



Mechanical and Manufacturing Engineering

# Course Outline

Term 2 2020

**MECH4100**

**MECHANICAL DESIGN 2**

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# 1. Staff contact details

## Contact details and consultation times for course convenor

David Lyons CEng FRINA MIEAust GCULT

This is a Microsoft Teams-based online Course: message me in Chat or via Post in **your Group's Teams Channel**. Video calls are also to be arranged this way **by appointment**. When getting in touch by **any** means, **always identify the course code MECH4100 and your Group number**.

Email: [david.lyons@unsw.edu.au](mailto:david.lyons@unsw.edu.au)

Moodle: <https://moodle.telt.unsw.edu.au/course/view.php?id=52281>

## Contact details and consultation times for additional lecturers/demonstrators/lab staff

You will be working for your industry **Client** in Groups with the assistance of the course convenor and one of the following **Mentors**. Please see the course [Moodle](#) or Sharepoint link posted in Teams for details of your group allocation and Mentor contact details (available early Week 1).

Name: Muhammad Imran – **Mentor** [muhammad.imran@unsw.edu.au](mailto:muhammad.imran@unsw.edu.au)

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# 2. Important links

- [Moodle](#)
- [Lab Access](#)
- [Health and Safety](#)
- [Computing Facilities](#)
- [Student Resources](#)
- [Course Outlines](#)
- [Engineering Student Support Services Centre](#)
- [Makerspace](#)
- [UNSW Timetable](#)
- [UNSW Handbook](#)
- [UNSW Mechanical and Manufacturing Engineering](#)

### 3. Course details

#### Credit points

This is a 6 unit-of-credit (UoC) course and involves up to 5 hours per week (h/w) of scheduled online contact.

The normal workload expectations of a student are approximately 25 hours per term for each UOC, including class contact hours, other learning activities, preparation and time spent on all assessable work.

You should aim to spend about 9 h/w on this course. The additional time should be spent in making sure that you understand the lecture material, completing the set assignments, further reading, and revising for any examinations.

#### Contact hours

	Day	Time	Week	Delivery Mode
Lectures	Wed	6:00-7:00PM	1	MS Teams details tba. Intro to course.
Tutorials/Group meetings	At least once a week	By Group and Mentor mutual arrangement	(1), 2-10	On Teams Group Channel

All classes in T2 2020 will be online. Please consult this course's Moodle module for details about delivery.

#### Summary and Aims of the course

This is the final undergraduate course (or Masters course) in engineering design. Here you will be expected to apply the knowledge and skills you acquired in the preceding courses/degree to a real, commercial design problem. To facilitate this, you will be working on a team project specified by UNSW's **Industry Partners**. They are your **Clients**.

The course requires the assembly of large amounts of high-level documentation and two instances of formal public presentation. The demonstration of teamwork and collaborative skills – as well as meeting specified deliverables – is essential for satisfactory completion. Interaction with the Client – both in formal meetings and in your regular liaison throughout the term – as well as the quality of your reporting of these events will be evaluated to the standards expected of professional consulting engineers.

**You will nominate a preference for your Project and Group (and hence Client) during Week “0” (from 25-31 May 2020) or Week 1 (between 09:00 27 May and 12:00 on 02 June) using Eventbrite <https://www.eventbrite.com.au/e/mech4100-t2-2020-project-and-group-selection-tickets-106608665388> First in, first-served.** Upon allocation to a Project, your Group of 9 or 10 members will engage in activities and negotiated learning with course

teaching staff and your Client. Final choice of Project and/or Group allocation is the preserve of course teaching staff whose decision is final. By the end of term your team must have:

- **Formulated the technical specifications for your design** through a process of negotiation with your Client, Group Mentor/tutor and course convenor. The design must be completed with a high level of engineering rigour.
- Understood and **demonstrated that you were responsible for defining and describing the organisational structure of your Group**, managing the project and coordinating the workload within your Group.

### Student learning outcomes

This course is designed to address the learning outcomes below and the corresponding Engineers Australia Stage 1 Competency Standards for Professional Engineers as shown. The full list of Stage 1 Competency Standards may be found in Appendix A.

After successfully completing this course, you should be able to:

Learning Outcome		EA Stage 1 Competencies
1.	Implement the basic elements of managing a design project and be able to plan and schedule work activities in accordance with standard practice in a Group environment.	PE1.6, 2.1, 2.3, 2.4, 3.1, 3.4, 3.5, 3.6
2.	Apply an effective problem-solving approach that is deliverable in practice and justify and defend the selection.	PE1.1, 1.4, 1.6, 2.1, 2.2, 2.3, 3.3
3.	Appreciate the need to critically review and reflect on your own capability and to invite peer review; to benchmark your performance against appropriate standards and to determine areas for your further development.	PE1.6, 2.1, 2.3, 2.4, 3.5, 3.6
4.	Execute effective oral and written presentations to technical audiences.	PE 3.2, 3.4

## 4. Teaching strategies

Effective learning is supported when you are actively engaged in the learning process. You become more engaged when you can see the relevance of your studies to professional, disciplinary and/or personal contexts. Relevance is best demonstrated by way of examples drawn from industry. The final year of your degree/Master's program is an ideal opportunity to experience "real world" engineering problems through interaction with industry and to gauge your strengths and weaknesses against their expectations and standards.

