



Mechanical and Manufacturing Engineering

# Course Outline

Semester 2 2018

**MMAN9001**

**MASTER OF ENGINEERING SCIENCE  
PROJECT A**

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# 1. Staff contact details

## Contact details and consultation times for course convenor

Name: Dr Ronald Chan  
Office location: J17, room 507  
Tel: (02) 9385 1535  
Email: [r.chan@unsw.edu.au](mailto:r.chan@unsw.edu.au)

It is recommended you email to make a specific appointment if you need to discuss any important issues, particularly if you want to discuss extensions, supervisor issues, etc. Always consult the course Moodle first in case your questions have already been answered, or in the event that others may benefit from reading what you are asking and the response.

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

Please see the course [Moodle](#).

# 2. Important links

- [Moodle](#)
- [UNSW Mechanical and Manufacturing Engineering](#)
- [Course Outlines](#)
- [Student intranet](#)
- [UNSW Mechanical and Manufacturing Engineering Facebook](#)
- [UNSW Handbook](#)

# 3. Course details

## Credit Points

This is a 6 unit-of-credit (UoC) course, and involves 0 hours per week (h/w) of face-to-face contact.

The UNSW website states “The normal workload expectations of a student are approximately 25 hours per semester for each UoC, including class contact hours, other learning activities, preparation and time spent on all assessable work. Thus, for a full-time enrolled student, the normal workload, averaged across the 16 weeks of teaching, study and examination periods, is about 37.5 hours per week.”

This means that 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**

This is no face-to-face contact for this course. Online workshops will be provided via Moodle.

## **Summary and Aims of the course**

The group project is to be completed in two consecutive semesters during the last academic year before graduation. This is the only course where the students have complete freedom to work on their chosen projects from the initiation to the end – the project should contain a good amount of original research and/or novel design work or analysis. It is not the responsibility of the supervisor and course coordinator to tell the student what to do, nor should it be assumed that the supervisor is an expert in all areas of engineering. They are there to offer guidance and advice, as are laboratory staff, workshop staff, and others in the school that may have expertise in the area of your project. The successful execution of the project is solely the responsibility of the student.

Project A is to be taken in the second last semester required for the completion of all requirements for the award of the degree. This course – together with MMAN9002 Master of Engineering Project B, which is to be taken in the following semester – requires each student to demonstrate managerial, technical and professional skills in planning and executing an approved engineering project within a stipulated time limit. Each student is guided by a supervisor, but successfully planning, executing and reporting on the project are the sole responsibility of each student.

## **Laboratory Staff**

The laboratories are the responsibility of the staff-in-charge and you must operate within the accepted practices of the laboratory concerned. You should not expect laboratory staff to take responsibility for your thesis or carry out work for you. The laboratory staffs are highly skilled and helpful; take full advantage of their experience.

If your project involves laboratory work, contact the officer-in-charge (OIC) of the laboratory in which you will be working as soon as possible to discuss your requirements. They will issue you with a Laboratory Access Approval (LAA) form which you must complete and return to the OIC.

Before you start work in a laboratory or undertake any activity which might be considered hazardous in any way, you must read and understand the practices and procedures described in the OHS section of the School's intranet.

## **Machine Workshop**

All student activities requiring manufacture in the Machine Workshop should be discussed with the Workshop personnel at the inception of the work. The Workshop personnel must have the opportunity to advise and influence the design to help minimise assembly, manufacture or functional problems.

## 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.	Conduct independent research and apply established theories to address an engineering problem that does not have a well-defined solution	PE2.1, 2.3, 2.4, 3.3
2.	Analyse critically, reflect on and synthesise complex information, problems, concepts and theories.	PE2.1, 2.3, 2.4
3.	Interpret and transmit knowledge, skills and ideas to specialist and non-specialist audiences.	PE2.4, 3.2, 3.4
4.	Demonstrate managerial skills to complete a project within limited time and resources.	PE3.4, 3.5, 3.6

## 4. Teaching strategies

Online workshops will be provided via Moodle. The purpose of the workshop is to provide general guidance and support to student teams in completing their project. In addition, student teams are expected to meet their project supervisor once every fortnight to provide progress update on their project.

