



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: Structural Design I

| Subject | Cat-nbr | Class | Term | Mode | Units | Campus |
|---------|---------|-------|---------|------|-------|-----------|
| CIV | 2503 | 90305 | 2, 2009 | ONC | 1.00 | Toowoomba |

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

STAFFING

Examiner: Yan Zhuge
Moderator: Karu Karunasena

REQUISITES

Pre-requisite: ENG1100 and CIV1501

SYNOPSIS

Structural design is concerned with buildings and other structures such as bridges. A structural design engineer is required to make decisions about how buildings and other structures will be built such that they will perform satisfactorily and will not rapidly deteriorate, deflect excessively or in the worst event, fall down. The design engineer makes decisions about the general arrangement of the structural members, the materials of which they are made, their size and how they are connected together. Structural designers make use of information about materials and construction processes together with various analytical techniques to assist them in making the correct decisions about how structures should be built. In pre-requisite courses students will have already acquired some of this knowledge. In particular they have learnt how to analyse structures to determine such things as bending moments, deflections and stresses. In this course they will revise, consolidate and extend these topics and use them to assist in the design of structures. The course concentrates on estimating the loads which a structure may be required to carry, designing individual members in steel and timber. Specific code provisions applicable to design of timber and steel together with load estimation are discussed in detail in this course.

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. present defining diagrams and associated discussions and/or calculations relating to structural design in a manner that communicates the logic of the underlying phenomena and processes; (Exam)
2. map out the major steps in the total design process; (Assignment 2)

3. extract separable structural elements from simple buildings and model the supports, restraints, continuity and loading conditions on such elements in terms of line load diagrams; (Assignment 1; Assignment 2; Exam)
4. utilise influence lines and approximate analysis techniques to determine design load effects on structures; (Assignment 1; Exam)
5. explain the logic behind, and apply limit state design; (Assignment 2; Exam)
6. use relevant industry standards to evaluate structural engineering loads; (Assignment 2; Assignment 3; Exam)
7. determine approximate member sizes in steel and timber for simple situations; (Assignment 2; Exam)
8. differentiate the material characteristics of timber from those of steel, and determine timber member sizes and connection details to industry standards for tension elements, beams and columns; (Assignment 3; Exam)
9. determine member sizes to industry standards for structural steel tension elements, pure compression elements, and beams; (Assignment 2; Exam)
10. explain nominated aspects of relevant national building codes. (Assignment 1; Assignment 2; Assignment 3; Exam)

TOPICS

| | Description | Weighting (%) |
|----|---|---------------|
| 1. | Total design process | 5.00 |
| 2. | Structural modelling | 5.00 |
| 3. | Design methods | 10.00 |
| 4. | Use of AS1170 | 15.00 |
| 5. | Influence lines and approximate methods | 15.00 |
| 6. | Timber design | 25.00 |
| 7. | Steel design | 25.00 |

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).

CIV2503 Structural Design I External Study Package, USQ Publication,

SAA HB2.2 Structural Engineering, Standards Australia,

(Australian Standards for Civil Engineering Students. Note this must be the 2003 edition. Any earlier edition will not be adequate.)

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.

Boughton, G & Crews, K 1998, *Timber design handbook*, Standards, NSW, Australia.

Gorenc, B, Tinyou, R & Syam, A 2005, *Steel designers handbook*, 7th edn, University of NSW Press, Sydney.

Hibbeler, RC 2009, *Structural analysis*, Pearson Prentice Hall, Singapore.

(Seven edition in SI Units)

Trahair, NS & Bradford, MA 1998, *The behaviour and design of steel structures to AS4100*, 3rd edn, Taylor & Francis,

STUDENT WORKLOAD REQUIREMENTS

| ACTIVITY | HOURS |
|---------------|-------|
| Assessments | 20.00 |
| Examinations | 2.00 |
| Lectures | 26.00 |
| Private Study | 81.00 |
| Tutorials | 26.00 |

ASSESSMENT DETAILS

| Description | Marks out of | Wtg (%) | Due date |
|-------------------------------|--------------|---------|------------------------|
| ASSIGNMENT 1 | 150.00 | 15.00 | 14 Aug 2009 |
| ASSIGNMENT 2 | 150.00 | 15.00 | 11 Sep 2009 |
| ASSIGNMENT 3 | 100.00 | 10.00 | 16 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 examination 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 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); English translation dictionaries (but not technical dictionaries). Candidates may take an appropriate non- electronic translation dictionary into the examination. This will be subject to perusal and, if it is found to contain annotations or markings that could give the candidate an unfair advantage, it may be removed from the candidate's possession until the appropriate disciplinary action is completed.; Translation dictionary. Students whose first language is not English, may, with the Examiner's approval, take an appropriate non- electronic translation dictionary into the examination. Students who wish to use a translation dictionary **MUST** request and receive written approval from the Examiner at least one week before the examination date.
 - 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).