



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: Concrete Structures

Subject	Cat-nbr	Class	Term	Mode	Units	Campus
CIV	3506	86326	1, 2009	ONC	1.00	Toowoomba

<b>Academic group:</b>	FOENS
<b>Academic org:</b>	FOES03
<b>Student contribution band:</b>	2
<b>ASCED code:</b>	030903

### STAFFING

Examiner: Thiru Aravinthan  
Moderator: Karu Karunasena

### REQUISITES

Pre-requisite: CIV2503 or Students must be enrolled in one of the following Programs: GCEN or GDET or METC or MEPR

### OTHER REQUISITES

Recommended prior or concurrent study: CIV3505

### SYNOPSIS

Concrete is a versatile building material which is used extensively in multistorey buildings, airports, dams, roads and many other important parts of today's modern infrastructure. Whilst it is inherently strong in compression, its weakness in tension is offset by suitable steel reinforcement which is initially either unstressed or prestressed. This results in a composite material which requires a detailed understanding of its behaviour before safe and economical designs can be produced. Accordingly this course provides a detailed coverage of : The Behaviour of Reinforced and Prestressed Concrete, Durability and Fire Resistance, Behaviour and Design for Strength and Serviceability of Reinforced Concrete Beams, Slabs and Columns, Anchorage, Detailing, Behaviour and Design for Strength and Serviceability of Fully Prestressed and Partially Prestressed Concrete Beams and Slabs.

### 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. calculate the design loads on an element for both the strength and serviceability limit states (Assignment 1, Assignment 2, Exam);

2. explain the background to, and be able to apply, the durability and fire resistance provisions of AS3600 Concrete Structures (Assignment 1, Assignment 2, Exam);
3. evaluate the behaviour under load of reinforced concrete beams and select a beam size and reinforcement layout which satisfies the strength and serviceability limit state requirements of AS3600 (Assignment 1, Exam);
4. evaluate the behaviour under load of reinforced concrete columns and select a column size and reinforcement layout which satisfies the strength limit state requirements of AS3600 (Assignment 2, Exam);
5. evaluate the behaviour under load of reinforced concrete slabs and select a slab size and reinforcement layout which satisfies the strength and serviceability limit state requirements of AS3600 (Assignment 2, Exam);
6. draw layouts and details of the reinforcement designed in 3, 4 and 5 above (Assignment 1, Assignment 2, Exam);
7. evaluate the behaviour of statically determinate prestressed concrete beams and slabs and select a beam or slab size and reinforcement and tendon layout which satisfies the strength and serviceability limit states of AS3600 (Assignment 2, Exam).

## TOPICS

	Description	Weighting (%)
1.	General principles of reinforced concrete	10.00
2.	Load estimation for RC structures	5.00
3.	Durability and fire resistance	5.00
4.	The behaviour, analysis and design of RC beams	20.00
5.	The behaviour, analysis and design of RC slabs	15.00
6.	The behaviour, analysis and design of RC columns	15.00
7.	Detailing of reinforced concrete members	10.00
8.	The behaviour, analysis and design of prestressed beams	20.00

## 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).

*CIV3506 Concrete structures: external study package*, University of Southern Queensland, Toowoomba.

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

HB2.2 Australian Standards for Civil Engineering Students *Structural engineering*, Standards Australia,

Warner, RF, Foster, SJ, & Kilpatrick AE 2007, *Reinforced concrete basics: analysis and design of reinforced concrete structures*, Pearson Prentice Hall, Frenchs Forest, NSW.

## 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	25.00
Examinations	2.00
Lectures	26.00
Private Study	76.00
Tutorials	26.00

## ASSESSMENT DETAILS

Description	Marks out of	Wtg (%)	Due date
ASSIGNMENT 1	100.00	10.00	03 Apr 2009
ASSIGNMENT 2	150.00	15.00	22 May 2009
2 HOUR OPEN EXAMINATION	750.00	75.00	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 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:  
Candidates may have access to any material during the Open examination except the following: electronic communication devices, bulky materials, devices requiring mains power and material likely to disturb other students.
  - 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).