Description: Concrete Structures

<table>
<thead>
<tr>
<th>Subject</th>
<th>Cat-nbr</th>
<th>Class</th>
<th>Term</th>
<th>Mode</th>
<th>Units</th>
<th>Campus</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIV</td>
<td>3506</td>
<td>62402</td>
<td>1, 2007</td>
<td>ONC</td>
<td>1.00</td>
<td>Toowoomba</td>
</tr>
</tbody>
</table>

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

STAFFING
Examiner: Thiru Aravinthan
Moderator: Karu Karunasena

REQUISITES
Pre-requisite: CIV2503

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

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

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, USQ Publication,
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,
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

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>HOURS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessment</td>
<td>25.00</td>
</tr>
<tr>
<td>Examinations</td>
<td>3.00</td>
</tr>
<tr>
<td>Lectures</td>
<td>26.00</td>
</tr>
<tr>
<td>Private Study</td>
<td>75.00</td>
</tr>
<tr>
<td>Tutorials</td>
<td>26.00</td>
</tr>
</tbody>
</table>

ASSESSMENT DETAILS

<table>
<thead>
<tr>
<th>Description</th>
<th>Marks out of</th>
<th>Wtg(%)</th>
<th>Due date</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASSIGNMENT 1</td>
<td>150.00</td>
<td>15.00</td>
<td>18 Apr 2007</td>
</tr>
<tr>
<td>ASSIGNMENT 2</td>
<td>100.00</td>
<td>10.00</td>
<td>28 May 2007</td>
</tr>
<tr>
<td>3 HOUR RESTRICTED EXAMINATION</td>
<td>750.00</td>
<td>75.00</td>
<td>END S1 (see note 1)</td>
</tr>
</tbody>
</table>

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 20% 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, achieve at least 45% in the examination 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); 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).

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).