**CES 3102 – Mechanics of Engineering Structures**  
**Fall 2012**

**Instructor**  
Dr. Jennifer Rice, Weil 475G, (352) 392-9537 x1488  
Email: jrice@ce.ufl.edu

**Meetings**  
9:35 am - 11:30 am, Tuesday & Thursday, FLG 260

**Office Hours**  
Tuesday & Thursday 2:00 to 3:00 pm, or by appointment.

**Class Website**  
E-learning (Sakai) [https://lss.at.ufl.edu/](https://lss.at.ufl.edu/)

**Co-requisite**  
EGM 3520, Mechanics of Materials

**Required Text**  

**2012-2013 Catalog Description**  
Introduction to structural loads, equilibrium, shear and bending moment diagrams, structural analysis software, classical methods for displacement determination, method of consistent deformations, slope deflection method, moment distribution method.

**Course Purpose**  
The purpose of this required course is to introduce students to the theory and application of structural analysis methods for trusses, beams and frames. The applications of these methods are presented in the context of practical structural engineering problems and their relation to subsequent design courses. This course is intended to continue students’ development of problems solving and critical reasoning skills essential to their success in professional engineering practice.

**ABET-Related Objectives and Outcomes**  
This course achieves the following ABET-related objectives and outcomes:  
Technical Proficiency: Our graduates will have ability to:  
3a. Apply knowledge of mathematics, science, and engineering to solve civil engineering problems

**Course Objectives**  
To develop the students’ ability to:  
1. Identify, formulate and solve problems encountered in structural analysis as an integral part of the design process in engineering practice  
2. Understand the behavior of structures and components under various loading conditions  
3. Apply classical and contemporary methods of structural analysis in engineering practice  
4. Communicate effectively in homework, quizzes and class discussions to strengthen these skills for use in practical engineering  
5. Introduce students to structural engineering software

**Topics**  
Overview of Structural Engineering  
Analysis of Statically Determinate Structures  
1. Equilibrium of beams, trusses, and frames  
2. Shear and moment diagrams for beams and frames  
3. Influence lines and critical loading for beams and trusses  
4. Deflection computation for beams and trusses
Analysis of Statically Indeterminate Structures
   1. Force method
   2. Stiffness method
   3. Moment distribution
   4. Structural analysis software

Calculators
Only NCEES approved calculators will be permitted during quizzes. Your quiz will be collected and your grade will be a zero if you are caught using a non-approved calculator. The approved calculators include the following:
• Hewlett Packard – HP 33s and HP 35s
• Casio – fx-115 ES, fx-115 MS, fx-115 MS Plus, fx-115 MS SR.
• If you are unsure about your calculator, it is your responsibility to check with the instructor for approval. Calculators will not be provided if you forget or bring the wrong calculator.

Laptops/Cell Phones/etc.
The use of any electronic device, except an approved calculator, is not permitted during quizzes. Your quiz will be collected and your grade will be a zero if you are caught using a non-approved electronic device. Phone use of any kind is not permitted during lectures. Please turn your phone off or to a silent ring and refrain from using it during class.

Class Structure and Attendance
This class meets twice a week, 100 minutes per class period. Each period will start with a brief review of previous material and/or questions on homework, followed by a lecture on new material. Usually a short break will be given part way through the lecture period. Quizzes will be given approximately every two weeks (see below). Regular attendance is strongly recommended for success in this course. While attendance does not make up a specific component of the course grade, it will be reflected in homework and quiz grades.

Evaluation Process
Homework: Eight homework assignments will make up 15% of your final grade. Seven problems sets will be assigned throughout the semester and will be due at the time of a quiz given on the same material (see below). An eighth homework assignment (the Frame assignment) will be given over the structural analysis software you will learn in class. Homework assignments will be posted on the course website. Homework must be submitted on engineering paper with a clearly defined problem statement, given information, required information, and a clearly indicated solution(s). Homework that cannot be read will not be graded. All solutions must have correct units; solutions without correct units will be penalized. Assignments are due at the beginning of class (9:35 am) on the due date unless otherwise stated. Late homework will not be accepted and will receive a grade of zero. The lowest homework score will be dropped (not to include the Frame assignment).

Quizzes: Seven in-class, closed-book quizzes will comprise 85% of your final grade. All work and solutions (with correct units and direction) are to be shown on the quiz in the space provided. Students who must miss a quiz due to University approved business should notify the instructor in advance with a written explanation for the absence along with the appropriate documentation.

The lowest of the first six quiz grades will be dropped. This policy removes the need for make-up quizzes caused by unplanned or conflicting events, illness, etc. No make-up quizzes will be given.
Grading Policy

90-100% A  
80-89% B  
70-79% C  
60-69% D

The instructor reserves the right to adjust the grade distributions; i.e. grades will not be adjusted for individuals.

