COURSE DETAILS

Units of Credit: 6
Contact hours: 3 hours per week
Class: Thursday, 18:00 –21:00
Colombo Theatre A (K-B16-LG03)

Course Coordinator and Lecturer:
Dr Hamid Valipour
email: H.Valipour@unsw.edu.au
office: No. 710 School of Civil Engineering
phone: 9385 6191

INFORMATION ABOUT THE COURSE

The aim of this course is to undertake an advanced coverage of various topics relating to the design of concrete structures. The course is targeted at students who specialise in Structural Engineering and are in the early stages of their career.

During this course you will be supported in polishing the core skills, qualities and understandings developed previously in undergraduate courses and in your early career and hone your structural engineering skills associated with your role as a Structural Engineer.

HANDBOOK DESCRIPTION

See link to virtual handbook:

OBJECTIVES

- Reinforce your knowledge of reinforced concrete design
- Develop and advance skills in structural design
- Develop in depth understanding of the philosophies and principles of the structural concrete informed by nonlinear behaviour of concrete
- Reinforce the philosophy of design and link design and advanced analysis
- Creative and critical thinking ability to develop and design new types of structural systems based on load path

TEACHING STRATEGIES

Private Study
- Review lecture material and textbook
- Do set problems and assignments
- Join Moodle discussions of problems
- Reflect on class problems, assignments and extra solved examples provided
- Download materials from Moodle
- Keep up with notices and find out marks via Moodle

Lectures
- Find out what you must learn
- See methods that are not in the textbook
- Follow worked examples
- Hear announcements on course changes
- Watch the lectures you have missed
Assessments (assignments and final exam)

- Demonstrate your understanding of the fundamentals of structural concrete and advanced methods of design
- Demonstrate your knowledge and skills in design of reinforced concrete structures
- Demonstrate higher understanding and problem solving skills

EXPECTED LEARNING OUTCOMES

After completing this course, you will be able to:

- demonstrate an understanding of advanced concepts in the design of reinforced concrete structures, and
- design non-regular structures using advanced concepts such as by stress analysis or strut-and-tie modelling or collapse load methods.
- Demonstrate an understanding about long-term behaviour and design of reinforced concrete structures

For each hour of contact it is expected that you will put in at least 1.5 hours of private study.

ASSESSMENT

The final grade for this course will normally be based on the sum of the scores from each of the assessment tasks. The Final Examination is worth 70% of the Final Mark if class work is included and 100% if class work is not included. The class work is worth 30% of the Final Mark if included. A mark of at least 40% in the final examination is required before the class work is included in the final mark. The formal exam scripts will not be returned.

Students who perform poorly in the assignments are recommended to discuss progress with the lecturer during the semester.

Note: The lecturer reserves the right to adjust the final scores by scaling if agreed by the Head of School.

Details of each assessment component, the marks assigned to it, the criteria by which marks will be assigned, and the dates of submission are set out below.

ASSIGNMENTS

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Percentage</th>
<th>Due Date</th>
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</thead>
<tbody>
<tr>
<td>2. Assignment 2 (7%): Linear stress analysis/shell design</td>
<td>01/09/2016</td>
<td>15/09/2016</td>
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<tr>
<td>3. Assignment 3 (7%): Serviceability</td>
<td>22/09/2016</td>
<td>06/10/2016</td>
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Note: Your assignments must be placed in the “Valipour” assignment box (located next to room 703 on level 7 of school of civil & environmental engineering) by 5:00 pm of the due dates. DO NOT PLACE YOUR ASSIGNMENTS IN “Hamed” ASSIGNMENT BOX!!!

Late submissions will be penalised at the rate of 10% per day after the due time and date have expired!!!

