Course Code:	**1501ENG**
Course Name:	**Engineering Mechanics**
Semester:	**Semester 1, 2016**
Program:	Diploma of Engineering
Credit Points:	10
Course Coordinator:	Ali Binazir
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Teaching Team

Your lecturer/tutor can be contacted via the email system on the portal.	
Name	**Email**
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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. It is assumed that students undertaking this course will have the ability to manipulate algebraic equations and a prior knowledge of basic trigonometry.

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 semester 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.
It is assumed that students undertaking this course will have the ability to manipulate algebraic equations and a prior knowledge of basic trigonometry.

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 a core engineering subject which defines a foundation 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.

Learning Outcomes

After successfully completing this course you should be able to:

1. Solve practical problems using basic Newtonian mechanics principles, giving clear, accurate and complete solutions;
2. Conduct basic laboratory experiments in small groups, perform an uncertainty analysis of laboratory data, and write scientific/engineering reports;
3. Solve practical problems involving static equilibrium in two- and three-dimensions using conventional approaches, giving clear, accurate and complete solutions;
4. Distinguish different types of loading and supports and accurately calculate support reactions of structures under loading;
5. Determine structural stability and determinacy, apply free body diagram concepts to accurately analyse the structures including beams, trusses, frames and arches;
6. Calculate the centroid/centre of gravity and the second moments of area of simple shapes, giving clear, accurate and complete solutions.

Texts and Supporting Materials

Required Resources

Required Resources

Haliday, D., Resnick, R. and Walker, J. (HRW)(2014), Fundamentals of Physics, Wiley, 10th Edition. (There are various options available including hardcover, binder, online.)

Loo, Y.C. and Guan, H. 2013. 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. (2014), 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 6 contact hours per week and 2 x 2 hour laboratory sessions. The 6 contact hours will be made up of 2 x 2 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. The tutor will guide you through the process as needed.

The laboratory sessions, where students work in small groups, will provide students with the opportunity to clarify their own ideas on the content material, to develop teamwork and necessary problem solving skills, and to develop written communication skills. The laboratory sessions will assist students to develop competency in laboratory skills and the interpretation of results.

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 expected 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.

Failure to attend contact sessions and participate in tutorials and workshops may be taken into consideration if you request out of hours assistance or special consideration.

Class Contact Summary

Attendance

Your attendance in class will be marked three times during a six 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 semester.

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.

Course Materials

Lecture notes will be made available to you on the Learning@Griffith College site 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 reinforce your learning from class time by undertaking sufficient independent study {approximately 6 hours per week outside of class time} so that you can achieve the learning outcomes of the 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

1501ENG labs will be held in room G39_2.18 for Gold Coast campus students and N34_1.03 for Mount Gravatt campus students. Please note that you are yet to be allocated to a particular lab class.

Please note that you must attend the labs as per your 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.

If you arrive 10 minutes late to laboratory classes you will be turned away. You cannot change lab groups without permission of the Course Coordinator.

Laboratory 1: Rigid body motion - acceleration of a rolling steel ball under the force of gravity.

Laboratory 2: Principles of one-dimensional mechanics - collisions using an air-track apparatus.

