MECH3003

Mechanical Design 2

Session 1, Weekday attendance, North Ryde 2020

School of Engineering

Contents

General Information

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

Prerequisites
((MECH2001 or MECH201) and (MECH2003 or MECH203) and (MECH2004 or MECH204)) or admission to MEngMechEng

Corequisites

Co-badged status

Unit description
In this unit, students will develop the skills to produce design solutions for complex engineering design problems. The unit covers knowledge in the design of machine components such as gears, belt drives, chain drives, bearings and shaft systems. At the end of the unit, students are expected to demonstrate the ability to design a complete mechanical system as well as the critical details for components of a larger system. The unit will culminate with an opportunity for the students to present a constructed system and demonstrate its ability to achieve the defined task in a competition.

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: Analyse and provide design solutions through the selection of appropriate machine components.

ULO3: Conceptualise and develop a mechanical system, through a prototype, that will be a viable and cost-effective solution to performing a specified task.

ULO2: Apply concepts and knowledge in Mechanics of Materials and Materials engineering to generate effective design solutions.

ULO4: Apply suitable engineering practices, specifically design optimisation skills to enhance the design of a complex mechanical engineering system.

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

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.

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.

Purchased of this textbook is not compulsory but does contain useful material that will benefit one undertaking a career/profession in mechanical engineering design.

2. Students will be expected to utilise CAD software during their assessments. CREO 6.0 is the selected CAD package for this unit and details of how to download the software to install on a student's PC's will be provided during the first week lecture.

3. 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 2 and revision of Mechanical Engineering Design	No tutorial/practical
2.	Diagnostic Test and Introduction to Project Competition	CAD exercises
3.	Gear Analysis	Design Process application to project
4.	Belt Drive Analysis	Gear in class assignment
5.	Chain Drive Analysis	Belt drive in class assignment
6.	Shaft Analysis	Chain drive in class assignment
7.	Bearing Analysis	Shaft in class assignment
8.	Weld Analysis	Project development (Monday tutorials cancelled due to public holiday)
9.	Mid session test	Bearing in class assignment
10.	Fastener Analysis	Project Trial and Presentation
11.	FEA and Topology Optimisation	Project development
12.	Project Competition	Project development
13.	Revision	Report completion

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

Content has been completely revised to align with curriculum changes. Please do not refer to past papers as an indication of what to expect in the 2020 offering of this unit.

CREO 4.0 has been upgraded to CREO 6.0 which should provide a more efficient workflow for students.

A revised project will be implemented that will better utilise the knowledge obtained in the prerequisite and this unit for a practical exercise.