MMAN2700

THERMODYNAMICS

Contents

1. Staff contact d

Contact details and consultation times for course convenor
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There will be time for content and course related questions at the end of each Monday lecture. If questions continue beyond when the lecture theatre is available, discussions can continue in J17/208A.

All non-private content or course related queries should be directed to Moodle forums first ± a problem you are having is unlikely to be unique in a large class and posing a question in the forum lets everyone see the solution.

Private queries may be emailed or dealt with face to face. Face to face consultation can be arranged by email.

Contact details and consultation times for additional lecturers/demonstrators/

2. Course details

Credit Points

ÆWeb Stream:
Web Streaming will be used to provide a live presentation of lecture content online. This presentation will incorporate D µ F K D W ¶ L Q W H U I D F H I R U S D. The Live Web Stream is intended to be used by students enrolled in W K H µ : H E ¶ O H F W X U H R S W L R the Web Stream will be provided on Moodle more than 24 hours before the lecture.

Links to downloadable recordings of each lecture will be posted on Moodle within 24 hours of the conclusion of the lecture.

¥: Laboratory Attendance:
There are 4 compulsory 2-hour laboratories. See Appendix B: Laboratory Timetable for attendance requirements.

Summary of the course

This course introduces the student to the terminology, principles and methods used in engineering thermodynamics. Thermodynamics is a subject which deals with the transfer of energy essential for life. Thermodynamics has long been an essential part of engineering curricula all over the world. It has a broad application area ranging from microscopic organisms to common household appliances, transportation vehicles, power generation systems and even philosophy. The knowledge of thermodynamics gained in this course is essential to many other courses studied in the mechanical engineering degree programme, such as advanced thermofluids, aerospace propulsion, internal combustion engines, refrigeration and air conditioning and solar energy.

Aims of the course

Most engineering jobs in a thermodynamic field will require greater knowledge than can be presented in a single session; however an introduction to thermodynamics will be valuable to all engineers.

This course aims to prepare students for future studies in thermodynamics through the introduction of some common uses of thermodynamics and the analysis of them. 595.3(on) 0 0 1 132.02 294.

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	Recognise that heat and work are methods by which energy is transferred.	PE1.1
2	Use the first law of thermodynamics to solve steady-state and transient problems on closed and open systems.	PE1.1, PE1.2, PE1.3
3	Demonstrate knowledge of the second law of thermodynamics by solving steady-state problems on closed and open systems.	PE1.1, PE1.2, PE1.3
4	Apply the first and second laws to analyse the behaviour of internal combustion engines (air ±standard cycles), Rankine power cycles (basic, regeneration, reheat) and Vapour compression refrigeration cycles.	PE2.1, PE2.2
5	Identify links between theoretical analysis methods learned in class and actual performance of thermodynamics machines and devices	PE1.3, PE2.2

4. Course schedule

All lectures in this course are given by the course convenor.

Week	Section	Topic	Location	Content	Suggested Readings
1	Introductory Concepts	Basic Concepts and Definitions	F8-G04 & J17-G03	Systems, property, state, path, process, cycle Units, Specific volume, density and pressure Temperature and the zeroth law The equation of state for an ideal gas P-v-T surfaces for an ideal gas Definition of work	Chapter 1
2		Work and Heat	F8-G04 & J17-G03		

5. Assessment

Assessment overview

Assessment	Length	Weight	Learning outcomes assessed	Assessment criteria	Due date and submission requirements	Deadline for absolute fail	Marks returned

Concept Tests

Two non- F R P S X O V R U \ µ] H tests will be run this session: One at the beginning of the session in week 1 and one near the end of the session. These tests focus on conceptual knowledge rather than calculation. The results of these tests will be used to better understand the knowledge that the student cohort approaches the subject with and to identify strengths and weaknesses in teaching.

Attendance at these tests is not compulsory

Late submissions will be penalised 5 marks per calendar day (including weekends). An extension may only be granted in exceptional circumstances. Where an assessment task is worth less than 20% of the total course mark and you have a compelling reason for being unable to submit your work on time, you must seek approval for an extension from the course convenor before the due date . Special consideration for assessment tasks of 20% or greater must be processed through student.unsw.edu.au/special-consideration.

It is always worth submitting late assessment tasks when possible. Completion of the work, even late, may be taken into account in cases of special consideration.

:KHUH WKHUH LV QR VSHFLDO FRQVLGHUDWLRQ the table above indicates the time after which a submitted assignment will not be marked, and will achieve a score of zero for the purpose of determining overall grade in the course.

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 per the marking guidelines provided.

Examinations

You must be available for all tests and examinations. Final examinations for each course are held during the University examination periods, which are June for Semester 1.

Provisional Examination timetables are generally published on myUNSW in May for Semester 1.

For further information on exams, please see the Exams section on the intranet.

Calculators

You will need to provide your own calculator, of a make and model approved b

7. Course evaluation and development

Feedback on the course is gathered periodically using various means, including the UNSW myExperience SURFHVV LQIRUPDO GLVFXVVLRQ LQ WKH ILQDO FODV 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 restructuring the Consultation sessions into more interactive Problem Solving Sessions and greater use of Moodle.

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. Plagiarism at UNSW is defined as using the words or ideas of others and passing them

Administrative matters

All students are expected to read and be familiar with School guidelines and polices, 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)
- Academic Honesty and Plagiarism
- Student Equity and Disabilities Unit
- Health and Safety
- Student Support Services

Phil Howlin
February 2017

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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 engineering synthesis and design processes

Appendix B: Laboratory Timetable

		Week number and date at beginning of week								
GROUP	3 13/3	4 20/3	5 27/3	6 3/4	7 10/4	Break 17/4	8 24/4	9 1/5	10 8/5	11 15/5

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