Note: Students enrolled in distance mode are expected to sit their final examination at the UNSW Kensington campus. For more information on exams such as approval guidelines to sit the final examination via distance (if required), please see the link below:

http://www.engineering.unsw.edu.au/civil-engineering/resources/exam

COURSE PROGRAM

SEMESTER 2, 2016

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topic</th>
<th>Assessments Due</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Jul 28</td>
<td>Introduction. Non-linear aspects of concrete and reinforcement; failure theories and surfaces.</td>
<td>Textbook: Chap. 1</td>
</tr>
<tr>
<td>2</td>
<td>Aug 4</td>
<td>Strut-and-tie modelling 1; principles</td>
<td>Textbook Sections: 7.1 to 7.5</td>
</tr>
<tr>
<td>3</td>
<td>Aug 11</td>
<td>Strut-and-tie modelling 2 ; design of non-flexural members</td>
<td>Textbook Sections: 7.6 to 7.8</td>
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<tr>
<td>Week</td>
<td>Date</td>
<td>Topic</td>
<td>Notes</td>
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<tr>
<td>4</td>
<td>Aug 18</td>
<td>Design of RC membranes using stress analysis</td>
<td>Additional notes provided</td>
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<tr>
<td>5</td>
<td>Aug 25</td>
<td>Design of slab and shell structures</td>
<td>Additional notes provided</td>
</tr>
<tr>
<td>6</td>
<td>Sep 1</td>
<td>Design for torsion</td>
<td>Textbook Sections: 3.5 &amp; 3.6.</td>
</tr>
<tr>
<td>7</td>
<td>Sep 8</td>
<td>Design for serviceability 1. Introduction to time effects; design procedures; serviceability limit states; cracked section analysis; deflection control.</td>
<td>Textbook Sections: 1.10; 3.3.1 to 3.3.5 + Additional notes provided</td>
</tr>
<tr>
<td>8</td>
<td>Sep 15</td>
<td>Design for serviceability 2. Deflection by refined calculations; crack width calculations and crack control.</td>
<td>Textbook Section: 3.3.6 + Additional notes provided</td>
</tr>
<tr>
<td>9</td>
<td>Sep 22</td>
<td>Detailing 1: continuity of load paths, connections and joints, special provisions for HSC columns.</td>
<td>Textbook: Chap 8 &amp; Section 5.7</td>
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<tr>
<td>10</td>
<td>Sep 29</td>
<td>Mid-Semester Break</td>
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<tr>
<td>11</td>
<td>Oct 6</td>
<td>Detailing 2: continuity of load paths, connections and joints, special provisions for HSC columns.</td>
<td>Additional Notes provided</td>
</tr>
<tr>
<td>12</td>
<td>Oct 13</td>
<td>Collapse load methods of design 1 – theory, bounds, yield line.</td>
<td>Additional Notes provided</td>
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<tr>
<td>13</td>
<td>Oct 20</td>
<td>Collapse load methods of design 2 – lower bound methods; simplified strip method.</td>
<td>Textbook: Section 4.10</td>
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**Note:** The timetable and course program is indicative only and is subject to changes throughout the semester. Every effort will be made to inform students of variations to the above programme.

**RELEVANT RESOURCES**

- Available online at:
  - UNSW Bookstore (online at: http://www.bookshop.unsw.edu.au/)
  - or
- **General References:**
  - **Note:** Other references may be given as required reading for each topic. These will usually be contained in technical journals and available via the library or made available via Moodle.

**Access to Australian Standards:**
Australian Standards may be accessed through the UNSW Library as follows:
2. Under “How do I find” Click on the link to “More…”
3. Click on the link “Standards”
4. Click on the link “Standards Subject Guide”
5. Click on “Australian Standards (SAl Global)” and enter the Standard desired into the search field.
DATES TO NOTE
Refer to MyUNSW for Important Dates available at:

https://my.unsw.edu.au/student/resources/KeyDates.html

PLAGIARISM
Beware! An assignment that includes plagiarised material will receive a 0% Fail, and students who plagiarise may fail the course. Students who plagiarise are also liable to disciplinary action, including exclusion from enrolment.

Plagiarism is the use of another person’s work or ideas as if they were your own. When it is necessary or desirable to use other people's material you should adequately acknowledge whose words or ideas they are and where you found them (giving the complete reference details, including page number(s)). The Learning Centre provides further information on what constitutes Plagiarism at:

https://student.unsw.edu.au/plagiarism

ACADEMIC ADVICE
For information about:

- Notes on assessments and plagiarism,
- School policy on Supplementary exams,
- Special Considerations,
- Solutions to Problems,
- Year Managers and Grievance Officer of Teaching and Learning Committee, and
- CEVSOC.

Refer to Academic Advice on the School website available at:

https://www.engineering.unsw.edu.au/civil-engineering/student-resources/policies-procedures-and-forms/academic-advice