In industry, you seldom choose your colleagues. For the work in this course, everyone will be assigned to a Group for the duration of the term. Your personal preferences *may* be taken into account, but are not guaranteed. Most of the activities and assessments will be conducted through the Group, although individual performance will be monitored and

assessed – just as it would be in industry. Dialogue is encouraged between you, others in your Group and the staff. Diversity in experience is acknowledged, as some students in each Group have prior industry background. You may draw on your experience to illustrate various aspects of the work you undertake, and this should help to motivate and facilitate engagement with the other members of your Group.

Technical, professional and personal knowledge and skills are best acquired through a combination of conceptual support, experience, reflection and then planning for the next exercise. This course provides a range of learning strategies and activities to support this approach. Microsoft Teams is used to foster an environment where you can collaborate in discussion groups and acquire the necessary information to complete your work.

This course attempts to approximate the learning processes that you will encounter upon entering industry. As such, the course will be highly activity-based.

A large part of engineering design involves the effective communication of your ideas and the confident justification of your approach. To do this well you need to be able to draft clear and concise reports which are stand-alone documents. However almost invariably as a designer, you will at some point in the tendering process have to give an oral defence for your design. This is the focus of the **mentoring** and **presentation** and **report** activities. You will work on a **major design project** where you can practise your design skills and demonstrate your understanding of the fundamental concepts of design, teamwork and project management. Study of the diverse disciplines of engineering has occupied much of your time in previous years. You were mostly assessed only in one of those sub-disciplines at a time. To create a tangible artefact that is complex, knowledge and skills from many diverse engineering disciplines will be needed by the designers to make the design successful. This is the focus of your industry-based project in this course.

## 5. Course schedule

	<b>Week</b>
<b>Lectures/ information seminar</b>	Week 1 – Wed 6PM in Teams: Settling Groups, Projects, Clients and discussion of the online course schedule.
<b>Group meetings</b>	Weeks 1 to 10 On Teams.
<b>Group progress review/ presentation</b>	Week 4. Check Moodle or Teams for details.
<b>Group final Poster &amp; report</b>	Week 11 Check Moodle or Teams for details.

## 6. Assessment

### Assessment overview

Task	Length	Group/ Individual	Weight	Learning outcomes assessed	Assessment criteria	Due date and submission requirements	Deadline for absolute fail	Marks returned
Progress Review	Approx. 10 minute presentation by YouTube video	Group	20%	2 and 4	Design capability and oral presentation skills	Week 4 Ref Rubric	n/a	2 weeks
Poster posted to Moodle or Teams	n/a	Group	20%	2 and 4	Design capability and graphical presentation skills	Week 11 Ref Rubric	n/a	2 weeks via Moodle
Final Design Report	(t.b.a.) pages as a guide + appendices. Ref rubric.	Group	30%	1 and 2	Design capability and report writing skills	Week 11 Ref Rubric	n/a	Upon release of final results
Written feedback from Client and Mentors	n/a	Group	30%	3 and 4	Design capability and communication skills	Weeks 5 & 11	n/a	Upon release of final results
Peer Assessment	n/a	Individual	N/A	1, 2 3 and 4	Professionalism, conduct and application	Week 11	n/a	Feedback via Moodle or Teams

## Assignments

### *Presentation*

All submissions are expected to be neat and clearly set out. Your results are the pinnacle of all your hard work and should be treated with due respect. Presenting results clearly gives the marker the best chance of understanding your method; even if the numerical results are incorrect.

### *Submission*

Work submitted late without an approved extension by the course coordinator or delegated authority is subject to a late penalty of 20 percent (20%) of the maximum mark possible for that assessment item, per calendar day.

The late penalty is applied per calendar day (including weekends and public holidays) that the assessment is overdue. There is no pro-rata of the late penalty for submissions made part way through a day.

Work submitted after the 'deadline for absolute fail' is not accepted and a mark of zero will be awarded for that assessment item.

For some assessment items, a late penalty may not be appropriate. These are clearly indicated in the course outline, and such assessments receive a mark of zero if not completed by the specified date. Examples include:

- a. Weekly online tests or laboratory work worth a small proportion of the subject mark, or
- b. Online quizzes where answers are released to students on completion, or
- c. Professional assessment tasks, where the intention is to create an authentic assessment that has an absolute submission date, or
- d. Pass/Fail assessment tasks.

