



The University of Southern Queensland

Course Specification

Description: Thermodynamics

Subject	Cat-Nbr	Class	Term	Mode	Units	Campus
MEC	2101	10558	1, 2002	ONC	1.00	TWMBBA

Academic Group:	FOENS
Academic Org:	FOES02
HECS Band:	2
ASCED Code:	030799

STAFFING

Examiner: John Eastwell
Moderator: David Buttsworth

RATIONALE

The rationale for the thermofluids strand of the Bachelor of Engineering requires that students are provided with a thorough fundamental understanding of the nature, dynamics and thermodynamics of fluids. A number of practical applications are covered to provide familiarity and reinforce this fundamental understanding. Expertise in this strand is expected of mechanical engineers in practice. In addition a small number of applications are taken to full professional practice level to provide the necessary personal development and allow the student to establish a measure of self confidence. This course has an educational as well as a training purpose. In view of the applicability of thermofluids laws and principles to universal and biological processes this course should serve as a foundation for those taking the specific study further and provide a broader appreciation of the universe to those students who will subsequently specialise to a subset of thermofluids such as "water engineering" or "hydraulics". It also provides a general appreciation of thermofluids to those students who will do no further courses which are directly dependent on this one. Courses in this strand are major studies for students doing the mechanical engineering major and elective to others.

SYNOPSIS

Thermodynamics is that branch of physics which seeks to derive relationships between properties of matter, especially those which are affected by temperature, and a description of the conversion of energy from one form to another. Mechanical engineering systems are primarily about energy exchanges. All mechanical engineers must therefore be well grounded in those relationships which describe those exchanges. They must also be skilled in analysing machinery and systems for the energy exchanges occurring. Thermodynamics is therefore an essential and most important part of any mechanical engineering course of study.

OBJECTIVES

On completion of this course, the student should have sufficient broad knowledge in thermodynamics to :

- state the thermodynamics processes, cycles or principles involved in a given situation;
- identify the laws or principles applicable to thermodynamics hardware;
- define the nature of a thermodynamic problem and select appropriate techniques for its solution;
- execute the analysis and complete the necessary calculations;
- evaluate the results as meaningful engineering solutions to the problem;
- identify the broad thermodynamic principles involved in engines, pumps, refrigeration, air conditioning and power stations, etc.

TOPICS

Description	Weighting (%)
1. Thermodynamics at work	5.00
2. Thermodynamic properties and units	5.00
3. Thermodynamic laws and relationships	20.00
4. Thermodynamic cycles	10.00
5. Thermodynamic machinery - engines	10.00
6. Thermodynamic machinery - compressors	10.00
7. Thermodynamic machinery - refrigerators	10.00
8. Thermodynamic machinery - steam plant	10.00
9. Thermodynamic machinery - fuels and combustion	10.00
10. Thermodynamic machinery - steam turbines	10.00

TEXT and MATERIALS required to be PURCHASED or ACCESSED:

Books can be ordered by fax or telephone. For costs and further details use the 'Book Search' facility at <http://bookshop.usq.edu.au> by entering the author or title of the text.

MEC2101 Thermodynamics, Study Book 1 and Book of Readings, USQ Publication.

Mayhew & Rogers *Thermodynamic and Transport Properties of Fluids*, 5th Edition, Oxford, Basil, Blackwell.

REFERENCE MATERIALS

Reference materials are materials that, if accessed by students, may improve their knowledge and understanding of the material in the course and enrich their learning experience.

Gordon J Van Wylen and Richard E Sonntag *Fundamentals of Classical Thermodynamics*, 5th Edition, J Wiley and Sons, 1998.

Joel R *Basic Engineering Thermodynamics*, 4th Edition, Longman.

Kinsky R *Applied Heat*, 1st Edition, McGraw-Hill.

Rogers and Mayhew *Engineering Thermodynamics*, 4th Edition, Longman, 1992.

STUDENT WORKLOAD REQUIREMENTS

ACTIVITY	HOURS
Assessment	15
Examinations	3
Lectures	13
Private Study	98
Tutorial	26

ASSESSMENT DETAILS

Description	Marks Out of	Wtg(%)	Required	Due Date
ASSIGNMENT 1	50.00	5.00	Y	04 Mar 2002 (see note 1)
ASSIGNMENT 2	200.00	20.00	Y	04 Mar 2002 (see note 2)
ASSIGNMENT 3	250.00	25.00	Y	04 Mar 2002 (see note 3)
3 HOUR RESTRICTED EXAMINATION	500.00	50.00	Y	END S1 (see note 4)

NOTES:

1. Further details about the due dates are detailed in the assessment section of the Course Specifications.
2. Further details about the due dates are detailed in the assessment section of the Course Specifications.
3. Further details about the due dates are detailed in the assessment section of the Course Specifications.
4. Further details about the due dates are detailed in the assessment section of the Course Specifications.

OTHER REQUIREMENTS

- 1 To satisfactorily complete each of the assignments students must obtain at least half of the marks available for each assignment.
- 2 To satisfactorily complete the examinations in the course, students must obtain at least half of the marks available for each examination.
- 3 To receive a passing grade in the course a student must normally receive 50% in the examination and at least 50% of the marks available in the course. When this condition is met, students will be awarded final grades as follows: total marks gained 900 or greater will normally be graded HD; total marks gained 800 - 899 will normally be graded A; total marks gained 650 - 799 will normally be graded B; total marks gained 500 - 649 will normally be graded C.
- 4 The due date for an assignment is the date by which a student must submit the assignment to the USQ. The onus is on the student to provide proof of the submit date, if requested by the Examiner
- 5 Students are to retain a verbatim copy of all assignment work submitted, for submission in the event that the original is lost or damaged.
- 6 In accordance with University's Assignment Extension Policy (Regulation 5.6.1), the examiner of a course may grant an extension of the due date of an assignment in extenuating circumstances
- 7 If students submit assignments after the due date without prior approval then a penalty of up to 20% of the assignment total marks will apply for each working day late.
- 8 In the event that a due date for an assignment falls on a local public holiday in their area, such as a Show holiday, the due date for the assignment will be the next day. Students are to note on the assignment cover the date of the public holiday for the Examiner's convenience.
- 9 The Faculty of Engineering and Surveying will NOT accept submission of hand written or typed assignments by facsimile, e- mail or computer diskette. Students in remote locations who do not have regular access to postal services may be given special consideration.
- 10 The final examination is restricted. Students should take to the examination: (a) the prescribed text by Mayhew & Rogers (Steam Tables); (b) one A4 sheet of paper with any formula the student chooses to list. Both sides of the sheet may be used.
- 11 A minimum standard of communication skills must be demonstrated in order for a passing grade to be achieved.
- 12 The Faculty of Engineering and Surveying does not offer supplementary examinations.
- 13 Students who have undertaken all of the required assessments in a course but who have failed to meet some of the specified objectives of a course within the normally prescribed time may be awarded the temporary grade: IM (Incomplete - Make up). An IM grade will only be awarded when, in the opinion of the examiner, a student will be able to achieve the remaining objectives of the course after a period of non directed personal study.
- 14 Students who, for medical, family/personal, or employment-related reasons, are unable to complete an assignment or to sit for an examination at the scheduled time may apply to defer an assessment in a course. Such a request must be accompanied

by appropriate supporting documentation. One of the following temporary grades may be awarded IDS (Incomplete - Deferred Examination; IDM (Incomplete Deferred Make-up; IDSM (Incomplete Deferred Examination and Make-up).
