Course Code:	1501ENG
Course Name:	Engineering Mechanics
Semester:	Trimester 3, 2018
Program:	Diploma of Engineering
Credit Points:	10
Course Coordinator:	Ali Binazir
Document modified:	4th May 2018

Teaching Team

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

Ali Binazir: ali.binazir@staff.griffithcollege.edu.au

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 "myTimetable" link.

Prerequisites

There are no prerequisites for this course. However, students are strongly recommended to undertake 1011SCG Mathematics 1A and 1018ENG Engineering Science prior to this course.

Brief 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.

Rationale

Engineering Mechanics, within the Diploma of Engineering, is an important foundation course for degree programs in Engineering. The course is also an important foundation for graduates wishing to commence employment in relevant fields.

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.

Learning Outcomes

After successfully completing this course you should be able to:

1. Apply the fundamental of physics and mathematics to analyse the equilibrium of simple systems under static loading.

2. Determine structural stability and determinacy, apply free body diagram concepts to accurately analyse the structures including beams, trusses, frames and arches.
3. Calculate the centroid/center of gravity and the second moments of area of simple shapes, giving clear, accurate and complete solutions.
4. Apply the concepts of sectional properties and internal force characteristics of beams, to solve real engineering problems;
5. Demonstrate the knowledge and skills to analyse and design simple systems within accuracy and design limitations in teams through experiential learning.
6. Explain and discuss engineering mechanics concepts and justify solutions using written communication skills.

Texts and Supporting Materials

Required Resources

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.

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.

Organisation and Teaching Strategies

The weekly class contact consists of 5 contact hours per week. The 5 contact hours will be made up of 1 x 3 hour lectures, 2 hour tutorial/ workshop.

The lectures will provide theoretical and practical understandings of the content areas.

The tutorial will provide students with the opportunity to clarify their own ideas on the content material, and to develop necessary problem solving skills. Problem solving techniques will be emphasised. The sessions also provide students with the opportunity to seek further explanation of concepts introduced in lecture sessions. The workshop provides you with practical questions to be completed in class to demonstrate your level of competency. Simple models will be used during workshops to demonstrate the engineering mechanics concepts. The tutor will guide you through the process as needed.

Class Contact Summary

Attendance

Your attendance in class will be marked two times during a five hour class. To receive full attendance, you must be present in the classroom on all occasions. Therefore, you are encouraged to attend and participate in all classes throughout the trimester.

Participation in Class

You are expected to read the relevant chapter/s and complete all work stated in the content schedule before the required class. This weekly preparation both in-class and independently will help in preparing you for the in-class quizzes and Final Examination. Peer study groups can be useful in assisting with your weekly preparation.

Consultation Times

Attendance during consultation times is optional but you are encouraged to use this extra help to improve your learning outcomes. Students can book a consultation time by sending an email to your lecturer or tutor.

Course Materials

Lecture notes will be made available to you under my study on the student portal and you are advised to print these out and bring them to each class so that extra notes can be added.

Independent Learning

You are expected to commit, on average, 1 hour per credit point per week on course related activities. Attendance at lectures, tutorials and workshops is a requirement. In independent study time you are recommended to read the prescribed text, complete weekly exercises in

your workbook and prepare for summative assessment. It is not expected that the workload should exceed normal expectations for a 10 credit point course.

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].

Content Schedule

Students must attend the labs as per timetable. Failure to do this will result in losing the mark for this assessment item. No second chance to do the lab/s will be given.

Students are expected to arrive to their tutorial/workshop classes no later than 10 minutes after scheduled commencement time. Students arriving more than 10 minutes late to their workshops might be turned away.

