

Mechanical and Manufacturing Engineering

# Course Outline

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# 1. Staff contact details

Contact details and consultation times for course convenor

The lecturer and demonstrators will be available to answer questions regarding the course during normal office hours and by e-mail (preferred).

Name: Associate Professor Shawn Kook

Office location:

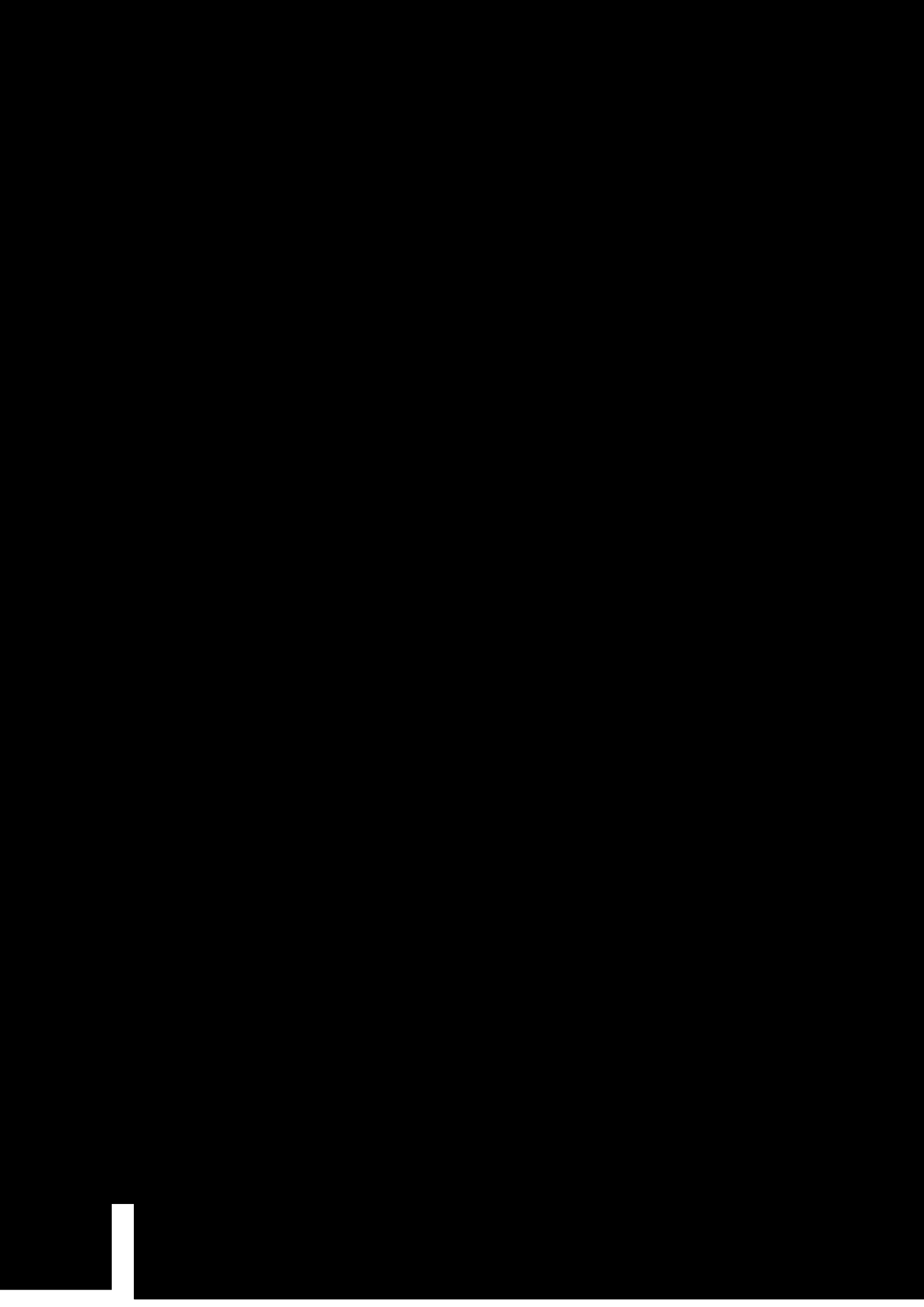
## Contact hours

	Week	Day	Time	Location
Lectures	1-5, 8, 9, 11, 12	Monday	2pm – 4pm	Tyree Energy Technology (H6) Room G16
Demonstrations	2-5, 8, 9, 11-13	Monday	4pm – 5pm	Postgraduate: Webster Building (G14) Room 256 or Quadrangle G044  Undergraduate: Civil Engineering (H20) Room G8 or Quadrangle G054
Laboratories	6, 7	Monday	2pm – 5pm	Willis Annexe (J18) Room 116C Undergraduate Teaching Lab

Please refer to your class timetable for the learning activities you are enrolled in and attend only those classes.

## Summary and Aims of the course

This course introduces the fundamentals of how the design and operation of automobile engines affect the performance and emissions. The fluid flow, thermodynamics, combustion, and fuel properties are studied with reference to engine power, efficiency, and pollutants formation. Students examine the design features and operating characteristics of different types of automobile engines including petrol engines and diesel engines, as well as the next-generation combustion engines including homogeneous-charge compression-ignition (HCCI) and gasoline compression ignition (GCI) engines. The key features of alternative fuels (including biofuels), hybrid, fuel cell, and electricity powered engines are also discussed. The course includes a lab for the performance test experiments of petrol and diesel engines.





## 6. Assessment

Assessment overview

Assessment	Length	Weight
		3.193 0 Td

## Assignments

### Presentation

All submission should be uploaded to Moodle in a pdf format.

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

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It is your responsibility to ensure that your calculator is of an approved make and model, and to obtain an “Approved” sticker for it from the School Office or the Engineering Student Centre prior to the examination. Calculators not bearing an “Approved” sticker will not be allowed into the examination room.