## 5. Course schedule

Date	Expected Task Completion
Week 1	<ul style="list-style-type: none"><li>• Met your supervisor in person</li><li>• Joined a project group on Moodle</li><li>• Read the course outline</li></ul>
Week 2	<ul style="list-style-type: none"><li>• Defined a problem statement</li><li>• Proposed a hypothesis/methodology</li><li>• Selected a project manager</li><li>• Defined a team name</li><li>• Had one group meeting with your supervisor to discuss:<ul style="list-style-type: none"><li>○ Problem statement</li><li>○ Hypothesis/Methodology</li><li>○ Keywords for literature research</li></ul></li><li>• Had at least one group meeting to:<ul style="list-style-type: none"><li>○ Exchange contacts with your team members</li><li>○ Assign a role/title for each member. E.G. Project Manager<ul style="list-style-type: none"><li>▪ Organise meeting</li><li>▪ Enforce meeting attendance</li><li>▪ Resolve team conflicts</li></ul></li></ul></li></ul>

Date	Expected Task Completion
Week 3	<ul style="list-style-type: none"> <li>• Refined the problem statement and hypothesis/methodology</li> <li>• Had at least one group meeting to discuss:               <ul style="list-style-type: none"> <li>○ Unique scope for individual team member</li> <li>○ Methodology to address the individual problem statement</li> <li>○ Identify a list of resources required for the project</li> </ul> </li> </ul>
Week 4	<ul style="list-style-type: none"> <li>• Had one group meeting with your supervisor to discuss:               <ul style="list-style-type: none"> <li>○ The refined problem statement and hypothesis/methodology</li> <li>○ Have your supervisor to provide on-the-spot feedback on the integrity of the scope of the project.</li> <li>○ Report of at least one key literature by each team member</li> <li>○ Had at least one group meeting to reflect on the feedback provided by the supervisor.</li> </ul> </li> </ul>
Week 5	<p>Milestone Evaluation I</p> <p>Each team will be allocated with a 20-minute slot in Week 5 to present the following items to the Course Coordinator and fellow Demonstrators.</p> <p>Project manager reports on:</p> <ul style="list-style-type: none"> <li>• Submit evidence of group meeting (e.g. minutes)</li> <li>• Introduce the scope of the project group</li> <li>• Introduce each member and their roles and responsibilities</li> </ul> <p>Each group member, including the project manager reports on:</p> <ul style="list-style-type: none"> <li>• The problem statement</li> <li>• The hypothesis/methodology</li> <li>• A brief methodology of how to address the problem</li> <li>• Resources required to complete the project</li> </ul>
Week 6	<ul style="list-style-type: none"> <li>• Had one group meeting with your supervisor to discuss:               <ul style="list-style-type: none"> <li>○ Update of any key literature</li> <li>○ Conducting survey (if any)</li> <li>○ Design of experiment (if any)</li> <li>○ Laboratory safety and training requirement (if any)</li> <li>○ Purchase of resources (if any)</li> </ul> </li> <li>• Had at least one group meeting to reflect on the feedback provided in the Milestone Evaluation</li> </ul>
Week 7	<ul style="list-style-type: none"> <li>• Had at least one group meeting to reflect on the feedback provided by the supervisor.</li> </ul>
Week 8	<ul style="list-style-type: none"> <li>• Had one group meeting with your supervisor to discuss:               <ul style="list-style-type: none"> <li>○ Table of content in the FINAL project report</li> <li>○ Update on resources purchase (if any)</li> </ul> </li> <li>• Had at least one group meeting to reflect on the feedback provided in the Milestone Evaluation and the supervisor. Derive a contingency plan</li> </ul>
Week 9	<p>Milestone Evaluation II</p> <p>Each student is to submit a 2-page 'concise literature survey' to Moodle. The aim of the task is to allow students to practice on compiling their literature survey chapter for the progress report. Personalised feedback will be provided within 2-week after the submission date.</p>
Week 10	Prepare for Progress Presentation and Interim Report
Week 11	Prepare for Progress Presentation and Interim Report
Week 12	Progress Presentation Video OR Face-to-Face Presentation and Interim Report Submission via Moodle

# 6. Assessment

## Assessment overview

Assessment	Length	Weight	Learning outcomes assessed	Assessment criteria	Due date and submission requirements	Deadline for absolute fail	Marks returned
Milestone Evaluation I	20 minutes per team	10%	1, 2, 3, and 4	Progress and Presentation Skills	During Week 5 Friday (24/08)	N/A	Graded on the spot
Milestone Evaluation II	2 A4 pages	10%	1, 2, 3, and 4	Progress and Presentation Skills	5pm, Friday Week 9 (21/09) via Moodle	One week after due date	2 weeks after submission
Progress Presentation Video OR Face-to-Face Presentation	15 minutes per team	10%	1, 2, 3, and 4	See marking rubrics	5pm, Friday, Week 13 (26/10) via Moodle for Video Presentation OR book a time with your supervisor to conduct a face-to-face presentation	One week after due date	Upon release of final results
Interim Report	Max. 10 pages, single sided, min. font size 11	70%	1, 2, 3, and 4	See marking rubrics	5pm, Friday, Week 13 (26/10) via Moodle	One week after due date	Upon release of final results

## 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 per cent (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.

