



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: Engineering Statics

| Subject | Cat-nbr | Class | Term | Mode | Units | Campus |
|---------|---------|-------|---------|------|-------|-----------|
| CIV | 1501 | 90293 | 2, 2009 | EXT | 1.00 | Toowoomba |

| | |
|-----------------------------------|--------|
| Academic group: | FOENS |
| Academic org: | FOES03 |
| Student contribution band: | 2 |
| ASCED code: | 030903 |

STAFFING

Examiner: Jo Devine
Moderator: Yan Zhuge

REQUISITES

Pre-requisite: ENG1500 or MAT1500

SYNOPSIS

The overall aim of this course is to introduce a fundamental area of rigid body-mechanics called "Statics". Knowledge of statics is fundamental to many engineering applications as it is used to evaluate the equilibrium of bodies subjected to forces. For example engineers need to predict how a bridge structure will behave under the influence of forces such as the cars, trucks & trains that will cross it and even under its own self weight. Statics is an analytical tool that can be used to evaluate these forces and assist in making such predictions. This course deals with balanced force systems applied to rigid-bodies that are at rest. Methods to determine support reactions and relationships between internal and external forces and internal force distribution will be introduced in this course. The knowledge gained in this course will be used extensively in later engineering design and analysis courses.

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. explain what a vector is, express it in vector and scalar notation and use vector algebra to solve problems (Assignment 1 & 2, 2 Hour Restricted Examination);
2. calculate the moment of a force, determine the result of a non-concurrent force system and reduce a simple distributed load to a resultant force (Assignment 1 & 2, 2 Hour Restricted Examination);
3. analyse & solve rigid body equilibrium problems using the equations of equilibrium (Assignment 1 & 2, 2 Hour Restricted Examination);

4. analyse the equilibrium of rigid bodies subjected to dry friction and discuss the concept of rolling resistance; (Assignment 1 & 2, 2 Hour Restricted Examination)
5. analyse the forces in pin-jointed trusses using the method of joints and the method of sections (Assignment 1 & 2, 2 Hour Restricted Examination);
6. construct and evaluate shear force and bending moment diagrams for beams with a variety of loads and types of support & evaluate maximum deflection for a beam (Assignment 1 & 2, 2 Hour Restricted Examination);
7. determine the centroid of an area and the first and second moments of area of plane shapes (Assignment 1 & 2, 2 Hour Restricted Examination).

TOPICS

| | Description | Weighting (%) |
|----|--|---------------|
| 1. | Fundamental Concepts of Force and Numerical Calculations | 5.00 |
| 2. | Force Vectors & Particle Equilibrium | 20.00 |
| 3. | Moment and non-concurrent forces | 12.50 |
| 4. | Equilibrium of a rigid body | 12.50 |
| 5. | Friction | 10.00 |
| 6. | Analysis of 2-D trusses | 12.50 |
| 7. | Analysis of Beams | 12.50 |
| 8. | Centroids & moment of inertia | 15.00 |

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).

Hibbeler, RC 2007, *Engineering mechanics: statics*, 11th edn, Prentice Hall, Singapore.

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.

Any book on Statics and Mechanics of materials will be suitable to enhance student's knowledge and understanding of the material in this course.

Beer, FP, Johnston, ER & DeWolf, JT 2006, *Mechanics of materials*, 4th edn, McGraw Hill, Boston.

(ISE S I Version. This textbook is set text for subsequent course MEC2402.)

Hibbeler, RC 2004, *Statics and mechanics of materials*, Prentice Hall, Singapore.

(SI (or later) Edition)

Meriam, JL & Kraige, LG 2006, *Engineering mechanics*, 6th edn, Wiley, New York.

STUDENT WORKLOAD REQUIREMENTS

| ACTIVITY | HOURS |
|----------------|-------|
| Assessments | 10.00 |
| Directed Study | 52.00 |
| Examinations | 2.00 |
| Private Study | 91.00 |

ASSESSMENT DETAILS

| Description | Marks out of | Wtg (%) | Due date |
|-------------------------------|--------------|---------|------------------------|
| CMA TEST 1 | 150.00 | 15.00 | 23 Aug 2009 |
| CMA TEST 2 | 250.00 | 25.00 | 11 Oct 2009 |
| 2 HOUR RESTRICTED EXAMINATION | 600.00 | 60.00 | END S2 (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 individual assessment item a student must achieve at least 50% of the marks or a grade of at least C-. (Depending upon the requirements in Statement 4 below, students may not have to satisfactorily complete each assessment item 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); 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); Formula sheets will be provided with the exam 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 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 the local public holiday in their area, such as a Show holiday, the due date for the assignment will be the next day. Student 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).

OTHER REQUIREMENTS

- 1 Students will require reliable and regular access to e-mail and internet access to UConnect for this course.
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