Special consideration and supplementary assessment

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

## 7. Attendance

You are required to attend a minimum of 80% of all classes, including lectures, labs and seminars. It is possible to fail the course if your total absences equal to more than 20% of the required attendance. Please see the [School intranet](#) and the [UNSW attendance page](#) for more information.

## 8. Expected resources for students

Lecture notes will be uploaded to Moodle prior to the lecture.

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

Text book reading is suggested for improved understanding; however, all the assessments are based on the materials provided by the lecturer and demonstrators. Please refer to the course schedule for the suggested reading from the text books. The selected text books are:

Internal Combustion Engine Fundamentals, J. B. Heywood, McGraw-Hill, 1988

An Introduction to Combustion, S. R. Turns, Mc-Graw-Hill, 2000

Copies of these text books are available in the UNSW bookshop and library:

<https://www.library.unsw.edu.au/>

Additional readings for the up-to-date engine technologies and combustion science can be found in the variety of journals. Students can get free access to the full contents of the articles from the following websites (need access through the UNSW IP address):

SAE (Society of Automotive Engineers) Digital Library

<http://digitallibrary.sae.org/quicksearch/>

Progress in Energy and Combustion Science

Fuel (the journal)

<http://www.sciencedirect.com/science/journal/00162361>

Energy and Fuels

<http://pubs.acs.org/journal/enfuem>

Combustion and Flame

<http://www.sciencedirect.com/science/journal/00102180>

Proceedings of the Combustion Institute

<http://www.sciencedirect.com/science/journal/15407489>

## 9. 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 much clearer marking criteria on the assignments and much more attractive lecture times (previously it was on Fri afternoon).

## 10. 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

# Appendix A: Engineers Australia (EA) Competencies

## Stage 1 Competencies for Professional Engineers

	Program Intended Learning Outcomes
PE1: Knowledge and Skill Base	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
PE2: Engineering Application Ability	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