



## Course specification

**Description: Energy Technology**

Subject	Cat-nbr	Class	Term	Mode	Units	Campus
MEC	4104	40508	1, 2005	EXT	1.00	Toowoomba

<b>Academic group:</b>	FOENS
<b>Academic org:</b>	FOES02
<b>Student contribution band:</b>	2
<b>ASCED code:</b>	030799

### STAFFING

Examiner: David Buttsworth

Moderator: Ruth Mossad

### REQUISITES

Pre-requisite: (MEC2101 and MEC3102) or MEC2106

### SYNOPSIS

Over the next decade or so, environmental concerns plus the depletion of the world's fossil fuel reserves accentuated by the industrialisation of presently third world countries, are going to force a reshaping of our use of energy. This course aims to prepare the student to play an informed and constructive part in that reshaping.

### OBJECTIVES

On completion of this course, students should be able to:

1. analyse combustion systems using appropriate tools from the field of combustion science;
2. analyse renewable energy systems using appropriate tools from the fields of thermofluids, heat transfer, and dynamics;
3. compare and contrast various combustion and renewable energy systems;
4. evaluate the potential of renewable energy technologies as a replacement for combustion energy technologies;
5. participate in the design and management of combustion and renewable energy systems.

### TOPICS

	Description	Weighting (%)
1.	Introduction to combustion	1.00
2.	Thermodynamics and mixtures	5.00
3.	Conservation equations for reacting flows	5.00

4.	Chemical reactions and products	10.00
5.	Laminar and turbulent flows	5.00
6.	Premixed flames	12.00
7.	Diffusion flames	12.00
8.	Introduction to renewable energy	2.00
9.	Biofuels	5.00
10.	Solar energy	15.00
11.	Wind energy	10.00
12.	Hydro energy	10.00
13.	Other renewable energy sources	5.00
14.	Energy storage and distribution	3.00

### **TEXT and MATERIALS required to be PURCHASED or ACCESSED**

ALL textbooks and materials are available for purchase from USQ BOOKSHOP (unless otherwise stated). Orders may be placed via secure internet, free fax 1800642453, phone 07 46312742 (within Australia), or mail. Overseas students should fax +61 7 46311743, or phone +61 7 46312742. For costs, further details, and internet ordering, use the 'Textbook Search' facility at <http://bookshop.usq.edu.au> click 'Semester', then enter your 'Course Code' (no spaces).

### **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.

CRC (edited by Kreith, F. & West, R.) 1996, *Handbook on Energy Efficiency*, CRC Press, Boca Raton.

Duffie, J. A. & Beckman, W. A. 1991, *Solar Engineering of Thermal Processes*, 2nd edn, John Wiley & Sons, New York.

Turns, S. R. 1996, *An Introduction to Combustion: Concepts and Applications*, McGraw-Hill, New York.

Twidell, J. & Weir, T. 1986, *Renewable Energy Resources*, E and F N Spon Ltd, University Press, Cambridge.

Walker, J. E. & Jenkins, N. D. 1997, *Wind Energy Technology*, John Wiley, New York.

### **STUDENT WORKLOAD REQUIREMENTS**

ACTIVITY	HOURS
Assessment	16.00
Directed Study	52.00
Examinations	3.00
Private Study	84.00

## ASSESSMENT DETAILS

Description	Marks out of	Wtg(%)	Due date
ASSIGNMENT 1	150.00	15.00	22 Apr 2005
ASSIGNMENT 2	150.00	15.00	03 Jun 2005
3 HOUR RESTRICTED EXAMINATION	700.00	70.00	END S1 (see note 1)

### NOTES

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

## IMPORTANT ASSESSMENT INFORMATION

- 1 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.
- 2 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.
- 3 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.
- 4 Requirements for student to be awarded a passing grade in the course:  
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.
- 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); one A4 sheet of paper with any formulae or other information the student chooses to list (both sides of the sheet may be used).
- 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/corporateservices/calendar/part5.htm> or in 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 one of the temporary grades: IM (Incomplete - Make up), IS (Incomplete - Supplementary Examination) or ISM (Incomplete -Supplementary Examination and Make up). A temporary 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).