### *Milestone Evaluation Marking Rubrics*

#### Criteria 1: Individual Job Performance

Grade	Rating	Explanation/Examples
Excellent	4	Progress is beyond expectation with a clear project scope
Good	3	Progress met all expectations
Satisfactory	2	Reasonable amount of progress is delivered
Marginal	1	Insufficient progress
Unsatisfactory	0	Complete lack of progress



## Criteria 2: Team Performance

Grade	Rating	Explanation/Examples
Excellent	4	Highly effectively team, team members are sharing resources effectively and show strong evidence of peer support
Good	3	Performing team, team members are sharing resources and show some evidence of peer support
Satisfactory	2	Evidence of team collaboration, but the minority of the team members appears disconnected.
Marginal	1	Some evidence of team collaboration, but the majority of the team members appears disconnected.
Unsatisfactory	0	Dysfunctional team, no evidence of any team collaboration effort.

## Progress Presentation

By **Friday Week 13**, each team must produce a 15-minute video (marked by the project supervisor) OR book a time with their supervisor to conduct a face-to-face presentation to address the rubrics below.

### *Progress Presentation Marking Rubrics*

#### Aspect 1: Presentation skills (/5)

Criteria
Did the presenter speak with clarity (volume, speed, enunciation)?
Did the presenter speak in an engaging way (tone, passion)?
Did the presenter engage the audience (eye contact, body language)?
Did the presenter deliver in a relaxed, confident manner?
Did the speaker make good use of well-designed visual aids?

#### Aspect 2: Knowledge base (/5)

Criteria
Was proper background information on the topic given?
Was the material selected for presentation appropriate to the topic?
Was enough essential information given to allow the audience to effectively evaluate the work done in context?
Was the talk free of irrelevant or filler information?
Did the presenter demonstrate a clear understanding of the material presented?

#### Aspect 3: Critical thinking & planning (/5)

Criteria
Did the approach to the work so far demonstrate thought and planning?
Were the strengths and weaknesses of the work, and the methods used to gather evidence/data, clearly explained?
Did the presenter demonstrate they had completed progress on their topic?
Did the presenter have a solid plan in place for completing their project?
Has the presenter thought about possible delays/problems that may arise?
Did answers to questions show an understanding of the project and background?

## Interim Progress Report Marking Rubrics

### Criteria 1: Reviewing the work of others (/30)

Grade	Mark	Brief description	Explanation/Examples
High Distinction	27 – 30	Of review paper quality	In addition to meeting the quality at the previous band – “Solid, and linked” – the student has made a critical assessment of the literature in the context of their research project to a depth and breadth that is of the quality that could be anticipated to be seen in a journal review paper.
Distinction	23 – 26	Solid and linked	The most significant areas of literature relevant to the proposed work have been reviewed and the student has clearly identified one or more knowledge gaps. The student will have shown that they understand the conceptual relationships between reviewed works and between reviewed works and the student’s research project. i.e., the student makes intellectual connections between the different parts of the review and puts their work in context.
Credit	19 – 22	Solid	The most significant areas of literature relevant to the proposed work have been reviewed. There are no major “holes”. What is generally missing in this band, but present in higher quality work, is the student showing that they understand the conceptual relationships between the different reviewed works.
Pass	15 – 18	Adequate	The literature reviewed is sufficient to inform the proposed research, although it is likely that further review will be required as the work progresses. What distinguishes work at this level from work at the next level up is quantity: an adequate review of the literature sketches enough that the reader can see what the picture is about, but neglects significant aspects. ie, are there significant holes in this review?
Fail	0 – 14	Deficient	Deficient work may be characterised by a number of features, including inappropriate reliance on sources not peer reviewed (such as the internet), not reviewing what should be the core of the literature in a particular area, or not reviewing any recent work (within, for example, the last 5 years although this will depend somewhat on the field).

### Criteria 2: Articulating a research question, plan and thesis outline (/20)

Grade	Mark	Brief description	Explanation/Examples
High Distinction	19 – 20	Broad context present. Specific and robust logical plan. Plan fits the review narrative.	The plan is robust and has provision for project variations and contingencies. The plan fits within the narrative set out by the literature review – the student makes clear why the plan is developed this way in the context of the reviewed literature. Thesis outline includes sub-sections, logical flow with a clear connection to the project plan and literature review.
Distinction	16 – 18	Broad context present. Specific logical plan. Plan fits the review narrative.	The plan fits within the narrative set out by the literature review – the student makes clear why the plan is developed this way in the narrow context of the reviewed literature. The research plan demonstrates a logical and feasible course of action. Realistic milestones have been set. Thesis outline that demonstrates a logical vision for the thesis.

