



The University of Southern Queensland

Course Specification

Description: Thermodynamics

Subject	Cat-Nbr	Class	Term	Mode	Units	Campus
MEC	2101	20558	1, 2003	EXT	1.00	TWMBBA

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

STAFFING

Examiner: David Buttsworth

Moderator: Ruth Mossad

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, students should be able to:

- analyse thermodynamics processes, cycles or principles involved in a given situation;
- apply thermodynamic laws and principles to particular thermodynamics hardware;
- for a given thermodynamic problem: (a) examine its nature and select appropriate techniques for its solution, (b) apply the selected techniques in a numerical analysis of the problem, (c) evaluate the results of the analysis;
- apply broad thermodynamic principles to common engineering systems.

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.

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

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.

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

Rogers & Mayhew 1992, *Engineering Thermodynamics*, 4th edition, Longman,

Van Wylen, G. J. & Sonntag, R. E. 1998, *Fundamentals of Classical Thermodynamics*, 5th edition, J Wiley and Sons,

STUDENT WORKLOAD REQUIREMENTS

ACTIVITY	HOURS
Assessment	15
Directed Study	137
Examinations	3

ASSESSMENT DETAILS

Description	Marks Out of	Wtg(%)	Required	Due Date
ASSIGNMENT 1	50.00	5.00	Y	21 Mar 2003
ASSIGNMENT 2	100.00	10.00	Y	16 May 2003
ASSIGNMENT 3	150.00	15.00	Y	06 Jun 2003
3 HOUR RESTRICTED EXAMINATION	700.00	70.00	Y	END S1 (see note)

NOTES:

- Student Administration will advise students of the dates of their examinations during the semester.

IMPORTANT ASSESSMENT INFORMATION

- Attendance requirements:
There are no attendance requirements for this course. However, it is the students' responsibility to study all material provided to them or required to be accessed by them to maximise their chance of meeting the objectives of the course and to be informed of course-related activities and administration.
- Requirements for students to complete each assessment item satisfactorily:
To complete each of the assessment items satisfactorily, students must obtain at least 50% of the marks available (or at least a grade of C-) for each assessment item.
- Penalties for late submission of required work:
If students submit assignments after the due date without prior approval then a penalty of 5% of the total marks gained by the student for the assignment will apply for each working day late.
- Requirements for student to be awarded a passing grade in the course:
(i) To be assured of a passing grade, students must demonstrate, via the summative assessment items, that they have achieved the required minimum standards in relation to the objectives of the course by satisfactorily completing all summative assessment items (the examination and assignments), as stated in 2 above. (ii) Students who do not qualify for a Passing grade may, at the discretion of the Examiner, be assigned additional work to demonstrate to the Examiner that they have achieved the required standard. It is expected that such students will have

gained at least 45 % of the total marks available for all summative assessment items.

- 5 Method used to combine assessment results to attain final grade:
The final grades for students will be assigned on the basis of the weighted aggregate of the marks (or grades) obtained for each of the summative assessment items in the course.
- 6 Examination information:
In a Restricted Examination, candidates are allowed access to specific materials during the examination. The only materials that candidates may use in the restricted examination for this course are: writing materials (non-electronic and free from material which could give the student an unfair advantage in the examination); calculators which cannot hold textual information (students must indicate on their examination paper the make and model of any calculator(s) they use during the examination); the prescribed text by Mayhew & Rogers (Steam Tables); one A4 sheet of paper with any formula the student chooses to list. Both sides of the sheet may be used.; Translation dictionary. Students whose first language is not English, may, with the Examiner's approval, take an appropriate non- electronic translation dictionary into the examination. Students who wish to use a translation dictionary MUST request and receive written approval from the Examiner at least one week before the examination date. Translation dictionaries will be subject to perusal and may be removed from the candidate's possession until appropriate disciplinary action is completed if found to contain material that could give the candidate an unfair advantage.
- 7 Examination period when Deferred/Supplementary examinations will be held:
Any Deferred or Supplementary examinations for this course will be held during the examination period at the end of the semester of the next offering of this course.
- 8 University Regulations:
Students should read USQ Regulations 5.1 Definitions, 5.6. Assessment, and 5.10 Academic Misconduct for further information and to avoid actions which might contravene University Regulations. These regulations can be found at the URL: <http://www.usq.edu.au/SECARIAT/calendar/Part5/> or in the printed version of the current USQ Handbook.

ASSESSMENT NOTES

- 1 The due date for an assignment is the date by which a student must despatch the assignment to the USQ. The onus is on the student to provide proof of the despatch date, if requested by the Examiner.
- 2 Students must retain a copy of each item submitted for assessment. This must be produced within five days if required by the Examiner.
- 3 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.
- 4 The Faculty will normally only accept assessments that have been written, typed or printed on paper-based media.
- 5 The Faculty will NOT accept submission of assignments by facsimile.

- 6 Students who do not have regular access to postal services or who are otherwise disadvantaged by these regulations may be given special consideration. They should contact the examiner of the course to negotiate such special arrangements.
- 7 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.
- 8 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.
- 9 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); IDB (Incomplete - Both Deferred Examination and Deferred Make-up).
- 10 The Faculty of Engineering and Surveying does not offer supplementary examinations.