

AE 3120 - INTRODUCTION TO STRUCTURAL ANALYSIS

Text: *Mechanics of Materials, 5th Edition, by James M. Gere*

<http://www.ae.gatech.edu/~earmanio/COURSES/ae3120/syllabus.htm>

Section A:

MWF 2:05 pm - 2:55 pm

Guggenheim 244

Instructor: Dr. Erian Armanios

Office: Weber 210-A

Telephone: 894-8202

E-mail: erian.armanios@ae.gatech.edu

Office Hours: W 3:00-4:00

Weekly Problem Sessions T 11:00-12:00

Guggenheim-AE: 442

Section B:

MWF 10:05 am - 10:55 am

Guggenheim 442

Instructor: Dr. John Holmes

Office: Weber 204

Telephone: 894-1559

E-mail: John.holmes@aerospace.gatech.edu

Office Hours: W 11:00-12:00 and by

appointment

Weekly Problem Sessions T 11:00-12:00

Guggenheim-AE: 442

Chapter	Title	Suggested Problems
4.1-4.5	Review of AE2120, S.F. & B.M.	4.5-15, 5-25, 5-31
5	Stresses in Beams	
5.1-3	Introduction, Pure and Nonuniform Bending	
5.4	Longitudinal Strains in Beams	5.4-4, 5-4
5.5	Normal stresses in Beams	5.5-8, 5-12, 5-17, 5-21
5.6	Design of Beams	5.6-12, 6-13, 6-16, 6-21
5.8	Shear stresses in Beams	5.8-5, 8-7, 8-8, 8-12
5.10	Shear stresses in the Webs of Beams With Flanges	5.10-2, 10-8, 10-10, 10-12
5.11	Built-Up Beams and Shear Flow	5.11-2, 11-5, 11-9, 11-10
5.12	Beams with Axial Loads	5.12-3, 12-4, 12-7, 12-15, 12-17
3	Torsion	
3.1-3	Introduction, Torsion of Circular Bars	3.2-3, 3-8, 3-15, 3-16
6	Stresses in Beams (Advanced Topics)	
6.1-3	Introduction, Composite Beams, Transformed- Section Method	6.2-2, 2-6, 2-10, 3-2, 3-10
6.5	Bending of Unsymmetric Beams	6.5-1, 5-3, 5-5, 6.4-4, 4-11
12.7	Products of Inertia	12.7-1, 7-3, 7-7
12.8	Rotation of Axes	12.8-5
12.9	Principal Axes and Moments of Inertia	12.9-6, 9-10
6.6-7	The Shear-Center Concept	

6.9 Open Sections Shear stresses and Shear Centers 6.8-1, 6.9-3, 9-4, 9-7, 9-12

9 Deflections of Beams

9.1-2	Introduction and Differential Equations	9.3-2, 3-4, 3-9
9.3	Deflections by Integration of Moment	9.3-12, 3-17, 3-19
9.4	Deflections by Integration of Shear and Load	9.4-8, 4-9
9.5	Method of Superposition	9.5-3, 5-6, 5-10, 5-14, 5-15, 5-19, 5-23

10 Statically Indeterminate Beams

10.1-2	Introduction and Types of Statically Indeterminate Beams	
10.3	Analysis by the Differential Equation of Deflection	10.3-3, 3-4, 3-10
10.4	Method of Superposition	10.4-2, 4-3, 4-5, 4-7, 4-16, 4-17

7 Analysis of Stress and Strain

7.1-2	Introduction, Plane Stress	7.2-2, 2-12, 2-16
7.3	Principal Stresses and Maximum Shear Stresses	7.3-10, 3-16
7.4	Mohr's Circle for Plane Stress	7.4-8, 4-16, 4-24
7.5	Plane Strain	7.7-11, 7-15

8 Applications of Plane Stress

8.1-2	Introduction and Spherical Pressure Vessels	8.2-3, 2-8
8.3	Cylindrical Pressure Vessels	8.3-4, 3-5, 3-6, 3-7
8.4	Maximum Stresses in Beams	8.4-4, 4-10
8.5	Combined Loadings	8.5-1, 5-10, 5-13, 5-17, 5-18

11 Columns

11.1-2	Introduction, Buckling and Stability	11.2-1, 2-3
11.3	Columns with Pinned Ends	11.3-6, 3-7, 3-8, 3-16, 3-19
11.4	Columns with Other Support Conditions	11.4-5, 4-7, 4-9, 4-10, 4-11
11.5	Columns with Eccentric Axial Loads	11.5-6, 5-9, 5-12

Reading: You are expected to read the assigned sections in your textbook and encouraged to check other sections and references. Learning is the ultimate goal.

Homework: The work you turn in is a product, with your name on it: it must represent your very best effort. I expect you to complete it on time, because you will plan your effort accordingly.
Work as many problems as possible, especially those marked with an asterisk (*). Each problem is an application of the principles presented in class and provides training on how to apply them. As you work these problems you will also appreciate the underlying assumptions and applicability of these principles. All work submitted must be done by you, and any help you get from your study group must be acknowledged. Refer to the Institute Honor Code when in doubt.

Homeworks are due on Fridays.

Exams: An imperfect means to evaluate your understanding not to punish you for your mistakes. We are always open to suggestions for improvement.

Grading: Home works 5%
Tests 60% (20% each)
Final 35%

Special Note from your Instructors:

Learning is a two-way process. We expect you to put forth your best effort as we do. Be assured that we are your best fans. We applaud as you progress, and brag about your achievements at every opportunity.

Test dates: February 7th, March 7th, and April 11th.

TAs: Mr. Samer Tawfik
Weber 206
F 11:00-12:00
(404) 385 2771
e-mail: gtg124e@prism.gatech.edu
Mr. Serkan Ozbay,
Weber 206
M 10:00-11:00
(404) 385-2771
e-mail: gte701q@prism.gatech.edu