

## MECH1110: Introduction to Mechanical Engineering Design

Singapore PSB

Trimester 1 - 2024 (Singapore)



THE UNIVERSITY OF  
NEWCASTLE  
AUSTRALIA

## OVERVIEW

<b>Course Description</b>	Students develop skills in interpreting and visualising 3D objects in 2D format. They create and assemble solid model representation of machine components and create 2D engineering drawings from solid models. Students develop advanced technical sketching skills to aid communication in engineering design.
<b>Academic Progress Requirements</b>	Nil
<b>Requisites</b>	Students who have successfully completed FNEG1110 cannot enrol in this course.
<b>Contact Hours</b>	<b>Singapore PSB</b>  <b>Computer Lab</b> Face to Face On Campus 2 hour(s) per week(s) for 13 week(s) starting Week 1  <b>Lecture</b> Face to Face On Campus 2 hour(s) per week(s) for 13 week(s) starting Week 1 2 hours x live and online (zoom) recap and Q&A per week.
<b>Unit Weighting</b>	10
<b>Workload</b>	Students are required to spend on average 120-140 hours of effort (contact and non-contact) including assessments per 10 unit course.

# COURSE OUTLINE

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# CONTACTS

**Course Coordinator**      **Singapore PSB**  
Dr Michael Carr  
Michael.J.Carr@newcastle.edu.au  
+61 2 4033 9354  
Consultation: By Email

**Teaching Staff**              Other teaching staff will be advised on the course Canvas site.

**School Office**                **School of Engineering (Callaghan)**  
SENG-ADMIN@newcastle.edu.au  
+61 2 4921 5798

# SYLLABUS

**Course Content**

- Basic spatial skill through the use of a solid modelling system.
- Interpreting and visualizing 3D objects in 2D format are developed.
- Solid model representation of machine components.
- Creating 2D engineering drawings from solid models.
- Advanced technical sketching skills to aid communication in engineering design.

**Course Learning Outcomes**      **On successful completion of this course, students will be able to:**

1. Communicate through technical sketching
2. Interchange engineering graphical information from 2D to 3D and back
3. Demonstrate a foundational skill set with 3D solids modelling

**Course Materials**              **Other Resources:**

- The SOLIDWORKS software will be provided in the lab for students to use during the trimester.

**Recommended Text:**

- AW Boundy, "Engineering Drawing", 8<sup>th</sup> edition with workbook  
6th and 7th editions without workbook are adequate though the practice examples in the workbook are useful, and exercise numbers are likely to differ from class notes.

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# ASSESSMENTS

This course has 3 assessments. Each assessment is described in more detail in the sections below.

	Assessment Name	Due Date	Involvement	Weighting	Learning Outcomes
1	Weekly Technical Sketching Portfolio	To be confirmed on Canvas.	Individual	30%	1, 2
2	Weekly Computer Aided Solids Modelling Portfolio	To be confirmed on Canvas.	Individual	30%	2, 3
3	Exam	During the formal examination period.	Individual	40%	1, 2, 3

## Late Submissions

The mark for an assessment item submitted after the designated time on the due date, without an approved extension of time, will be reduced by 10% of the possible maximum mark for that assessment item for each day or part day that the assessment item is late. Note: this applies equally to week and weekend days.

## Assessment 1 - Weekly Technical Sketching Portfolio

<b>Assessment Type</b>	Written Assignment
<b>Description</b>	This portfolio requires students to measure and create technical sketches of items which are outlined in the sketching portfolio handout.
<b>Weighting</b>	30%
<b>Due Date</b>	To be confirmed on Canvas.
<b>Submission Method</b>	Online Digital files submitted to Canvas.
<b>Assessment Criteria</b>	Clarity of drawings.
<b>Return Method</b>	In Class
<b>Feedback Provided</b>	In Class

## Assessment 2 - Weekly Computer Aided Solids Modelling Portfolio

<b>Assessment Type</b>	Written Assignment
<b>Description</b>	This portfolio leverages off the sketching portfolio and involves students translating hand sketches into a solids model. More advanced modelling techniques are introduced and a quality set of drawings are to be submitted.
<b>Weighting</b>	30%
<b>Due Date</b>	To be confirmed on Canvas.
<b>Submission Method</b>	Online Digital files submitted to Canvas.
<b>Assessment Criteria</b>	Visual accuracy of model, compliance with AS1100, quality of presentation
<b>Return Method</b>	In Class
<b>Feedback Provided</b>	In Class

## Assessment 3 – Exam

<b>Assessment Type</b>	Formal Examination
<b>Purpose</b>	Synthesise the information provided in the lectures and tutorials.
<b>Description</b>	Graphical communication is a key skill for all engineers, the exam tests students' knowledge and skills in the essential communication form.
<b>Weighting</b>	40%
<b>Due Date</b>	During the formal examination period.
<b>Submission Method</b>	Formal Exam
<b>Assessment Criteria</b>	Geometric accuracy of the model, appropriateness of the assembly and drawing as appropriate. Capacity to communicate using graphical methods and in general compliance with AS1100.
<b>Return Method</b>	Not Returned
<b>Feedback Provided</b>	No Feedback