Weekly Teaching Schedule

Week	Topic	Activity	Readings
1	Introduction to Engineering Mechanics, Fundamentals of statics (I) (rigid body, moment, structures and elements and loading)	Lecture	Loo and Guan Chapter 1
	Tutorial problems and workshop with simple models	Tutorial	
2	Fundamentals of statics (II) (equilibrium equations, component and resultant forces)	Lecture	Loo and Guan Chapter 2

	Tutorial problems and workshop with simple models	Tutorial	
3	Supports and support reactions, determinacy and stability, freebody diagram	Lecture	Loo and Guan Chapter 3
	Tutorial problems and workshop with simple models	Tutorial	
4	Analysis of trusses (I): determinacy and stability, zero-force members, method of joints	Lecture	Loo and Guan Chapter 4
	2D trusses tutorial problems	Tutorial	
5	Introduction on Truss project, Analysis of truss (II): Method of sections	Lecture	Loo and Guan Chapter 4
	Tutorial problems and workshop with tecQuipment system and software	Workshop	
	Statics quiz 1	Quiz	Loo and Guan Chapter 1-4
6	Analysis of forces and moments in three-dimensional space	Lecture	Loo and Guan Chapter 5
	Three-dimensional problems	Tutorial	
7	Working on truss project	Lecture	Loo and Guan Chapters 1-4
	Working on truss project	Workshop	
8	Centroids, center of gravity and moments of inertia, Deflection of simply supported beams	Lecture	Loo and Guan Chapters 6 & 7

	Tutorial problems and workshop with simple models	Tutorial	
9	Shear force and bending moment in beams	Lecture	Loo & Guan Chapter 8
	Tutorial problems and workshop with tecQuipment software	Workshop	
10	Shear force and bending moment diagram	Lecture	Loo & Guan Chapter 8
	Tutorial problems and workshop with TecQuipment software	Tutorial	Loo & Guan Chapter 8
	Statics quiz 2	Quiz	Loo and Guan Chapters 5 - 8
11	Introduction to stress	Lecture	Loo & Guan Chapter 9
	Working on beam project	Workshop	
12	Revision	Lecture	Loo and Guan Chapters 6-9
	Working on beam project	Workshop	

Assessment

This section sets out the assessment requirements for this course.

Summary of Assessment

Item	Assessment Task	Weighting	Relevant 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

Assessment Details

In-class quizzes

Type: Test or quiz

Due date: In-class quizzes will be held during tutorial/workshop classes in weeks 2,3,4,8 and 9.

Weight: 10% (5 × 2%)

Task description:

A 15 minutes quiz will be undertaken at the end of tutorial/workshops 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 tutor at the end of each session for marking.

Statics Quiz1 and 2

Type: Quiz

Due dates: Statics quiz 1 will be held on week 5 and Statics quiz 2 will be held on week 10.

Weight: 20% (2 × 10%)

Format: Closed book

Task description:
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: Assignment – Written Assignments

Due dates: Week 7 for Truss project and Week 11 for Beam project

Weight: 30% (2 × 15%)

Marked out of: 100

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.

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
Type: Exam – constructed response

Due date: End of trimester examination period

Weight: 40%

Marked out of: 100

Format: Closed book

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

Submission and Return of Assessment Items

Normally you will be able to collect your assignments in class within fourteen [14] days of the due date for submission of the assignment.

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.

Extensions

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 Medical Certificate]. Please refer to the Griffith College website - Policy Library - for guidelines regarding extensions and deferred assessment.

Assessment Feedback

Marks awarded for assessment items will also be available on the on-line grades system on the Student Website within fourteen [14] days of the due date.

Generic Skills

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	Taught	Practised	Assessed
Written Communication		Yes	Yes
Oral Communication			
Information Literacy			
Secondary Research			
Critical and Innovative Thinking	Yes	Yes	Yes
Academic Integrity		Yes	Yes
Self Directed Learning			
Team Work	Yes	Yes	Yes
Cultural Intelligence			
English Language Proficiency			

Additional Course Generic Skills

Additional Course Information

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 online evaluation tool whenever these are available.

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 a breach of academic integrity 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 Academic Integrity Policy on the Griffith College website – Policy Library.

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.