AE 323 – APPLIED AEROSPACE STRUCTURES
Spring 2019

Instructor:	Prof. Philippe H. Geubelle Office: 306F Talbot Lab Tel: (217)244-7648 geubelle@illinois.edu
Class Hours:	Monday, Wednesday, Friday 9:00 am – 9:50 am in 124 Burrill Hall.
Teaching Assistant:	Sagar Vyas MS student in AE sagarv2@illinois.edu
Office Hours:	**PG:** Thursdays 4-5 pm in **301 Talbot** **SV:** Mondays, Wednesdays and Fridays in 3-4pm in **105 Talbot**
Practice Session:	A weekly practice session will take place **every Tuesday from 5 to 6pm in 153 MEB**. The objectives of the session are (i) to answer any question on the last and/or next homework assignments, and (ii) to solve problems taken, primarily, from previous exams. Participation in the practice sessions is voluntary and no new material will be covered there.
Course Website:	A web site has been created on compass2g for the course to post the homework problems, and the PowerPoint slides used in class.
Course Notes:	The PowerPoint slides will be used primarily to cover the theoretical concepts, while applications will be solved on the blackboard. Since the application problems are not include in the posted slides, attendance to the lectures is greatly recommended.
Textbook:	Analysis of Aircraft Structures: An Introduction – Second Edition B.K. Donaldson, Cambridge University Press, 2008 Although we will do a review of concepts of the theory of elasticity discussed in Part I of the book, the course covers primarily Parts III, IV and V of the book.

Exams: Two 50-minute midterm exams (scheduled around weeks 8 and 12) and a three-hour final exam will be held. All exams will be **closed book and closed notes** and the material covered in each exam is **cumulative** from the beginning of the semester. An **equation sheet** will be provided in each exam and **no calculators will be allowed**.

Homework: A few application problems will be assigned every Wednesday in class. You will have a week to solve these problems.

Symbolic Math Software: In the solution of the boundary value problems encountered in the course, some of you might find more efficient to use a symbolic math software such as Mathematica, Maple, or Matlab.

Graphical output: Some of the assignments will include a graphical representation of the solution (e.g., the spatial variation of the beam deflection). Feel free to use any software to that effect (although Matlab is probably the easiest one to use). But always remember to clearly label the axes and to provide a curve legend if necessary. Also, always include your name in the title of the plot.

Grading:

Homework assignments:	30%
Midterm exam #1:	20%
Midterm exam #2:	20%
Final exam:	30%

Final grades will be allocated using the above percentages. A plus/minus scale will be used, although there is no grade curving.

Objectives: This course is designed to introduce students to the fundamental concepts of engineering theory of bending, torsion and extension of aircraft structures and to allow students to solve Boundary Value Problems of such structures subjected to a variety of 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 thin-walled, single and multi-cell torsion problems,
(c) be introduced to introductory concepts of aeroelasticity,
(d) understand the use of energy methods and their equivalence with equilibrium methods,
(e) become familiar with elastic column instability (buckling) problems.

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