# ADDITIONAL INFORMATION

## Grading Scheme

This course is graded as follows:

Range of Marks	Grade	Description
85-100	High Distinction (HD)	Outstanding standard indicating comprehensive knowledge and understanding of the relevant materials; demonstration of an outstanding level of academic achievement; mastery of skills*; and achievement of all assessment objectives.
75-84	Distinction (D)	Excellent standard indicating a very high level of knowledge and understanding of the relevant materials; demonstration of a very high level of academic ability; sound development of skills*; and achievement of all assessment objectives.
65-74	Credit (C)	Good standard indicating a high level of knowledge and understanding of the relevant materials; demonstration of a high level of academic achievement; reasonable development of skills*; and achievement of all learning outcomes.
50-64	Pass (P)	Satisfactory standard indicating an adequate knowledge and understanding of the relevant materials; demonstration of an adequate level of academic achievement; satisfactory development of skills*; and achievement of all learning outcomes.
0-49	Fail (FF)	Failure to satisfactorily achieve learning outcomes. If all compulsory course components are not completed the mark will be zero. A fail grade may also be awarded following disciplinary action.

\*Skills are those identified for the purposes of assessment task(s).

## Communication Methods

Communication methods used in this course include:

- Canvas Course Site: Students will receive communications via the posting of content or announcements on the Canvas course site.
- Email: Students will receive communications via their student email account.

## Course Evaluation

Each year feedback is sought from students and other stakeholders about the courses offered in the University for the purposes of identifying areas of excellence and potential improvement.

## Oral Interviews (Vivas)

As part of the evaluation process of any assessment item in this course an oral examination (viva) may be conducted. The purpose of the oral examination is to verify the authorship of the material submitted in response to the assessment task. The oral examination will be conducted in accordance with the principles set out in the [Oral Examination \(viva\) Procedure](#). In cases where the oral examination reveals the assessment item may not be the student's own work the case will be dealt with under the [Student Conduct Rule](#).

## Academic Misconduct

All students are required to meet the academic integrity standards of the University. These standards reinforce the importance of integrity and honesty in an academic environment. Academic Integrity policies apply to all students of the University in all modes of study and in all locations. For the Student Academic Integrity Policy, refer to <https://policies.newcastle.edu.au/document/view-current.php?id=35>.

## Adverse Circumstances

The University acknowledges the right of students to seek consideration for the impact of allowable adverse circumstances that may affect their performance in assessment item(s). Applications for special consideration due to adverse circumstances will be made using the online Adverse Circumstances system where:

1. the assessment item is a major assessment item; or
2. the assessment item is a minor assessment item and the Course Co-ordinator has specified in the Course Outline that students may apply the online Adverse Circumstances system;
3. you are requesting a change of placement; or

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4. the course has a compulsory attendance requirement.  
Before applying you must refer to the Adverse Circumstance Affecting Assessment Items Procedure available at:  
<https://policies.newcastle.edu.au/document/view-current.php?id=236>

**Important Policy Information**

The Help button in the Canvas Navigation menu contains helpful information for using the Learning Management System. Students should familiarise themselves with the policies and procedures at  
<https://www.newcastle.edu.au/current-students/respect-at-uni/policies-and-procedures> that support a safe and respectful environment at the University.

*This course outline was approved by the Head of School on 30th November 2023. No alteration of this course outline is permitted approval. If a change is approved, students will be notified and an amended course outline will be provided in the same manner as the original.*

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## Graduate Profile Statements

This course builds students' capacity in the following University of Newcastle Bachelor of Engineering Graduate Profile Statements (based on 2011 Engineers Australia revised Stage 1 Competency Standards for Professional Engineers):

UON Att.	University of Newcastle Bachelor of Engineering Graduate Profile Statements/ Engineers Australia Stage 1 competency statements	Taught	Practised	Assessed	Skill Level (1-4)
	<b>Professional Attributes</b>				
11	3.1. Ethical conduct and professional accountability	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1
12	3.2. Effective oral and written communication in professional and lay domains.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1
13	3.3. Creative, innovative and pro-active demeanour.				
14	3.4. Professional use and management of information.				
15	3.5. Orderly management of self, and professional conduct.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1
16	3.6. Effective team membership and team leadership.				
	<b>Engineering Ability</b>				
7	2.1. Application of established engineering methods to complex engineering problem solving.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1
8	2.2. Fluent application of engineering techniques, tools and resources.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1
9	2.3. Application of systematic engineering synthesis and design processes.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1
10	2.4. Application of systematic approaches to the conduct and management of engineering projects.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1
	<b>Knowledge Base</b>				
1	1.1. Comprehensive, theory based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the engineering discipline.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1
2	1.2. Conceptual understanding of the mathematics, numerical analysis, statistics, and computer and information sciences which underpin the engineering discipline.				
3	1.3. In-depth understanding of specialist bodies of knowledge within the engineering discipline.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1
4	1.4. Discernment of knowledge development and research directions within the engineering discipline.				
5	1.5. Knowledge of contextual factors impacting the engineering discipline.				
6	1.6. Understanding of the scope, principles, norms, accountabilities and bounds of contemporary engineering practice in the specific discipline.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1