



UNSW
AUSTRALIA

Course outline

Semester 1 2017

Never Stand Still

Engineering & Technology Mechanical and Manufacturing Engineering

MECH9761

AUTOMOBILE ENGINE TECHNOLOGY

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1. Staff contact details

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

Position	Name	Email	Office
Lecturer	A/Prof Shawn Kook	s.kook@unsw.edu.au	Room 402E, Ainsworth Building (J17)
Demonstrator (Head)	Lingzhe Rao	lingzhe.rao@unsw.edu.au	Room 402, Ainsworth Building (J17)
Demonstrator	Harsh Goyal	harsh.goyal@unsw.edu.au	
Demonstrator	Hu Chien Su	chien.su@unsw.edu.au	

2. Course details

Credit points

This is a 6 unit-of-credit (UoC) course, and involves 3 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.”

Summary 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

3. Teaching strategies

For the lectures, students are highly encouraged to study the given topics before they attend the class. The suggested readings and the lecture notes uploaded to the Moodle page prior to the class are minimum requirements. Students should keep an eye on the lat

4. Course schedule

Week	Lecture (2-4pm)	Suggested Readings	Demonstration (4-5pm)
1	Automobile Industry Why still combustion engines?		
2	Engine classification Thermodynamic Cycle Analysis	Heywood book pp. 7-12, 161-173 Otto & Diesel cycle section of the Thermodynamics text book	- Thermodynamic cycle review. - Guideline for "websearch" assignment.
3	Engine Performance Parameters	Heywood book pp. 42-54, 383-388, 508-511	- Websearch assignment submission due. - Demonstration questions
4	Spark Ignition (SI) Engine	Heywood book pp. 294-296, 301-304, 314-316, 326-336, 371-375, 390-404, 413-418, 437-443, 450-457	- Demonstration questions.
5	Compression Ignition (CI) Engine	Heywood book pp. 491-493, 517-532, 536-549, 555-561	- Marked websearch assignment returned. - Lab preparation. - Demonstration questions.
6	Lab for group 1~3, 20 in each group		
			Mid-session test for groups 4-6
7	Public Holiday on Fri 14 Apr (no lecture, no demo, no lab, no exam)		
8	Lab for group 4~6, 20 in each group		
			Mid-session test for groups 1-3
9	Pollutants and After-treatment	Heywood book Chapter 11 An Introduction to Combustion: Chapter 15	- Lab review and guideline for the lab report
10	Combustion and Thermochemistry	Heywood book Chapter 3 An Introduction to Combustion: Chapter 2	- Lab report submission - Demonstration questions
11	Fuels and Alternative Fuels Engine	Heywood book pp. 64-68, 470-478, 541-542, 550-552	- Marked mid-session test papers returned - Demo questions
12	Hybrid/Fuel Cell Engines		- Demo questions
13	Future of Mobility		- Marked lab report returned - Demo questions

Lecture schedule

There are 10 x 2-hour lectures as shown above.

Demonstration (tutorial) schedule

You have enrolled into one of the two tutorial sessions running concurrently: one in room

5. Assessment

Assessment Overview

Assessment	Length	Weight	Learning outcome s assessed	Assessment criteria	Due date and submission requirements	Deadline for absolute fail	Marks returned
Websearch	200 words	10%	1, 4	Data search and compilation, Writing skill	Printed one-pager due by week 3 demo	One week from the due date	Week 5 demo
Mid-session test	1 hour	20%	1, 2, 3, 4	Course content from week 1-5 inclusive.	Week 6 or 8 when you do not attend the lab	N/A	Week 11 demo
Lab assignment	Four tasks	Lab attendance 5%, Report 15%	1, 4	Lecture materials from weeks 3-5	Printed results and hand written calculation by week 10 demo	One week from the due date	Week 13 demo
Final exam	2 hours	50%	1, 2, 3, 4	All course content from weeks 1-12 inclusive.	Exam period, date TBC	N/A	Upon release of final results

*All the assessment tasks are found in the Moodle page.

Assignments

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Late submissions will

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](#).

6. Expected resources for students


Lecture notes will be uploaded to the UNSW Moodle prior to the lecture. 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 2(es)-fo230.5(t)-6.6(oreu pr)-6(i-1.

7. 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 demo questions and more hands-on labs.

8. 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. 

UNSW is a leading research university with a strong commitment to academic integrity.

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

9. Administrative matters

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:

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

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Appendix A: Engineers Australia (EA) Competencies



	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 engineering synthesis and design processes
	PE2.4 Application of systematic approaches to the conduct and management of engineering projects
PE3: Professional and Personal Attributes	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