



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: Advanced Prestressed Concrete

Subject	Cat-nbr	Class	Term	Mode	Units	Campus
ENG	8802	91141	2, 2009	WEB	1.00	Toowoomba

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

### STAFFING

Examiner: Thiru Aravinthan  
Moderator: Karu Karunasena

### OTHER REQUISITES

Completion of undergraduate course CIV3506 Concrete Structures or equivalent. Familiarity with design standards for structural engineering.

### RATIONALE

This course provides students with an opportunity to enhance their skills in prestressed concrete design and applications.

### SYNOPSIS

Prestressed concrete is used extensively in bridges, multistorey buildings and many other important parts of today's modern infrastructure. The inherent weakness of concrete in tension is offset by introducing a pre-compression in a prestressed member, which improves its service load behaviour, such as reduced deflections and cracking. An advanced understanding of its behaviour is essential before safe and economical designs can be produced. This course will provide a detailed coverage of: The behaviour of prestressed concrete, analysis and design for strength and serviceability of prestressed concrete members, such as beams and slabs including continuous members, and anchorage design and losses in prestress. It will also cover the recent advances in prestressed technology including external post-tensioning, use of fibre reinforced plastics in prestressing and improvement in the durability of prestressed concrete structures.

### 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 the course, students should be able to:

1. evaluate the behaviour and design of prestressed concrete beams and slabs (including statically indeterminate beams and slabs) and design tendon layout, which satisfy the strength and serviceability limit states as required by design standards (assignments);
2. analyse the stresses in anchorage zones and design end anchorages for prestressed concrete beams and slabs (assignments);
3. evaluate the short-term and long-term losses in prestressing and design prestressed structures considering these losses (assignments);
4. discuss and appraise the recent advances in the prestressed concrete technology including the use of advanced materials and application of new technologies (assignments).

## TOPICS

	Description	Weighting (%)
1.	Introduction to prestressed concrete	5.00
2.	Analysis and design for flexure	20.00
3.	Shear, bond & bearing	10.00
4.	Deflections	15.00
5.	Continuous beams	15.00
6.	Losses in prestress	10.00
7.	End anchorages	10.00
8.	External prestressing	10.00
9.	Miscellaneous topics	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).

Australian Standards AS3600 *Concrete Structures*, Standards Australia,

Gilbert, RI & Mickleborough, NC 1990, *Design of Prestressed Concrete*, Unwin Hymn, London.

## 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.

Nawy, EG 1996, *Prestressed Concrete: A Fundamental Approach*, 2nd edn, Prentice Hall, Upper Saddle River, NJ.

Warner, RF, Rangan, BV, Hall, AS & Faulkes KA 1998, *Concrete Structures*, Addison Wesley, Longman Cheshire, Melbourne.

Warner, RF & Faulkes, KA 1988, *Prestressed Concrete*, 2nd edn, Longman Cheshire, Melbourne.

## STUDENT WORKLOAD REQUIREMENTS

ACTIVITY	HOURS
Assessments	40.00
Directed Study	52.00
Private Study	73.00

## ASSESSMENT DETAILS

Description	Marks out of	Wtg (%)	Due date
DISSCUSSIONS/QUIZZES	250.00	25.00	20 Jul 2009 (see note 1)
ASSIGNMENT 1	250.00	25.00	04 Sep 2009
ASSIGNMENT 2	500.00	50.00	30 Oct 2009

### NOTES

1. Discussions and quizzes will be assessed throughout 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. (ii) Students must participate in discussions posted on the USQStudy Desk.
- 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-. 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:  
There is no examination in this course.
- 7 Examination period when Deferred/Supplementary examinations will be held:  
Not applicable.
- 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 email the assignment to 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 In this course students may submit assignments electronically in the format specified in the assignment requirements.
- 5 The Faculty will NOT accept submission of assignments by facsimile.
- 6 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.
- 7 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 the temporary grade: IM (Incomplete - Make up). An IM 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.
- 8 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. The

## **OTHER REQUIREMENTS**

- 1 Students must have access to e-mail and internet access to UConnect for this course.
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