

Course Registration Numbers: 58068

Schedule: MWF 4:30 – 5:20; 1109 ARMS

Instructor: Michael D. Sangid; Email: msangid@purdue.edu
Office: 3329 ARMS; Telephone: 494-0146
Office Hours: Wednesday and Friday: 3:30 – 4:30 pm, additionally I will be available briefly after each class or by appointment

TA: Nithya Subramanian Email: nsubram@purdue.edu
Office Hours: Nithya will hold regular office hours for HW assistance.
Thursdays 3:30 – 5:30 in room 3119 ARMS. Please seek HW help in the scheduled office hours of the TA (preferred) or by emailing the TA first, if possible.

Prerequisites: AAE 203 – Aeromechanics I

Required Text: *Mechanics of Materials*, James M Gere & Barry J. Goodno, Cengage Learning (ISBN #: 978-0-534-55397-5), 7th Edition, 2009.

Course Description: Review of statics and equilibrium. Basic concepts of mechanics of solids. Mechanical behavior of materials. Description of structural components. Axially-loaded members. Torsion of shafts. Transverse loading of beams. Combined loading. Plane stress and applications. Failure theories. Emphasis on aerospace structural component applications.

Approach: Active learning – classes are a mixture of lecture and discussion

Grading: 3 Credit Hours – HW (40%), Midterm 1 (20%), Midterm 2 (20%), Final (20%)

Homework: Assigned weekly on Monday and due on the following Friday. You are allowed to drop the lowest score out of the 11 HW assignments.

<u>Lecture Date</u>	<u>Material to Cover</u>	<u>Reading</u>	<u>HW</u>
Week 1			
1 M 1/9/12	Syllabus and Review of Forces	#11.1-11.3	
2 W 1/11/12	Moments and Equilibrium Eqns	#11.5-11.7	
3 F 1/13/12	Equilibrium Examples / Free Body Diagram	#11.4, 11.8	HW 1 - Assigned
Week 2			
M 1/16/12	No Class - MLK Day		
4 W 1/18/12	Statics of Structures and Trusses	#11.9	
5 F 1/20/12	End Statics / Mechanics of Materials Intro		HW 1 - Due
Week 3			
6 M 1/23/12	Normal Stress & Strain	1.1 - 1.2	HW 2 - Assigned
7 W 1/25/12	Mechanical Properties of Materials	1.3 - 1.4	
8 F 1/27/12	Elasticity (Hooke's Law/Poisson's Ratio)	1.5	HW 2 - Due
Week 4			
9 M 1/30/12	Shear Stress and Strain	1.6	HW 3 - Assigned
10 W 2/1/12	Allowable Loads and Failure	1.7 - 1.8	
11 F 2/3/12	Axial Loaded Members	2.1 - 2.2	HW 3 - Due
Week 5			
12 M 2/6/12	Nonuniform Cross-Section Members	2.3 - 2.4	HW 4 - Assigned
13 W 2/8/12			
14 F 2/10/12	Stresses on Inclined Sections	2.6	HW 4 - Due
Week 6			
15 M 2/13/12	Strain Energy	2.7	HW 5 - Assigned
16 W 2/15/12	Fatigue and Stress Concentrations	2.9 - 2.10	
17 F 2/17/12	Review and Catch-Up		HW 5 - Due
Week 7			
18 M 2/20/12	Torsional Deformation of a Circular Bar	3.1 - 3.2	
(*) Tu 2/21/12	Midterm I (1-17): 6:30-7:30, KRAN G016		
19 W 2/22/12	Uniform and Nonuniform Torsion	3.3 - 3.4	
20 F 2/24/12	Torsion as Pure Shear: Stress/Strain	3.5 - 3.6	
Week 8			
21 M 2/27/12	Torsion: Indeterminacy and Strain Energy	3.8 - 3.9	HW 6 - Assigned
22 W 2/29/12	Torsion of Thin Walled Tubes	3.1	HW 7 - Assigned
23 F 3/2/12	Beams in Shear and Bending	4.1 - 4.3	HW 6 - Due
Week 9			
24 M 3/5/12	Shear Force & Bending Moment Diagrams	4.4 - 4.5	
25 W 3/7/12	Centroids, Moment of Inertia, Etc	12.1 - 12.5	HW 7 - Due
F 3/9/12	Class Canceled (you're welcome)		
Week 10			
M 3/12/12	No Class - Spring Break		
W 3/14/12	No Class - Spring Break		
F 3/16/12	No Class - Spring Break		
Week 11			
26 M 3/19/12	Beam Bending Normal/Shear Stresses	5.1 - 5.5	HW 8 - Assigned
27 W 3/21/12	Design Criteria	5.6, 5.8	
28 F 3/23/12	Shear Stresses in Webs of Beams	5.9 - 5.10	HW 8 - Due

Week 12			
29 M 3/26/12	(***) Built-Up Beams and Shear Flow	5.11 - 5.12	HW 9 - Assigned
30 W 3/28/12	Composite Beams	6.2	
31 F 3/30/12	Review and Catch-Up		HW 9 - Due
Week 13			
32 M 4/2/12	Plane Stress	7.1 - 7.2	
(*) Tu 4/3/12	Midterm II (18-31): 6:30 - 7:30, KRAN G016		
33 W 4/4/12	Principal Stress and Max Shear Stress	7.3	
34 F 4/6/12	Mohr's Circle for Plane Stress	7.4	
Week 14			
35 M 4/9/12	Hooke's Law for Plane Stress	7.5	HW 10 - Assigned
36 W 4/11/12	Triaxial and 3D Stress	7.6	
37 F 4/13/12	Plane Strain	7.7	HW 10 - Due
Week 15			
38 M 4/16/12	Pressure Vessels	8.1 - 8.3	HW 11 - Assigned
39 W 4/18/12	Buckling and Stability	11.1 - 11.2	
40 F 4/20/12	Boundary Conditions of Columns	11.3 - 11.4	HW 11 - Due
Week 16			
41 M 4/23/12	(**) Applications, Review, and Catch-Up		
42 W 4/25/12	TBD		
F 4/27/12	TBD		
Week 17			
(*) TBD	Final Exam (32 - 41)		

(*) Indicates an Exam

(**) Guest Lecturer: Prof. Skip Grandt

(***) Guest Lecturer: Prof. C.T. Sun

(#) Indicates reading material from Prof Corless notes of AAE203:

<https://engineering.purdue.edu/AAE/Academics/Courses/aae203/2009/fall/Notes>