



Mechanical and Manufacturing Engineering

# Course Outline

Term 1 2019

**MMAN9002**

**MASTER OF ENGINEERING SCIENCE  
PROJECT B**

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# 1. Staff contact details

## Contact details and consultation times for course convenor

Name: Dr Ron Chan  
Office Location: Room ME507, Ainsworth Building  
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](#)
- [Lab Access](#)
- [Computing Facilities](#)
- [Student Resources](#)
- [Course Outlines](#)
- [Engineering Student Support Services Centre](#)

# 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.

## Contact hours

There 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 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 B is to be taken in the last semester required for the completion of all requirements for the award of the degree. This course – together with MMAN9001 Master of Engineering Project A, which is to be taken in the previous 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 staff 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.	Develop a design or a process or investigate a hypothesis following industry and professional engineering standards.	PE2.1, 2.2, 2.3, 2.4
2.	Critically reflect on a specialist body of knowledge related to their project topic.	PE1.3
3.	Apply scientific and engineering methods to solve an engineering problem.	PE2.1
4.	Analyse data objectively using quantitative and mathematical methods.	PE1.2, 2.1, 2.2

## 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 updates on their project.

## 5. Course schedule

Workshop	Content
Workshop 1	<ul style="list-style-type: none"> <li>• <i>Writing an annotation table of content</i></li> </ul>
Workshop 2	<ul style="list-style-type: none"> <li>• <i>Writing an appealing introductory chapter</i></li> </ul>
Workshop 3	<ul style="list-style-type: none"> <li>• Compiling a high value-added project and documentation skill</li> </ul>
Workshop 4	<ul style="list-style-type: none"> <li>• Preparing a short, but concise presentation</li> </ul>

## 6. Assessment

### Assessment overview

Assessment	Group Project?	If Group, # Students per group	Length	Weight	Learning outcomes assessed	Assessment criteria	Due date and submission requirements	Deadline for absolute fail	Marks returned
Milestone Evaluation I	No	N/A	2-page, single-sided, min. font 11	10%	1, 2, 3 and 4	Progress and Presentation Skills	Week 3	1 week after the due date	2 weeks after submission
Milestone Evaluation II	No	N/A	2-page, single-sided, min. font 11	10%	1, 2, 3 and 4	Progress and Presentation Skills	Week 6	1 week after the due date	2 weeks after submission
Project Presentation	Yes	Supervisor-dependent	15-minute per team	10%	1, 2, 3 and 4	See marking rubrics	Week 10-13	1 week after the due date	Upon release of final results
Final Report	No	N/A	50-page, single-sided, min. font 11	70%	1, 2, 3 and 4	See marking rubrics	Week 13	1 week after the 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 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.

## **Project Presentation**

Between Monday Week 10 to Friday Week 13, each team must book a time with their supervisor to present their work.

## 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?

## Project Report Submission

**Project Report (INDIVIDUAL SUBMISSION) is due Friday week 13, 5pm. Only SOFTCOPY will be accepted via Moodle submission.**

The quality of the presented work is very important and great care must be taken with the typing and presentation of graphs and diagrams; drawings should be to standard engineering practice. Drawings submitted to the Workshop must be approved by the officer-in-charge of the relevant laboratory. The English should be clear and grammatically correct with a high standard of spelling and punctuation.

There is no strict minimum length for a project, nor is there a maximum length. We impose a HARD LIMIT of 50 pages (including title page, table of content, appendices, etc.). Appendices must be brief and should contain only material which is indispensable but at the same time cannot be included in the text.

### Confidential Projects

If your project contains confidential information, you must complete a Confidentiality Form to restrict it from viewing for two years – available from the Moodle Site – and submit this statement with your project. Confidential Projects should not be uploaded to the database but should be submitted in all other required formats. Discuss submission with the Project Coordinator.



### *Production and Submission Specifications*

All project students are required to submit copies of their project in the formats shown below. Students who do not submit as required will be denied graduation until the requirements have been met.

#### *One PDF copy through Moodle*

You MUST submit a PDF copy through the Project B Moodle page. Name this file 'z1234567\_Project', with '1234567' being your student ID number.

