MECH2003

Mechanical Design 1

Session 1, Weekday attendance, North Ryde 2020

School of Engineering

Contents

General Information

Unit convenor and teaching staff
Unit Convener & Lecturer
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Credit points
10

Prerequisites
(MECH1001 or ENGG150) and (MATH1020 or MATH1025 or MATH133 or MATH136)

Corequisites

Co-badged status

Unit description
In this unit, students will develop skills in computer-aided drawing with a specific focus on part modelling, manufacturing drawings, assembly modelling, CNC programming and surfacing. The unit also covers basic knowledge in the selection of machine elements and principles in the design of engineering systems. Students are expected to demonstrate the ability to analyse rotating systems required to transmit power and consider the most suitable methods for assembling them.

Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at https://www.mq.edu.au/study/calendar-of-dates

Learning Outcomes

On successful completion of this unit, you will be able to:

ULO1: Employ computer-aided-drawing proficiently to produce solid models, assemblies, computer-numerical-control codes and manufacturing drawings that meet industrial and Australian standards.

ULO2: Analyse and identify the usage of different types of permanent and non-permanent joints.

ULO3: Analyse power transmission, losses and angular velocity changes in mechanical engineering systems.

ULO4: Discuss the mechanical design process and how the use of engineering principles supports this procedure.

Assessment Tasks

Coronavirus (COVID-19) Update

Assessment details are no longer provided here as a result of changes due to the Coronavirus (COVID-19) pandemic.

Students should consult iLearn for revised unit information.

Find out more about the Coronavirus (COVID-19) and potential impacts on staff and students

General Assessment Information

1. There will be no tutorial or practicals in week 1.

2. Extension of assessment tasks will only be given for formal academic request that has been applied online.

3. Students are required to refer to Ilearn for detailed marking rubrics for the assessment tasks.

4. In order to pass this unit, a student must obtain a mark of 50 or more for the unit (i.e. obtain a passing grade P/ CR/ D/ HD). For further details about grading, please refer below in the policies and procedures section. The unit will be graded according to the Macquarie University Grading policy. The following grades will be used according to the listed numerical range:

ASSESSMENT GRADES AND STATUS

GRADE	RANGE	STATUS ('Standard Grade' in AMIS)	DESCRIPTION
HD	85-100	Pass	Provides consistent evidence of deep and critical understanding in relation to the learning outcomes. There is substantial originality, insight or creativity in identifying, generating and communicating competing arguments, perspectives or problem solving approaches; critical evaluation of problems, their solutions and their implications; creativity in application as appropriate to the program.
D	75-84	Pass	Provides evidence of integration and evaluation of critical ideas, principles and theories, distinctive insight and ability in applying relevant skills and concepts in relation to learning outcomes. There is demonstration of frequent originality or creativity in defining and analysing issues or problems and providing solutions; and the use of means of communication appropriate to the program and the audience.

CR	65-74	Pass	Provides evidence of learning that goes beyond replication of content knowledge or skills relevant to the learning outcomes. There is demonstration of substantial understanding of fundamental concepts in the field of study and the ability to apply these concepts in a variety of contexts; convincing argumentation with appropriate coherent justification; communication of ideas fluently and clearly in terms of the conventions of the program.
P	50-64	Pass	Provides sufficient evidence of the achievement of learning outcomes. There is demonstration of understanding and application of fundamental concepts of the program; routine argumentation with acceptable justification; communication of information and ideas adequately in terms of the conventions of the program. The learning attainment is considered satisfactory or adequate or competent or capable in relation to the specified outcomes.
F	0-49	Fail	Does not provide evidence of attainment of learning outcomes. There is missing or partial or superficial or faulty understanding and application of the fundamental concepts in the field of study; missing, undeveloped, inappropriate or confusing argumentation; incomplete, confusing or lacking communication of ideas in ways that give little attention to the conventions of the program.

Please note that the two CAD tests conducted will assess student's competency to complete the given task accurately as well as the time required to complete it.

