AE 323 – Applied Aerospace Structures (3 Credit Hrs.)
Spring 2013

Instructor: Mr. Owen Kingstedt
Email: kingste1@illinois.edu
Office: 323 Talbot Lab
Office Hours: 2-4pm Mondays, 9am-11am Tuesdays, Fridays 10-11am and by appointment

TA: Mr. Ravi Kumar Tumkur Revannasiddaiah
Office: 319F Talbot Lab
Email: tumkur1@illinois.edu
Office Hours: 2-4pm Wednesdays, 2-4pm Thursdays and by appointment

Prerequisites:
Required: MATH 241: Calculus III
          MATH 285: Introduction to Differential Equations
          TAM 210: Introduction to Statics

Recommended but not required: AE 321: Mechs. of Aerospace Structures

Lecture: 119 Materials Science & Eng. Building, Monday, Wednesday and Friday (MWF) 9:00-9:50am

Course Objectives:
This course is designed to introduce students to the fundamental concepts of the engineering theory of bending, torsion and extension of aircraft structures and to allow students to solve Boundary Value Problems (BVP) of such structures subjected to a variety of loads and boundary conditions. The specific objectives of this course are for the students to:
(a) be able to solve for stress, strain and displacement fields in beam bending problems,
(b) be able to solve thick and thin walled, single and multi-cell torsion problems,
(c) understand the use of energy methods and their equivalence with equilibrium methods,
(d) become familiar with elastic column instability (buckling) problems,
(e) be able to predict failure of these structures,
(f) obtain an introduction into the field of aeroelasticity.

Recommended Text:

This text is not specifically required for the course, but is recommended as an aid in the understanding of the material presented during lecture.

Website:
The course website is hosted on Compass2g and will contain announcements, homework, homework solutions, equations sheets, etc. It is recommended that students check Compass2g regularly for updates on the course throughout the semester.
Academic Integrity:
The Aerospace Engineering department expects all students to conduct their academic work to the highest ethical standards. All homework problems and exams must represent your own work. Students may aid each other on homework through discussion when formulating solutions. Each student is responsible for submitting their own homework solutions.

Students are expected to know and comply with the University Student Code:


Homework:
There will be homework distributed throughout the semester, posted on the course website. Assigned homework must be submitted on the due date at the beginning of lecture. During the semester students will be allowed to submit one assignment to the course mailbox (300 Talbot Lab) by 5pm on the due date without penalty. Homework submitted after 5pm on the due date will not be accepted unless a prior arrangement has been made with the instructor via email, prior to the due date of the homework. The lowest homework score will be dropped when calculating the course grade.

Homework solutions should be neat and orderly. Problems may be solved using Mathematica, Maple, etc., provided the code is submitted with the homework solution.

Homework exercises should mainly be viewed as a learning tool to help you understand the course material. It is very difficult to master the course material without being in a position to solve a large proportion of these problems. Your chances of success on exams will increase drastically if you complete the homework on a regular basis.

Examinations:
There will be two (2) midterms and one (1) final exam. All midterm exams are one hour, closed notes, closed book exams, and will occur during the regular course meeting time. An equation sheet will be provided, by the instructor, for use on the exam. A copy of the equation sheet can be found on the course website. No aids beyond a calculator, and the provided equation sheet can be used by students on a midterm or final exam. The use of cellular phones or any other electronic device during and exam is strictly prohibited, and is a violation of the student code. If you are unable to take and exam because of a conflict, you must contact the instructor via email prior to the exam. All excuses must be verifiable with documentation from the appropriate source, such as McKinley, a physician or the appropriate dean. Make-up exams will be given only under exceptional circumstances.

The topics and tentative dates for each exam are listed below. Note that the topic of engineering mechanics builds upon itself, thus exams are highly likely to contain material that may have been on a previous exams, homework and lectures.

Midterm Exam 1: March 6th, 9am
1.1 Stresses
1.2 Strains
1.3 Material Constitution
2.1 Beam Bending

Midterm Exam 2: April 24th, 9am
2.2 Beam Torsion
3.1 Work and Potential Energy Principles
3.2 Analytical Solutions of Statics Problems

Final Exam: **May 6th, 8-11am**  
ALL course material

Exam question solutions may be reviewed during lecture after the exam. Electronic copies of the exams or solutions will not be posted on the course website.

**Grades:**

Grades are earned based on each course component have the following weights.
- Homework (avg.): 15%
- Midterm 1: 25%
- Midterm 2: 25%
- Final: 35%

Example of how to calculate final course grade:
- Homework Avg: 93% x 15% = 14.0%
- Midterm 1: 76% x 25% = 19.0%
- Midterm 2: 92% x 25% = 23.0%
- Final Exam: 84% x 35% = 29.4%
- Final Grade: = 85.4 % (B)

**Grading Scale:**

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>92-100%</td>
</tr>
<tr>
<td>A-</td>
<td>90-91.99%</td>
</tr>
<tr>
<td>B+</td>
<td>88-89.99%</td>
</tr>
<tr>
<td>B</td>
<td>82-87.99%</td>
</tr>
<tr>
<td>B-</td>
<td>80-81.99%</td>
</tr>
<tr>
<td>C+</td>
<td>78-79.99%</td>
</tr>
<tr>
<td>C</td>
<td>72-77.99%</td>
</tr>
<tr>
<td>C-</td>
<td>70-71.99%</td>
</tr>
<tr>
<td>D+</td>
<td>68-69.99%</td>
</tr>
<tr>
<td>D</td>
<td>62-67.99%</td>
</tr>
<tr>
<td>D-</td>
<td>60-61.99%</td>
</tr>
<tr>
<td>F</td>
<td>&lt;60%</td>
</tr>
</tbody>
</table>

**Attendance:**

In class attendance is highly recommended as example problems covered in lecture will not be made available on the course website. If a class is missed, students should consult with fellow students to obtain the covered material.

**Computers/Cell phones:**

Cell phones should be set to silent/vibrate during lecture. Computers should be used in a productive manor during lecture, to review material or take notes. Please refrain from making your cell phone, computer or other electronic device a distraction in the classroom.

**Note:**

The course instructor reserves the right to make changes to the syllabus during the semester as necessary. Students will be notified of changes through postings on the course website.