The submitted file should be less than 20mb. If you feel that your work would benefit from a larger, higher-res version, please submit this directly to your supervisor. The electronic version must have the copyright declaration included in it, as a scanned version of the signed original, though by your submission you will also agree that the work is all your own.

#### *Data*

Your project mark will not be released until you have organised to pass on your project data to your supervisor. This can be Dropbox, USB stick, hard drive – discuss with your supervisor. However, it is now a legal requirement of research conducted at UNSW that the original data be archived, and so you must collate all the work that went into your project (drawings, excel files, CAD files, CFD/FEA result files, etc. – everything that went into creating your project, but not early work or dead-ends that did not make the cut). Your supervisor will mark this task complete on Moodle.

#### *Specifications for Project*

Paper must be ISO size A4 (210 x 297mm). All text should be size 11 or 12 font Times New Roman or close equivalent serif font, apart from titles and figures. Margins must be not less than 30 mm at the left and right edge, 30 mm at the upper edge, and 20 mm at the lower edge.

The project must include a title sheet headed:

**UNSW SYDNEY**  
**SCHOOL OF MECHANICAL AND MANUFACTURING ENGINEERING**  
**Title of Project**  
**Name of Author**  
**Student ID**  
**Masters of Engineering (or other degree for which the project is submitted)**  
**Date of submission (Month and Year)**  
**Supervisor's name**

All sheets must be numbered. The main body of the project must be numbered consecutively from beginning to end in Arabic numerals (i.e. 1, 2, 3, etc.). The preliminary pages (Abstract, List of Contents, List of Figures, List of Symbols) should be numbered using lower-case Roman numerals (i.e. i, ii, iii, etc.), commencing with the title page (but not

shown on the title page). Pages in appendices may be numbered consecutively from the main text or may have their own numbering system.

Graphs, diagrams and photographs should be inserted as close as possible to their first reference in the text. Graphs and tables which are printed in landscape format should be readable from the right-hand side.

Supplementary data (e.g. CFD animations) can also be uploaded within the size limit and can be referenced within the text. These are considered as extra material. The project must stand alone without them.

All quoted sources must be clearly referenced either at the end of the project with a key or on the page quoted using a single referencing system (e.g. <https://student.unsw.edu.au/apa>).

Please submit your PDF copy through the Moodle submission portal.

## Project B report marking rubrics

### Criteria 1: Lit review/background and putting the results in context (20%)

Grade	Mark	Brief description	Explanation/Examples
Fail	0 – 9	Aims not clear	The student hasn't done a good job explaining the research aims to the reader - I'm not really sure what this is about.
Pass	10 – 12	Reason for research not clear	I understand the project aims but the student has not made it clear to the reader how it is connected to the background - why is this aim being pursued? What is the hypo-project being tested? What is the broader significance?
Credit	13 – 15	Background clear - results not contextualised	The student makes the project background clear to the reader, and the significance of the research aim within a broader context. The student has not been able to take a step back and make an assessment of the significance of their results.
Distinction	16 – 18	Background and aims are clear, context is incomplete	The student makes the project background clear to the reader, and the significance of the research aim within a broader context. The literature review is comprehensive but may be lacking depth of insight. The student has made a reasonable attempt to assess the significance of their results, but it is either not realistic nor does not follow logically from the arguments presented.
High Distinction	19 – 20	Background to research and significance of conclusions reached are clear	The student makes the project background clear to the reader, and the significance of the research aim within a broader context. The student also makes a realistic assessment of the significance of their results in this context. The literature review is comprehensive and insightful.

### Criteria 2: Execution of the research project, quality of analysis, discussion of results (50%)

Grade	Mark	Brief description	Explanation/Examples
Fail	0 – 24	Clearly deficient	Work at this level is clearly deficient - in not addressing the stated project aims or in containing major problems that the student should reasonably have been aware of but did not address in the project.

