MAE 150B (Online)

Aerodynamics

Summer 2012

Instructor: Xiaolin Zhong, Professor of MAE, UCLA
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Office Hours: Because of the nature of online instruction, I do not hold regular office hours. Instead, your questions are handled through e-mails. Please send me and/or the TA e-mails regarding your questions. For general questions, the questions and answers will both be e-mailed to all students of the class, and be posted as class announcements in courseweb.

TA: Mr. Danny Kahei Fong.

Starting from the second week, Danny will hold two-hour weekly web-based interactive TA sessions to help you with homework problems and to answer questions, etc. The details and time of the TA sessions will be announced to the class by Danny.

Prerequisite: MAE 103 and 150A, or equivalent

Lectures: We will release two lectures each week, with an exception that only one lecture is given in the week of the midterm exam. Lectures are to be posted the weekend before the lectures are to be viewed. The power-point slides I used for the lectures will also be posted on the courseweb.

Class Web Site: http://courseweb.seas.ucla.edu. All handouts, assignments, and solutions will be posted on this website only.


Grading:

1. Homework: 15%. Weekly homework will be assigned and collected through courseweb. HW solutions will also be posted on the same class web site.
2. Midterm Exam: 30% (Saturday, July 28, 2012, 1–3 pm, closed book except your own notes of two one-sided pages)
3. A Computer Project: 10%. The TA will post project
assignment and instructions after the midterm exam.
4. **Final Exam:** 45% (Saturday, September 1, 2012, 1-4 pm, closed book except your own notes of six one-sided pages.)

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**MAE 150B: Aerodynamics**

**Course Outline**

1. **Brief Review of Basic Equations for Incompressible Flow (Chapter 1-2)**
   - Introduction
   - Conservation of mass, momentum and energy
   - Kinematics

2. **Advanced Aspects of Inviscid Flow Theory (Chapter 3)**
   - Laplace's equation
   - Source, sink and flow over a cylinder
   - Source panel method

3. **Incompressible Flow over Airfoils (Chapter 4)**
   - Characteristic parameters for airfoil and wing aerodynamics
   - Joukowski airfoil and Kutta condition
   - Classical thin airfoil theory
   - Vortex panel numerical method

4. **Incompressible Flow over Wings of Finite Span (Chapter 5)**
   - Lifting-line theory
   - Lifting-surface theory

5. **Gas Dynamics (Chapter 7-9)**
   - Review of normal shock waves
   - Oblique shock waves
   - Prandtl-Mayer expansion waves

6. **Subsonic and Supersonic Flow Around Thin Airfoils (Chapter 10-12)**
   - Linear velocity potential
   - Transonic aerodynamics
   - Subsonic compressible flow over airfoils
   - Linearized supersonic flow

(This section will not be covered at length due to the time constraint)