



AERSP 301 – Aerospace Structures I Fall Session



Course Outcomes

Students who successfully complete this course will be able to:

1. Identify design features of aerospace structures, and calculate load factors and margins of safety;
2. Analyze the behavior of thin-walled beams subjected to combined loads, including bending, torsion, and shear;
3. Analyze the stability of structural elements and determine critical buckling loads; and
4. Develop structural finite element models and use them to predict structural deformations and stresses under external loads.

Times and Locations

M W F 9:05 am – 9:55 am, Room 220 Hammond

Additional optional evening problem and exam review sessions will be scheduled

Prerequisites

E MCH 210 or 013; Prerequisite of current: AERSP 313, EMCH 215

Optional Text Book

Megson, T.H.G., *Aircraft Structures for Engineering Students*, 5th ed., Elsevier, 2012

References

Sarafin, T.P., and Larson, W.J., *Spacecraft Structures and Mechanisms*, Kluwer, 1995
 D.K. Donaldson, *Analysis of Aircraft Structures: An Introduction*, McGraw-Hill, 1993

Course Web Page

<http://cms.psu.edu> (PSU Course Management System, “ANGEL”)

Topical Course Outline:

	No. Weeks	Chapters
Introduction to Flight Vehicle Structures	1	12
Aerospace Structures Design Concepts	2	13, 14, 15
- Loads, structural members and roles, types of failure, damage tolerance, conservatism in design, margins of safety, stress reports		
Analysis of Aircraft Structures Review	2	
- Elasticity (stress, strain, plane stress, solutions, stress concentrations)		1, 2, 3
- Structural materials (conservative eqn's, temp. effects, failure, composites)		11
- Extension and bending of beams; deflections and stresses		16
Torsion and Shear of Thin-Walled Beams; Deflections and Stresses	EXAM I 2	17, 18, 19
Work and Energy Principles	EXAM II 2	4, 5
Finite Element Analysis (Bars and Beams)	3	6
Structural Stability and Buckling of Beams	FINAL 2	8, 7, 9

Grading

Homework	7 assignments	20%
Participation	Attendance, contributions to class	+5%
Midterm I	10/10/13 6:30 – 7:45, 262 Willard	25%
Midterm II	11/19/13 6:30 – 7:45 362 Willard	25%
Final Exam	Location, Time TBD	30%

Instructors

Dr. Jose Palacios (814) 867 - 4871
 TBD

Office Hours: M W 11:00 am – 12:30 pm, 233H Hammond
 Office Hours: T R 2:00 pm – 3:30 pm, 27 Hammond

Accessibility:

Penn State welcomes students with disabilities into the University's educational programs. If you have a disability-related need for reasonable academic adjustments in this course, contact the Office for Disability Services (ODS) at 814-863-1807 (V/TTY). For further information regarding ODS, please visit the Office for Disability Services Web site at <http://equity.psu.edu/ods/>.

In order to receive consideration for course accommodations, you must contact ODS and provide documentation (see the documentation guidelines at <http://equity.psu.edu/ods/guidelines/documentation-guidelines>). If the documentation supports the need for academic adjustments, ODS will provide a letter identifying appropriate academic adjustments. Please share this letter and discuss the adjustments with your instructor as early in the course as possible. You must contact ODS and request academic adjustment letters at the beginning of each semester.