop		1, 2,3,

5. Assessment Plan

5.1 Assessment Summary

Item	Assessment Task	Weighting	Learning Outcomes	Due Date
1	In-class quizzes	10% (5 × 2% each)	1,2,3,4,5 (depending on week)	Weeks 2,3,4,8,9
2	Statics quiz 1	10%	1,2	Week 5
3	Truss project	15%	1,2,5,6	Week 7 (Submit via TurnItIn)
4	Statics quiz 2	10%	1,2,3,4	Week 10

	5	Beam project	15%	2,3,4,5,6	Week 11 (Submit via TurnItIn)
	6	Final Exam- Hurdle 40%	40%	1,2,3,4,5	Final examination period

5.2 Assessment Detail

In-class quizzes

A 15 minutes quiz will be undertaken during lectures in weeks 2, 3, 4, 8 and 9. These assessments will be marked based on problem solving ability and critical reflection. In-class quizzes will be one or two conceptual questions with either no calculations or simple calculations.

Submission:

The quizzes must be submitted to the lecturer at the end of each session for marking.

Statics Quiz 1 and Quiz 2

These quizzes will help students to keep up to date with their work. They will also provide feedback to both the students and the teaching team regarding progress and conduct of the course. Marks will be awarded according to correctness of the procedure, accuracy of the solution and clarity of the presentation.

Project × 2 (Truss and Beam project)

Type: Written Assignments

Task description: These project-based group assessment tasks require students to identify, describe and reflect on existing real life bridges constructed using truss and beam members. Students will analyse simple statically determinate systems to find the axial member forces (in truss members) and internal force characteristics and deflection (in beams) with accurate calculations. This will lead to the design of truss members and beam using simplified formulae or tables within various design constraints. Students will propose a truss bridge for their first submission and a beam bridge for their second submission. They will present a formal report with calculations and justifications.

There are two laboratory sessions available for each project. Truss laboratory session will be held in Week 5 and Beam laboratory session will be held in Week 9. There is no grading for these sessions however, students are expected to use these sessions towards the completion of their Truss and Beam projects.

Truss laboratory session:

This session aims at familiarising students with the determination of forces into the members of a truss. Students will perform active experimentation, reflect on their observation and relevant conceptualisation to back support the Truss project.

Beam laboratory session

This session aims at familiarising students with the deflection of beams impacted by load, load position, second moment of area of beams, span and boundary condition. Students will perform active experimentation, obtain their experience, reflect their observation, and abstract the relevant conceptualisation to back support the Beam Project.

Marking Criteria: The project reports will be marked based on 1) Critical reflection, 2) Problem solving ability, 3) Justification, 4) Written presentation. The projects will be assessed based on group work and individual contribution.

Submission: Via Turnitin

Final Examination

The final examination will assess the student's knowledge and understanding of the topics covered in the course and the ability to apply that understanding to the solution of practical problems. The examination paper is devised also to test the students computational skills, as well as the ability to apply that knowledge to engineering design problems. Marks will be awarded according to correctness of the procedure, accuracy of the solution and clarity of the presentation.

Other Assessment Information

Assessment is based on the student's grasp of the underlying principles of the course matters and their ability to apply such principles to practical engineering problems.

Students are required to attempt and complete all types of assessment and must demonstrate a reasonable degree of competence in the required learning objectives for each type of assessment.

To receive a grade pass or better for the course, the student must:

1) achieve an aggregate mark of at least 50% overall

2) achieve at least 40% for final examination

5.3 Late Submission

An assessment item submitted after the due date, without an approved extension from the Course Coordinator, will be penalised. The standard penalty is the reduction of the mark allocated to the assessment item by 5% of the maximum mark applicable for the assessment item, for each working day or part working day that the item is late. Assessment items submitted more than five working days after the due date are awarded zero marks.

Please refer to the Griffith College website - Policy Library > Assessment Policy for guidelines and penalties for late submission.

