



Course specification

Description: Energy Technology

| Subject | Cat-nbr | Class | Term | Mode | Units | Campus |
|---------|---------|-------|---------|------|-------|-----------|
| MEC | 4104 | 50900 | 1, 2006 | ONC | 1.00 | Toowoomba |

| | |
|-----------------------------------|--------|
| Academic group: | FOENS |
| Academic org: | FOES02 |
| Student contribution band: | 2 |
| ASCED code: | 030799 |

STAFFING

Examiner: Ahmad Sharifian
Moderator: David Buttsworth

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 (Assignment 1, Assignment 2, Exam);
2. analyse renewable energy systems using appropriate tools from the fields of thermofluids, heat transfer, and dynamics (Assignment 1, Assignment 2, Exam);
3. compare and contrast various combustion and renewable energy systems (Assignment 1, Assignment 2, Exam);
4. evaluate the potential of renewable energy technologies as a replacement for combustion energy technologies (Assignment 1, Assignment 2, Exam);

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, JA & Beckman, WA 1991, *Solar Engineering of Thermal Processes*, 2nd edn, John Wiley & Sons, New York.

Turns, SR 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, JE & Jenkins, ND 1997, *Wind Energy Technology*, John Wiley, New York.

STUDENT WORKLOAD REQUIREMENTS

| ACTIVITY | HOURS |
|---------------|-------|
| Assessment | 16.00 |
| Examinations | 3.00 |
| Lectures | 26.00 |
| Private Study | 84.00 |
| Tutorials | 26.00 |

ASSESSMENT DETAILS

| Description | Marks out of | Wtg(%) | Due date |
|-------------------------------|--------------|--------|------------------------|
| ASSIGNMENT 1 | 150.00 | 15.00 | 28 Apr 2006 |
| ASSIGNMENT 2 | 150.00 | 15.00 | 09 Jun 2006 |
| 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:
It is the students' responsibility to attend and participate appropriately in all activities (such as lectures, tutorials, laboratories and practical work) scheduled for them, and 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 satisfactorily complete an assessment item a student must achieve at least 50% of the marks or a grade of at least C-. Students do not have to satisfactorily complete each assessment item to be awarded a passing grade in this course. Refer to Statement 4 below for the requirements to receive a passing grade in this course.
- 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 available 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 receiving a passing grade a student must achieve at least 30% in each of the weighted assessment items, achieve at least 50% in the examination and at least 50% of the total weighted marks available for the course.
- 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 despatched to USQ within 24 hours 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).