CVEN9802 Structural Stability

Semester 1, 2015

COURSE DETAILS

Units of Credit: 6
Contact hours: 3 hours per week
Class: Thursday, 6.00pm - 9.00pm
Room: CivEng G1

Course Coordinator: Professor Chongmin Song
and Lecturer: email: c.song@unsw.edu.au
Room: CE712;
Phone: 9385 5021

INFORMATION ABOUT THE COURSE

You will study fundamental theory of structural stability analysis and its application to the analysis and design of civil engineering structures. This course lays the foundation for other postgraduate courses in structural engineering. You are expected to be familiar with the theories and concepts introduced in the previous structural engineering courses CVEN3301 and CVEN3302.

HANDBOOK DESCRIPTION

Euler strut; uniform and non-uniform cross sections. Eccentric loading; stressing beyond the elastic limit. Struts continuous over several supports. Stability of frames.

Refer to Online Handbook available at:

TEACHING STRATEGIES

<table>
<thead>
<tr>
<th>Private Study</th>
<th>Lectures</th>
<th>Exercise classes</th>
<th>Assessments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Review lecture material and textbook</td>
<td>Find out what you must learn</td>
<td>Be guided by demonstrators</td>
<td>Demonstrate your knowledge and skills</td>
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<tr>
<td>Do set problems and assignments</td>
<td>See methods that are not in the references</td>
<td>Practice solving set problems</td>
<td>Demonstrate higher understanding and problem solving</td>
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<tr>
<td>Reflect on class problems and assignments</td>
<td>Follow worked examples</td>
<td>Ask questions</td>
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EXPECTED LEARNING OUTCOMES

At the end of this course, if a student has attended the lectures reflective on the presented material and participated in the exercise classes, it is expected that they will be able to determine the buckling loads for simple columns and frames, as well as have an understanding of the concept of effective length and its use in design.

For each hour of contact it is expected that a student 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: two examinations, three sets of hand-in problems. The assessment breakdown and dates are as follows:

1. Hand-in 1 due: 6:00pm, Wednesday, Week 3 value: 8%
2. Hand-in 2 due: 6:00pm, Wednesday, Week 9 value: 9%
3. Hand-in 3 due: 6:00pm, Wednesday, Week 13 value: 8%
4. Exam 1 held: Week 6 value: 30%
5. Exam 2 held: Final exam period value: 45%

Total 100%

An average mark of at least 40% in the two examinations is required before the marks for the hand-in exercise problems are included in the final mark.

Please keep a copy of all your submissions in case that they are misplaced.

COURSE PROGRAM

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topic</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>5 March</td>
<td>Introduction to Structural Stability</td>
</tr>
<tr>
<td>2</td>
<td>12 March</td>
<td>Elastic Column Buckling</td>
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<td>3</td>
<td>19 March</td>
<td>Elastic Column Buckling (continued)</td>
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<td>4</td>
<td>26 March</td>
<td>Beam Column Analysis</td>
</tr>
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<td>5</td>
<td>2 April</td>
<td>Mid-Session Exam</td>
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<tr>
<td>6</td>
<td>9 April</td>
<td>No Class</td>
</tr>
<tr>
<td></td>
<td>Break</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>23 April</td>
<td>Column Bracing</td>
</tr>
<tr>
<td>8</td>
<td>30 April</td>
<td>Frame Buckling</td>
</tr>
<tr>
<td>9</td>
<td>7 May</td>
<td>Energy Methods and Numerical Formulations</td>
</tr>
<tr>
<td>10</td>
<td>14 May</td>
<td>Energy Methods and Numerical Formulations (continued)</td>
</tr>
<tr>
<td>11</td>
<td>21 May</td>
<td>Introduction to Finite Element Method for Buckling Problems</td>
</tr>
<tr>
<td>12</td>
<td>28 May</td>
<td>Finite Element Analysis of Buckling by Using ANSYS</td>
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<tr>
<td>13</td>
<td>4 June</td>
<td>Finite Difference for Buckling Problems</td>
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RESOURCES

Recommend Readings


Additional Readings

- Stability of Structures: Elastic, Inelastic, Failure & Damage Theories by Bazant & Cedolin
- Buckling Strength of Metal Structures by Bleich

DATES TO NOTE

Refer to MyUNSW for Important Dates available at:
https://student.unsw.edu.au/dates

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

COURSE EVALUATION AND DEVELOPMENT

The School of Civil and Environmental Engineering evaluates each course each time it is run through (i) the UNSW Course and Teaching Evaluation and Improvement (CATEI) process, and (ii) Focus Group Meetings.

As part of the CATEI process, your student assessments on various aspects of the course are graded; the Course Coordinator prepares a summary report for the Head of School. Any problem areas are identified for remedial action, and ideas for making improvements to the course are noted for action the next time that the course is run.

Focus Group Meetings are conducted by the four Year Managers (academic staff) for any students who wish to attend, in each year of the civil and/or environmental engineering programs. Student comments on each course are collected and disseminated to the Lecturers concerned, noting any points which can help improve the course.

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