5.4 Other Assessment Information

Retention of Originals

You must be able to produce a copy of all work submitted if so requested. Copies should be retained until after the release of final results for the course.

Requests for extension

To apply for an extension of time for an assignment, you must submit an Application for Extension of Assignment form to your teacher at least 24 hours before the date the assignment is due. Grounds for extensions are usually: serious illness, accident, disability, bereavement or other compassionate circumstances and must be able to be substantiated with relevant documentation [e.g. Griffith College Student Medical Certificate]. Please refer to the Griffith College website - Policy Library - for guidelines regarding extensions and deferred assessment.

Return of Assessment Items

1. Marks awarded for in-trimester assessment items, except those being moderated externally with Griffith University, will be available on the Student Portal within fourteen [14] days of the due date. This does not apply to the final assessment item in this course (marks for this item will be provided with the final course result).

2. Students will be advised of their final grade through the Student Portal. Students can review their exam papers after student grades have been published (see relevant Griffith College Fact Sheet for allocated times at Support> Factsheets). Review of exam papers will not be permitted after the final date to enrol.

3. Marks for **all** assessment items including the final exam (if applicable) will be recorded in the Moodle Course Site and made available to students through the Moodle Course Site.

The sum of your marks overall assessment items in this course does not necessarily imply your final grade for the course. Standard grade cut off scores can be varied for particular courses, so you need to wait for the official release of grades to be sure of your grade for this course.

6. Policies & Guidelines

Griffith College assessment-related policies can be found in the Griffith College Policy Library which include the following policies:

Assessment Policy, Special Consideration, Deferred Assessment, Alternate Exam Sitting, Medical Certificates, Academic Integrity, Finalisation of Results, Review of Marks, Moderation of Assessment, Turn-it-in Software Use. These policies can be accessed using the 'Document Search' feature within the Policy Library

Academic Integrity; Griffith College is committed to maintaining high academic standards to protect the value of its qualifications. Academic integrity means acting with the values of honesty, trust, fairness, respect and responsibility in learning, teaching and research. It is important for students, teachers, researchers and all staff to act in an honest way, be responsible for their actions, and show fairness in every part of their work. Academic integrity is important for an individual's and the College's reputation.

All staff and students of the College are responsible for academic integrity. As a student, you are expected to conduct your studies honestly, ethically and in accordance with accepted standards of academic conduct. Any form of academic conduct that is contrary to these standards is considered a breach of academic integrity and is unacceptable.

Some students deliberately breach academic integrity standards with intent to deceive. This conscious, pre-meditated form of cheating is considered to be one of the most serious forms of fraudulent academic behaviour, for which the College has zero tolerance and for which penalties, including exclusion from the College, will be applied.

However, Griffith College also recognises many students breach academic integrity standards without intent to deceive. In these cases, students may be required to undertake additional educational activities to remediate their behaviour and may also be provided appropriate advice by academic staff.

As you undertake your studies at Griffith College, your lecturers, tutors and academic advisors will provide you with guidance to understand and maintain academic integrity; however, it is also your responsibility to seek out guidance if and when you are unsure about appropriate academic conduct.

In the case of an allegation of a breach of academic integrity being made against a student he or she may request the guidance and support of a Griffith College Student Learning Advisor or Student Counsellor.

Please ensure that you are familiar with the Griffith College Academic Integrity Policy; this policy provides an overview of some of the behaviours that are considered breaches of academic integrity, as well as the penalties and processes involved when a breach is identified.

For further information please refer to the Griffith College website - Policy Library > Academic Integrity Policy

Reasonable Adjustments for Assessment – The Disability Services policy

The Disability Services policy (accessed using the Document Search' feature with the Policy Library) outlines the principles and processes that guide the College in making reasonable adjustments to assessment for students with disabilities while maintaining academic robustness of its programs.

Risk Assessment Statement

There are no out of the ordinary risks associated with this course.

Note: For all Diploma level programs, Griffith College acknowledges content derived from Griffith University.