Grade	Mark	Brief description	Explanation/Examples
Pass	25 – 30	"Thin" results, lacking intellectual engagement	The student has completed a body of work and presented some results but not succeeded in interpreting meaning from them (=intellectual input is largely absent from the discussion, which is essentially equivalent to observation of the results). Performance at this level may also indicate a lack of engagement with the project, sometimes evidenced as a "thin" or "one-dimensional" investigation characterised by attempted padding.
Credit	31 – 37	Several components to the research work, not coherently linked.	The student probably has a number of components to their research, such as literature, experiments, designs, simulations etc. They have interpreted meaning from the results but have overall not succeeded in linking the components of their research together as a coherent scientific story. There's no clear "big picture".
Distinction	38 – 44	Solid, coherent work, linking all the research components together into a consistent story.	At this level the student has assembled the pieces of their research project (which could include literature, different sets of experiments or measurements, simulations or analyses) into a coherent scientific story. Overall, you are left with a clear and convincing picture of what the research question was and what the answer is (along with its caveats). A student is generally not going to be able to achieve this if there are conceptual or methodological problems with their work, or if their review of literature is inadequate.
High Distinction	45 – 50	Solid, coherent and consistent story PLUS something unexpected.	Student would have to have achieved as at the previous level but additionally has achieved something unexpected, thoughtful and original, such as a novel perspective or theory. This requires deep thinking of the student.

### Criteria 3: Conclusion, and value added (20%)

Grade	Mark	Brief description	Explanation/Examples
Fail	0 – 9	No value	There are obvious and substantial problems with what was presented – the work as it stands has no value because it doesn't "hold water".
Pass	10 – 12	No interesting results	The presented work is not at all challenging and yields entirely expected results – the student does not appear to appreciate this. The work doesn't really add any significant value.
Credit	13 – 15	Minimal value	The presented work adds some value in some way – improvement of "local knowledge" such as techniques, additional data points in a larger design or hypothesis etc. The student worked well but did not push themselves harder to make any real new discoveries or interpretations, therefore the conclusions are limited, and discussions of future work are predictable extensions of the work completed.
Distinction	16 – 18	Will have wider impact when further work is done.	You are fairly sure that the results and discussion can eventually form the core of a research publication or change in industry practice (It may have already been included in a conference publication during the course of the project). However, further work will first be required – such as repeated experiments – before the work is truly sufficient. The student has included good, thoughtful discussion of limitations and provided insight into future work on this project or new avenues of research which could be followed.
High Distinction	19 – 20	Will have wider impact now..	This is valuable work. This work can easily form the basis of a peer-reviewed journal publication, or other form of professional dissemination/presentation appropriate to the field (i.e. patent application, best practice document at a company, trade publication, workshop, etc.).

#### Criteria 4: Document presentation (10%)

Grade	Mark	Brief description	Explanation/Examples
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.
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. The structure of the document is poor or illogical, with little discernible flow.
Credit	6 – 7	Poor judgement with respect to layout, possible padding	Document is not at a professional level. 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. Poor judgement has been exercised in placing data, tables or figures in the body of the work, and/or excessive figures/tables – some of which would have been better placed in an appendix or discarded. An attempt might have been made to "pad" the work or increase the page count using unnecessary, repetitive, or large figures, unnecessarily lengthy text, wide margins, etc. The language is not sophisticated or sufficient for describing the technical aspects clearly and rigorously, and there are disjointed aspects to the structure.
Distinction	8 – 9	Professional, may have issues with data presentation	Document is at a professional level. 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, and good use made of appendices. Some of the graphical presentation of data is inappropriate - poor choice of axes, overcrowding, poor use of chart space etc. Padding is not a feature of work at this level. The structure is well thought out and logical, and there is a good command of descriptive and technical language – descriptions and explanations have depth but clarity and are concisely worded.
High Distinction	10	Professional, concise and readable	Document is at a professional level. 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

#### Special consideration and supplementary assessment

If you have experienced an illness or misadventure beyond your control that has interfered with your assessment performance, you are eligible to 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

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 more demonstrator support to the student major group project.

## 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 School guidelines and policies, available on the intranet. In particular, students should be familiar with the following:

- [Attendance](#)
- [UNSW Email Address](#)
- [Computing Facilities](#)
- [Special Consideration](#)
- [Exams](#)
- [Approved Calculators](#)
- [Academic Honesty and Plagiarism](#)
- [Student Equity and Disabilities Unit](#)
- [Health and Safety](#)
- [Lab Access](#)
- [Makerspace](#)
- [UNSW Timetable](#)
- [UNSW Handbook](#)
- [UNSW Mechanical and Manufacturing Engineering](#)

# 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