AERSP 470- Advanced Aerospace Structures
Syllabus - Spring Semester 2014

Goals: The objectives of the course are to help students:
1) Appreciate the roles that structures and structural materials play in aerospace vehicles;
2) Understand general design concepts for aerospace structures: vehicles, components, and materials;
3) Develop the analysis tools and skills needed to analyze the static and dynamic performance of aero structures;
4) Gain experience identifying, formulating, and solving aerospace structural engineering problems.

Times and Location: M W F 12:20 – 1:10 PM 220 Hammond (I think?!) 

Prerequisites: AERSP 301, AERSP 304, EMCH 215


References:

Grading: 
Homework Assignments 30% 
Mid term Exam 30% 
Final Exam 40% 

Instructor: Jose Palacios OFH MW 9-10 PM 
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Course Topical Outline:

Review (Chps 4, 5, 16) 2 weeks 
Aerospace Structural Design Principles (Energy Methods, Beam Bending)

Plate Theory (Chp 7) 3 weeks 
Thin Plate Theory, Stress Resultants and Kinematics 
Thin Plate Governing Equations and Boundary Conditions

Advanced Concepts in Buckling of Lightweight Structures (Chp 9, etc) 2 weeks 
Thin Plate Solutions and Plate Buckling 
Local and Global-Local Buckling of Thin Walled Structures

Composite Materials (Chp 25) 3 weeks 
Introduction to Advanced Fiber Composites 
Analysis of Orthotropic Composite Plies 
Analysis of Composite Laminates – Stiffness Matrix 
Analysis of Composite Laminates – Stress and Strain 
Analysis of Composite Laminates – Thermal Expansion 
Failure Mechanisms and Analysis

Introductory Structural Dynamics and Aeroelasticity (Chps 10, 28) 4 weeks 
Introduction to Structural Vibration, Beam Free Vibration 
Forced Response of a Beam Structure 
Airfoil and Wing Divergence 
Wing Divergence, Swept Wings 
Control Effectiveness and Reversal 
Airfoil Flutter 
Wing Flutter, Swept Wings

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In order to receive consideration for reasonable accommodations, you must contact the appropriate disability services office at the campus where you are officially enrolled, participate in an intake interview, and provide documentation: http://equity.psu.edu/ods/guidelines. If the documentation supports your request for reasonable accommodations, your campus’s disability services office will provide you with an accommodation letter. Please share this letter with your instructors and discuss the accommodations with them as early in your courses as possible. You must follow this process for every semester that you request accommodations.