



The University of Southern Queensland

## Course specification

The current and official versions of the course specifications are available on the web at <http://www.usq.edu.au/coursespecification/current>.  
Please consult the web for updates that may occur during the year.

### Description: Materials Technology

Subject	Cat-nbr	Class	Term	Mode	Units	Campus
MEC	3203	86307	1, 2009	EXT	1.00	Toowoomba

<b>Academic group:</b>	FOENS
<b>Academic org:</b>	FOES02
<b>Student contribution band:</b>	2
<b>ASCED code:</b>	030305

## STAFFING

Examiner: Steven Goh

Moderator: Harry Ku

## REQUISITES

Pre-requisite: MEC1201 or Students must be enrolled in one of the following Programs: GCEN or GDET or METC

## SYNOPSIS

The engineer uses a wide variety of materials from platinum to rocks to construct bridges, automobiles, jet engines, process plants, electronic components, etc. These materials have widely varying properties and consequently it is necessary for the engineer to have a sound working knowledge of the characteristic properties and behaviour during processing/fabrication and in service of the common types of engineering materials. This course extends the basic course "Engineering Materials", to show how the basic principles of materials science are used in the development of contemporary engineering materials. This knowledge is demonstrated through application in material selection and failure analysis of materials.

## OBJECTIVES

The course objectives define the student learning outcomes for a course. The assessment item(s) that may be used to assess student achievement of an objective are shown in parenthesis. On completion of this course, students should be able to:

1. appraise the characteristic properties, applications and behaviour (including strengthening mechanisms) during processing, fabrication and service of a wide range of engineering materials (Assignment 1, Assignment 2, Exam);
2. Systematically specify and justify suitable material(s) for a given application (Assignment 1, Assignment 2, Exam);
3. evaluate the effects of stress fatigue, creep, corrosion, and wear on materials (Assignment 1, Assignment 2, Exam);
4. examine forms and effects of corrosion in metals and review the main methods of corrosion prevention (Assignment 1, Assignment 2, Exam);

5. assess the effects of welding on the properties of a welded component and the methods used to ensure a sound weld (Assignment1, Assignment 2, Exam);
6. apply basic procedures used in the failure analysis of a component and in the selection of a material for a given component (Assignment1, Assignment 2, Exam).

## TOPICS

	Description	Weighting (%)
1.	Ferrous Metal	10.00
2.	Non-Ferrous Metal	10.00
3.	Polymers & Composites	10.00
4.	Ceramics	10.00
5.	Strengthening Mechanisms	10.00
6.	Corrosion of Materials	10.00
7.	Wear of Materials	10.00
8.	Failure Analysis, Fatigue and Creep	10.00
9.	Joining of Materials	10.00
10.	Materials Selection	10.00

## 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).

A hand held battery operated calculator which does not have keys for the alphabet.

Askeland, DR & Phule, PP 2006, *The science and engineering of materials*, 5th edn, Thomson Learning, Southbank, Victoria.

(SI Edition. (A CD-ROM is included in the textbook))

## 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.

## STUDENT WORKLOAD REQUIREMENTS

ACTIVITY	HOURS
Assessments	26.00
Directed Study	60.00
Examinations	2.00
Private Study	67.00

## ASSESSMENT DETAILS

Description	Marks out of	Wtg (%)	Due date
ASSIGNMENT 1	200.00	20.00	23 Apr 2009
ASSIGNMENT 2	300.00	30.00	04 Jun 2009
2 HOUR RESTRICTED EXAMINATION	500.00	50.00	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 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 extenuating circumstances then a penalty of 5% of the assigned mark may apply for each working day late up to a maximum of ten working days at which time a mark of zero can be recorded for that assignment.
- 4 Requirements for student to be awarded a passing grade in the course:  
To be assured of receiving a passing grade in a course a student must obtain at least 50% of the total weighted marks 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); a non-programmable electronic calculator (students must indicate on their examination paper the make and model of any calculator(s) they use during the examination).
  - 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).