



The University of Southern Queensland

## Course specification

<b>Description: Stress Analysis</b>						
Subject	Cat-nbr	Class	Term	Mode	Units	Campus
MEC	2402	50419	1, 2006	ONC	1.00	Toowoomba

<b>Academic group:</b>	FOENS
<b>Academic org:</b>	FOES02
<b>Student contribution band:</b>	2
<b>ASCED code:</b>	030701

### STAFFING

Examiner: Hao Wang  
Moderator: Selvan Pather

### REQUISITES

Pre-requisite: CIV1501

### SYNOPSIS

Every structure or machine has to perform its intended function within a predetermined and acceptable probability of failure. Stress analysis addresses the stability and strength of structures and machines while under load. It predicts how force is carried through a structure or machine and how the materials at any point in any individual member resist the force. As such, stress analysis is essential to the design function and the analysis function. Every engineer who has to make a judgement on the strength and stability of any structure, machine or mechanism, no matter how simple or how complex, must understand the fundamental principles of stress analysis.

### 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. review and apply the principles of static equilibrium to the analysis of structures such as pressure vessels, beams, and torsion members (Assignment 1, Assignment 2, Assignment 3, Exam);
2. evaluate stress and strain within various structures by applying the appropriate engineering theories (Assignment 1, Assignment 2, Assignment 3, Exam);
3. formulate solutions to problems requiring the application of suitable engineering theories for stress and strain (Assignment 1, Assignment 2, Assignment 3, Exam).

## TOPICS

	Description	Weighting (%)
1.	Normal stress and strain	5.00
2.	Pressure vessels	5.00
3.	Shear stress and strain	5.00
4.	Torsional members	10.00
5.	Stress analysis	20.00
6.	Strain analysis	10.00
7.	Theories of elastic failure	10.00
8.	Normal stress in beams	10.00
9.	Shear stress in beams	10.00
10.	Elastic plastic analysis	10.00
11.	Buckling	5.00

## 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).

*MEC2402 Stress analysis external study package*, USQ Publication,

Beer, Johnston & DeWolf 2004, *Mechanics of materials*, 3rd edn, McGraw Hill, New York.

(in SI units)

## 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
Assessment	15.00
Directed Study	77.00
Examinations	3.00
Lectures	34.00
Tutorials	26.00

## ASSESSMENT DETAILS

Description	Marks out of	Wtg(%)	Due date
ASSIGNMENT 1	50.00	5.00	31 Mar 2006
ASSIGNMENT 2	100.00	10.00	05 May 2006
ASSIGNMENT 3	150.00	15.00	02 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 10% 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 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); hand-held, battery-operated calculator 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); an A4 sheet (two sides) containing any information that they believe will be relevant for the examination. The A4 sheet must be submitted with the exam booklets. No other materials are permitted in the examination. Charts, tables and graphs needed

for the solution of the examination problems will be provided with the examination paper.

- 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).