Undergraduate students, in order to graduate, must have an overall GPA and an upper-division GPA of 2.0 or better (C or better). Note: a C- average is equivalent to a GPA of 1.67, and therefore, it does not satisfy this graduation requirement. Graduate students, in order to graduate, must have an overall GPA of 3.0 or better (B or better). Note: a B- average is equivalent to a GPA of 2.67, and therefore, it does not satisfy this graduation requirement. For more information on grades and grading policies, please visit:

Student Grade Appeals

To adequately address grade appeals on homework assignments and quizzes, they will not be discussed at the start, during, or at the end of the class period. Students may submit a written (typed) memo to Dr. Rice (in class or via e-mail) within two class periods of when the grade is posted. The memo must clearly state the reason for appealing the grade as well as a proposed solution.

Academic Misconduct

All students admitted to the University of Florida have signed a statement of academic honesty committing them to be honest in all academic work and understanding that failure to comply with this commitment will result in disciplinary action. This statement is a reminder to uphold your obligation as a UF student and to be honest in all work submitted and exams taken in this course and all others. Academic dishonesty will not be tolerated. Ignorance provides no protection from the consequences. The University Student Code of Conduct may be found at www.dso.ufl.edu/sccr/honorcodes/conductcode.php.

Disability Policy

Any student who, because of a disability, may require special arrangements in order to meet the course requirements should contact the instructor as soon as possible to make any necessary arrangements. Students should present appropriate verification from the Disability Resource Center (DRC) during the instructor’s office hours or by appointment. For additional information, you may contact the DRC office at 001 Building 0020 (Reid Hall), 352-392-8565 or visit http://www.dso.ufl.edu/drc/.

Counseling Services

Resources are available on campus for students having personal problems or lacking clear career and academic goals. The resources include:

- UF Counseling & Wellness Center, 3190 Radio Rd, 352-392-1575, psychological and psychiatric services.
- Career Resource Center, Reitz Union, 352-392-1601, career and job search services.
# Syllabus (tentative)

<table>
<thead>
<tr>
<th>Class</th>
<th>Date</th>
<th>Chapter</th>
<th>Topic</th>
<th>HW Assigned</th>
<th>Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8/23/2012</td>
<td>1</td>
<td>Introduction, Materials and Structures, Idealization</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>8/28/2012</td>
<td>2, 5.5</td>
<td>Reactions, Determinacy, Multi-member Structures</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>8/30/2012</td>
<td></td>
<td>Quiz 1 - Reactions, Equilibrium, Determinacy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>9/6/2012</td>
<td>3</td>
<td>Trusses - Method of Sections</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>9/11/2012</td>
<td>4</td>
<td>Shear and Moment Diagrams</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>9/13/2012</td>
<td></td>
<td>Quiz 2 - Trusses</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>8</td>
<td>9/18/2012</td>
<td>4</td>
<td>Shear and Moment Diagrams</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>9/20/2012</td>
<td>6</td>
<td>Influence Lines - Construction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>9/25/2012</td>
<td>6</td>
<td>Influence Lines - Application</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>9/27/2012</td>
<td></td>
<td>Quiz 3 - Shear and Moment Diagrams</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>12</td>
<td>10/2/2012</td>
<td>8</td>
<td>Beam Deflections - Double Integration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>10/4/2012</td>
<td>8</td>
<td>Beam Deflections - Double Integration, Analysis Software</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>10/9/2012</td>
<td>8</td>
<td>Beam Deflections - Moment-Area</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>10/11/2012</td>
<td></td>
<td>Quiz 4 - Influence Lines</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>16</td>
<td>10/16/2012</td>
<td>8</td>
<td>Beam Deflections - Moment-Area</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>10/18/2012</td>
<td>9</td>
<td>Energy Methods, Virtual Work</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>10/23/2012</td>
<td>9</td>
<td>Virtual Work for Beams and Trusses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>10/25/2012</td>
<td></td>
<td>Quiz 5 - Double Integration and Moment-Area</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>20</td>
<td>10/30/2012</td>
<td>9</td>
<td>Virtual Work for Beams and Trusses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>11/1/2012</td>
<td>9</td>
<td>Virtual Work for Beams and Trusses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>11/6/2012</td>
<td>10</td>
<td>Indeterminate Analysis - Force Method</td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>11/8/2012</td>
<td></td>
<td>Quiz 6 - Virtual Work</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>24</td>
<td>11/13/2012</td>
<td>15*</td>
<td>Stiffness Method Introduction, Spring Structures</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>11/15/2012</td>
<td>15*</td>
<td>Indeterminate Analysis - Stiffness Method - Beams</td>
<td></td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>11/20/2012</td>
<td>15*</td>
<td>Indeterminate Analysis - Stiffness Method - Beams</td>
<td></td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>11/22/2012</td>
<td>**</td>
<td><strong>No class - Thanksgiving</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>11/27/2012</td>
<td>16*</td>
<td>Indeterminate Analysis - Stiffness Method - Frames</td>
<td></td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>12/4/2012</td>
<td></td>
<td>Quiz 7 - Indeterminate Analysis</td>
<td>7</td>
<td></td>
</tr>
</tbody>
</table>

* See posted course notes to supplement text material