Delivery and Resources

Coronavirus (COVID-19) Update

Any references to on-campus delivery below may no longer be relevant due to COVID-19.

Please check here for updated delivery information: https://ask.mq.edu.au/account/pub/display/unit_status

1. Richard G Budynas, "Shigley's Mechanical Engineering Design." McGrawll Hill, 10th Edition.

2. A.W. Boundy, "Engineering drawing and Sketchbook." McGrawll Hill, 8th Edition.

Purchased of these textbooks are not compulsory but they are very useful materials that will benefit one undertaking a career/profession in mechanical engineering design.

3. Students will be trained in using Computer Aided Drawing (CAD) software. The software selected will be announced during the first lecture as well as how to download the software to install on a student's PC's.

4. Other required resources: scientific calculators.

Unit Schedule

Coronavirus (COVID-19) Update

The unit schedule/topics and any references to on-campus delivery below may no longer be relevant due to COVID-19. Please consult iLearn for latest details, and check here for updated delivery information: https://ask.mq.edu.au/account/pub/display/unit_status

Weeks	Lecture Topics	Assignments during tutorials
1.	Introduction to Mechanical Engineering Design	No tutorial/practical
2.	CAD and Manufacturing Drawings	Sketching in CAD
3.	The Design Process	Part modelling
4.	3D printing and laser cutting	Manufacturing Drawings
5.	Small Volume Manufacturing Techniques	CAD Test 1
6.	Material Removal Methods	Surfacing
7.	Manufacturing Automation	CNC code generating
8.	Permanent and Non-Permanent Joints (No lecture due to Anzac Day public holiday)	Assembly Modelling
9.	Mid session test	CAD Test 2
10.	Design of Basic Rotating Systems	Motors Selection Tutorial
11.	Motors and Motor selection	CAD Assignment
12.	Spring selection	CAD Assignment
13.	Revision	CAD Assignment

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central (https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central). Students should be aware of the following policies in particular with regard to Learning and Teaching:

- Academic Appeals Policy
- Academic Integrity Policy
- Academic Progression Policy
- Assessment Policy
- Fitness to Practice Procedure
- Grade Appeal Policy
- Complaint Management Procedure for Students and Members of the Public
- Special Consideration Policy *(**Note:** The Special Consideration Policy is effective from 4 December 2017 and replaces the Disruption to Studies Policy.)*

Students seeking more policy resources can visit the Student Policy Gateway (https://students.mq.edu.au/support/study/student-policy-gateway). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

If you would like to see all the policies relevant to Learning and Teaching visit Policy Central (https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central).

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/study/getting-started/student-conduct

Results

Results published on platform other than eStudent, (eg. iLearn, Coursera etc.) or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in eStudent. For more information visit ask.mq.edu.au or if you are a Global MBA student contact globalmba.support@mq.edu.au

Student Support

Macquarie University provides a range of support services for students. For details, visit http://students.mq.edu.au/support/

Learning Skills

Learning Skills (mq.edu.au/learningskills) provides academic writing resources and study strategies to help you improve your marks and take control of your study.

- Getting help with your assignment
- Workshops
- StudyWise
- Academic Integrity Module

The Library provides online and face to face support to help you find and use relevant information resources.

- Subject and Research Guides
- Ask a Librarian

Student Services and Support

Students with a disability are encouraged to contact the Disability Service who can provide appropriate help with any issues that arise during their studies.

Student Enquiries

For all student enquiries, visit Student Connect at ask.mq.edu.au

If you are a Global MBA student contact globalmba.support@mq.edu.au

IT Help

For help with University computer systems and technology, visit http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/.

When using the University's IT, you must adhere to the Acceptable Use of IT Resources Policy. The policy applies to all who connect to the MQ network including students.

Changes from Previous Offering

CAD package will be updated to provide students with a more efficient workflow.

Changes since First Published

Date	Description
07/02/2020	The following statement was added: Please note that the two CAD tests conducted will assess student's competency to complete the given task accurately as well as the time required to complete it.