Louisiana State University  
Colleague of Engineering  
Dept. of Civil & Environ. Eng.

**CE 4435 Indeterminate Structural Analysis (3 credits)**

**Course Outline**

**Instructor:** Dr. Aly Mousaad Aly  
Office: 3513D Patrick F. Taylor Hall  
Phone: 225-578-6654  
Email: aly@LSU.edu  
Office Hours: Tuesday & Thursday 12:00PM – 1:00PM

**Semester**  
Fall 2013

**Class Hours:**  
Tuesday & Thursday 10:30AM – 11:50AM  
Patrick F. Taylor Hall 2171

**Credits:**  
3 hours (in class)  
6 hours (out of class: reading, homework, and writing a report)

**Prerequisites:** A grade of ‘C’ or better in CE3415 (Structural Analysis I)

**Description:** The course topics include: analysis of statically indeterminate structures, method of consistent deformations, elastic energy, virtual work, slope deflection, moment distribution, and matrix formulations.

**Objectives:** The main objective of this course is to extend students understanding of structural analysis for indeterminate structures. After completing the course, the students will be able to:  
- Recognize if a structure is statically unstable, determinate or indeterminate;  
- Analyze simple indeterminate structures (plane trusses and frames) by using the consistent deformation method;  
- Describe the basic equations used in the slope-deflection method for analysis of frame structures;  
- Solve problems with simple indeterminate frame structures
by using the moment distribution method;

- Perform approximate analyses of moderate-size indeterminate frame structures using hand-calculations;
- Compute stiffness coefficients for simple plane frame/truss structures based on their physical interpretation;
- Analyze indeterminate frame structures using the matrix method for structural analysis;
- Use typical structural analysis software and critically evaluate the obtained results.


**Grading:** Assignment of final grades will be accumulated as follows:

- Homework (15 %)
- Quizzes (15 %) -- can be any time during the in class hours
- Midterm Exams (30 %)
- Final Exam (40 %)

All examinations are closed book.

**Grading Scale:** The total grade is assigned as follows:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>A</td>
<td>90 – 100%</td>
</tr>
<tr>
<td>B</td>
<td>80 – 89%</td>
</tr>
<tr>
<td>C</td>
<td>70 – 79%</td>
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<tr>
<td>D</td>
<td>60 – 69%</td>
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<tr>
<td>F</td>
<td>below 60%</td>
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**Policy** Students are responsible for attending classes and exams. All students should respect the right of others to have an equitable opportunity to learn and honestly demonstrate the quality of their learning. All students are deemed by the university to understand that if they are found responsible for academic misconduct, they will be subject to the academic misconduct procedures and sanctions, as outlined in the Code of Student Conduct.
Tentative Schedule:

1. Classes

<table>
<thead>
<tr>
<th>Topic</th>
<th>Lectures</th>
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<tbody>
<tr>
<td>Introduction</td>
<td>1</td>
</tr>
<tr>
<td>Stability, Determinacy and Indeterminacy</td>
<td>1.5</td>
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<tr>
<td>Virtual Work</td>
<td>1.5</td>
</tr>
<tr>
<td>Force Method</td>
<td>6</td>
</tr>
<tr>
<td>Approximate Methods of Structural Analysis</td>
<td>3</td>
</tr>
<tr>
<td>Slope-Deflection Method</td>
<td>1</td>
</tr>
<tr>
<td>Moment-Distribution Method</td>
<td>5</td>
</tr>
<tr>
<td>Matrix Structural Analysis</td>
<td>4</td>
</tr>
</tbody>
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2. Exams

   a. Midterm #1: Will be announced one week in advance
   b. Midterm #2: Will be announced one week in advance
   c. Final: Tuesday, December 10th, 2013 (7:30AM – 9:30AM)