Grade	Mark	Brief description	Explanation/Examples
Credit	13 – 15	Broad context present. Specific logical plan.	Research question and plan are presented, and include some detail. There is enough of a plan to believe that the research project is feasible, and that student understands the resources and time required. The plan does not appear to be informed by the literature review – it sits largely separately to the literature review, it is not part of the narrative developed in the review. Thesis outline reflects the research plan, but lacks enough detail.
Pass	10 – 12	Broad context present. No specific plan.	Research question and plan are presented, but lack detail and a logical plan of investigation. There is enough of a plan to believe that the research project is feasible. Generic chapter headings may show no particular relevance to the research.
Fail	0 – 9	Broad context missing.	The research question is not explained, and no clear demonstration of student understanding. Research plan is not present, or does not have sufficient detail to demonstrate they can successfully complete a thesis project. No thesis outline is presented (i.e., thesis chapter headings). [INTERNAL: Statements equivalent to "The aim is to understand

### Criteria 3: Document presentation (/10)

Grade	Mark	Brief description	Explanation/Examples
High Distinction	10	Professional, concise and readable	Everything from above, plus text is clear and concise. Graphical presentation of data is appropriate, clear and economical.
Distinction	8 – 9	Professional, may have issues with data presentation	Everything from above, plus a logical flow of sections, and appropriate judgement in the placement data, tables or figures in the body of the work or the appendices. Figures and diagrams are correctly and clearly labelled, text spacing aids readability, consistent formatting, references in text match reference list (and vice versa), pictures are clear and attributed, sections clearly labelled. Some of the graphical presentation of data is inappropriate - poor choice of axes, overcrowding, poor use of chart space etc.
Credit	6 – 7	Poor judgement with respect to layout, possible padding	Appropriate use of section and sub-section heading structures. Figures and diagrams are labelled, formatting is consistent, references in text match reference list (and vice versa), pictures are clear and attributed, sections clearly labelled. There may be superfluous material present, such as unnecessary, repetitive or unusually large figures, unnecessarily lengthy text, unusually wide margins, unnecessary appendices, etc.
Pass	5	Poor formatting / document structure	Document is not at a professional level. Although figures and diagrams are labelled and references in text match reference list (and vice versa), formatting is unclear and inconsistent to the extent that the reader can lose track of the context when reading.
Fail	0 – 4	Impedes document reading	Presentation is poor to the extent that it impedes reading of the document. Examples include multiple inconsistent citation styles or incomplete citations, unintelligible grammar, figures or tables not labelled or badly inconsistent document formatting.

### Criteria 4: Project progress (/40)

Grade	Mark	Brief description	Explanation/Examples
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High Distinction	35 – 40	Excellent progress	Good sets of results being found, and clearly on track for completion of significant work during Thesis B.
Distinction	30 – 34	Good work conducted, real progress made	Real progress made with some results already being found. Preliminary work all completed and well into the research component of the project.
Credit	25 – 29	Start on project	Preliminary work completed and project looks at a stage where it can be completed in time. Initial work has been completed to allow the significant work to take place in Thesis B.
Pass	20 – 24	Minor work completed	Some work complete on research project, but does not look like one session worth of work. Some simple preliminary work conducted.
Fail	0 – 19	Insufficient progress	Very little actual work has been completed, perhaps laboratory inductions or some introductory demonstrations only.

### Consequences of you fail in Project A and B

If you Fail in Project A, you must re-enrol in Project A again in a future semester.

If you Fail in Project B, you have two options:

- re-enrol for Project A & B again with a new project and supervisor.
- re-enrol for Project B again with the same project (needs consent of an appropriate supervisor & student).

### Examinations

There is no examination for the course.

### Special consideration and supplementary assessment

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

## 7. Expected resources for students

No prescribed textbook.

Content on the Moodle page will be updated often with tips, discussions and resources, so you are strongly advised to make sure you are able to receive updates.

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

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

## 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 giving students the opportunity to present their work either via a team video or book a time with their supervisor to conduct a face-to-face presentation, to allow flexible for both the students and their supervisor.

## 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: [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)

Further information on School policy and procedures in the event of plagiarism is available on the [intranet](#).

## 10. Administrative matters and links

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

- [Attendance, Participation and Class Etiquette](#)
- [UNSW Email Address](#)
- [Computing Facilities](#)
- [Assessment Matters](#) (including guidelines for assignments, exams and special consideration)
- [Exams](#)
- [Approved Calculators](#)
- [Academic Honesty and Plagiarism](#)
- [Student Equity and Disabilities Unit](#)
- [Health and Safety](#)
- [Student Support Services](#)

# 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