Weekly Teaching Schedule

Week	Topic	Activity	Readings
1	Introduction to Engineering Mechanics, velocity, acceleration, kinematics, motion in one dimension, units, measurements, errors; Learning Outcomes: 1	Lecture	HRW (Chapters 1,2)
	Problems on units, definitions and kinematics of one dimensional motion, measurement, and uncertainty; Learning Outcomes: 1	Tutorial	HRW (Chapters 1,2)
2	Newton's laws, vectors, forces, friction, gravitation, interacting objects; Learning Outcomes: 1	Lecture	HRW (Chapters 3-6, 13)
	Problems related to vectors, forces and Newton's laws of motion; Learning Outcomes: 1	Tutorial	HRW (Chapters 3-6, 13)
3	Circular motion, rotational motion and oscillatory motion; Learning Outcomes: 1	Lecture	HRW (Chapters 4,10,15)
	Problems related to circular, rotational and oscillatory motion; Learning Outcomes: 1	Tutorial	HRW (Chapters 4,10,15)
4	Conservation of momentum and energy; Learning Outcomes: 1	Lecture	HRW (Chapters 7-9)
	Problems related to the conservation of energy and momentum; Learning Outcomes: 1	Tutorial	HRW (Chapters 7-9)
5	Topic 1: Fundamentals of statics (I) (rigid body, moment, structures and elements, loading); Learning Outcomes: 4	Lecture	Loo & Guan Ch1
	Problems related to definitions, forces, moments and couples; Learning Outcomes: 4	Tutorial	
	In-Class Quiz 1 (during 1st lecture timeslot)	Examination	All material
6	Topic 2: Fundamentals of statics (II) (equilibrium equations, component and resultant forces); Learning Outcomes: 3	Lecture	Loo & Guan Ch2
	Problems related to equilibrium equations, component and resultant forces; Learning Outcomes: 3	Tutorial	Loo & Guan Ch2
7	Topic 3: Supports and support reactions, determinacy and stability, freebody diagram; Learning Outcomes: 3, 4	Lecture	Loo & Guan Ch 3
	Problems related to topic 3; Learning Outcomes: 3, 4	Tutorial	Loo & Guan Ch 3
8	Topic 4: Structures with internal hinge connections; Learning Outcomes: 3, 4, 5	Lecture	Loo & Guan Ch 3-4
	Problems related to topic 4; Learning Outcomes: 3, 4, 5	Tutorial	Loo & Guan Ch 3-4
9	Topic 5: Analysis of trusses (I): determinacy and stability, zero- force members, method of joints; Learning Outcomes: 3, 5	Lecture	Loo & Guan Ch 4
	Trusses (I): Problems related to the method of joints; Learning Outcomes: 3, 5	Tutorial	Loo & Guan Ch 4
10	Topic 6: Analysis of trusses (II): method of sections; Learning Outcomes: 3, 5	Lecture	Loo & Guan Ch 4
	Trusses (II): Problems related to the method of sections; Learning Outcomes: 3, 5	Tutorial	
	In-Class Quiz 2 (during 1st lecture timeslot);	Examination	Loo & Guan Ch 4
11	Topic 7: Analysis of forces and moments in three- dimensional space; Learning Outcomes: 3	Lecture	Loo & Guan Ch 5
	Three-dimensional problems: Problems related to static equilibrium in three dimensions; Learning Outcomes: 3	Tutorial	Loo & Guan Ch 5
12	Topic 8: Centroids, centres of gravity and moments of inertia of simple and composite shapes; Learning Outcomes: 6	Lecture	Loo & Guan Ch 6 and 7
	Centroids and moments of area: Problems related to lecture topic 8; Learning Outcomes: 6	Tutorial	Loo & Guan Ch 6 and 7
13	Revision	Tutorial	All material

Assessment

This section sets out the assessment requirements for this course.

Summary of Assessment

Item	Assessment Task	Weighting	Relevant Learning Outcomes	Due Date
1	Laboratory Report 1	5%	1,2	Laboratory report at the end of first lab class
2	Laboratory Report 2	5%	1&2	Laboratory report at the end of second lab class
3	Tutorial Assignment - Dynamics	10%	1	2,3,4,5
4	Tutorial Assignment - Statics	10%	3,4,5,6	9,12
5	In-Class Quiz 1 - Dynamics	15%	1	5
6	In-Class Quiz 2 - Statics	15%	3,4,5,6	10
7	Final Exam *- Students must pass this assessment with a mark of at least 16 out of 40 to pass the course*	40%	3,4,5,6	14

Assessment Details

Laboratory Reports

The laboratory reports assess the ability of the student to apply the principles of Newtonian mechanics to analysis and interpretation of actual experimental data. The students understanding of experimental uncertainty and the ability to present their results clearly and concisely will be assessed. All students are required to complete the relevant pre-lab quiz before their allocated lab class. Students are NOT allowed to enter the laboratory without providing the relevant pre-lab quiz.

Laboratory reports are individual activity and will be marked out of:

1) Following the laboratory procedure as written
2) Correctly recording the tasks performed
3) Correctly answering the questions in lab manual
4) Correct estimate and propagation of uncertainty
5) Degree of agreement between prediction and observation
6) Completeness

The lab reports must be submitted at the end of each lab based on the group allocations.

Tutorial Assignments

The tutorial exercises assess the ability of students to apply theory to problems and their understanding of the concepts. Through these tutorials, students' problem solving skills and computational skills will be developed. Marks will be awarded according to the correctness of the final answers, the accuracy of the solution and the clarity of the presentation. Tutorial assignments are individual activities.

1) Week 1-4 assignment questions will be given online (Wiley Plus)
2) Weeks 9 and 12 statics assignments are given in the required reading resource by Loo and Guan. Submission should be handwritten hardcopy.

In-class Quizzes

The in-class quizzes are closed book.

The in-class quizzes encourage the students to keep up to date with their work. It also provides 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.

Final Examination

The final examination will be 190 minutes in duration, including 10 minute perusal, and 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

Overall, there is a high level of satisfaction among students for this course. The results were particularly high on the teaching, engagement and the quality of this course.

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.

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.