### *Marking*

Marking guidelines for assignment submissions will be provided at the same time as assignment details to assist with meeting assessable requirements. Submissions will be marked according to the marking guidelines provided.

## **Special consideration and supplementary assessment**

If you have experienced an illness or misadventure beyond your control that will interfere with your assessment performance, you are eligible to apply for Special Consideration prior to submitting an assessment or sitting an exam.

**Please note** that UNSW now has a [Fit to Sit / Submit rule](#), which means that if you attempt an exam or submit a piece of assessment, you are declaring yourself fit enough to do so and cannot later apply for Special Consideration.

For details of applying for Special Consideration and conditions for the award of supplementary assessment, please see the information on UNSW's [Special Consideration page](#).

## 7. Expected resources for students

UNSW Library website: <https://www.library.unsw.edu.au/>

Moodle: <https://moodle.telt.unsw.edu.au/login/index.php>

Information provided by your Client.

## 8. Course evaluation and development

Feedback on the course is gathered periodically using various means, including the UNSW myExperience process, informal discussion in the final class for the course, and the School's Student/Staff meetings. Your feedback is taken seriously, and continual improvements are made to the course based, in part, on such feedback.

In this course, recent improvements resulting from student feedback include the adoption of a fully online environment based on Microsoft Teams and the engagement of leading industry partners as Clients.

## 9. Academic honesty and plagiarism

UNSW has an ongoing commitment to fostering a culture of learning informed by academic integrity. All UNSW students have a responsibility to adhere to this principle of academic integrity. Plagiarism undermines academic integrity and is not tolerated at UNSW. *Plagiarism at UNSW is defined as using the words or ideas of others and passing them off as your own.*

Plagiarism is a type of intellectual theft. It can take many forms, from deliberate cheating to accidentally copying from a source without acknowledgement. UNSW has produced a website with a wealth of resources to support students to understand and avoid plagiarism, visit: [student.unsw.edu.au/plagiarism](http://student.unsw.edu.au/plagiarism). The Learning Centre assists students with understanding academic integrity and how not to plagiarise. They also hold workshops and can help students one-on-one.

You are also reminded that careful time management is an important part of study and one of the identified causes of plagiarism is poor time management. Students should allow sufficient time for research, drafting and the proper referencing of sources in preparing all assessment tasks.

If plagiarism is found in your work when you are in first year, your lecturer will offer you assistance to improve your academic skills. They may ask you to look at some online resources, attend the Learning Centre, or sometimes resubmit your work with the problem fixed. However more serious instances in first year, such as stealing another student's work or paying someone to do your work, may be investigated under the Student Misconduct Procedures.

Repeated plagiarism (even in first year), plagiarism after first year, or serious instances, may also be investigated under the Student Misconduct Procedures. The penalties under the procedures can include a reduction in marks, failing a course or for the most serious matters (like plagiarism in an honours thesis) even suspension from the university. The Student Misconduct Procedures are available here:

[www.gs.unsw.edu.au/policy/documents/studentmisconductprocedures.pdf](http://www.gs.unsw.edu.au/policy/documents/studentmisconductprocedures.pdf)

## 10. Administrative matters and links

All students are expected to read and be familiar with UNSW guidelines and policies. In particular, students should be familiar with the following:

- [Attendance](#)
- [UNSW Email Address](#)
- [Special Consideration](#)
- [Exams](#)
- [Approved Calculators](#)
- [Academic Honesty and Plagiarism](#)
- [Equitable Learning Services](#)

V1.1 25 May 2020

# Appendix A: Engineers Australia (EA) Competencies

## Stage 1 Competencies for Professional Engineers

	<b>Program Intended Learning Outcomes</b>
<b>PE1: Knowledge and Skill Base</b>	PE1.1 Comprehensive, theory-based understanding of underpinning fundamentals
	PE1.2 Conceptual understanding of underpinning maths, analysis, statistics, computing
	PE1.3 In-depth understanding of specialist bodies of knowledge
	PE1.4 Discernment of knowledge development and research directions
	PE1.5 Knowledge of engineering design practice
	PE1.6 Understanding of scope, principles, norms, accountabilities of sustainable engineering practice
<b>PE2: Engineering Application Ability</b>	PE2.1 Application of established engineering methods to complex problem solving
	PE2.2 Fluent application of engineering techniques, tools and resources
	PE2.3 Application of systematic engineering synthesis and design processes
	PE2.4 Application of systematic approaches to the conduct and management of engineering projects
<b>PE3: Professional and Personal Attributes</b>	PE3.1 Ethical conduct and professional accountability
	PE3.2 Effective oral and written communication (professional and lay domains)
	PE3.3 Creative, innovative and pro-active demeanour
	PE3.4 Professional use and management of information
	PE3.5 Orderly management of self, and professional conduct
	PE3.6 Effective team membership and team leadership