Department of Engineering Technology

Title and Course Number: ET 310 and ET 310 Laboratory, Strength of Materials

Credits and Contact Hours: 4 cr. 42 contact hours -- lecture
40 contact hours – laboratory

Course Description: Application of the principles of strength of materials to practical design and analysis problems.

Prerequisites: ET 240 and Math 235

Textbook: Applied Strength of Materials, 4th or 5th Ed., by Robert L. Mott

Instructor: Kenny Stevens, P.E., ECIII Rm 383 and/or 183, 646-2491, Office hours: 3:00 - 4:30 M-T-W-Th.

Desired Outcomes	Assessment Tool
To conduct appropriate experiments in the laboratory as they apply to strength of materials and be able to interpret the results (ABET 9c).	Formal lab reports
To obtain a knowledge of appropriate engineering materials and their use in civil and mechanical construction (ABET 9e).	ASTM Standards presentation
To apply basic technical concepts to the solution of civil problems involving structures and material behavior (ABET 9f)	Class Homework
To perform standard analysis and design in the area of structures and machine elements (ABET 9g)	Design- based final exam
To promote awareness that material analyses are often keys in keeping projects on schedule and as such, reporting results in a timely manner is of the utmost importance (ABET 3k).	Timeliness of homework

Computer Usage: Excel, SolidWorks, MDSolids

Laboratory: Materials such as steel, aluminum, wood, plastics and composites are tested for their engineering properties. Topics include:

Report Writing
Stress-Strain Relationships (Data)
Static Tensile Test of Metals
Static Tensile Test of Plastics
Torsion Test of Cylindrical Rods
ASTM Standards
Direct Shear Test
Composite versus Traditional Materials
Hardness and Impact Tests
Small Clear Timber Tests
Stress in a Cantilever Beam (Strain Gages)
Observing Stress Concentrations
Finite Element Modelling

Oral and Written Communication Requirements: Periodic laboratory reports on material properties. These take the form of memoranda, business letters and formal reports.

Calculus Usage: Used in the development of shear, moment, slope & deflection equations.

Library Usage: The principal reference used in the class and laboratory is the ASTM Standards. Students must make use of these of these standards several times throughout the semester. These standards are available at the Zuhl Library.

Prepared By: Kenny Stevens 08/2010

ET 310 – Applied Strength of Materials
Fall 2010

Date	Topic(s)	Section In Text
20 Aug	Breaking Stuff	1.1-1.7
23Aug	Normal Stress	1.8-1.10
25 Aug	Normal Stress	1.8-1.10
27 Aug	Shearing Stress, Bearing Stress	1.11-1.16
30 Aug	What's Up Between Stress & Strain, Properties	2.1-2.12
1 Sep	Stress in Design	3.1-3.3
3 Sep	Stress in Design	3.4-3.8
6 Sep	**Holiday!! Please bring a car from home so we can break it in lab!!**	
8 Sep	Deformations	3.7
10 Sep	Deformations	3.8
13 Sep	Columns	11.1-11.3
15 Sep	Review	
16 Sep	EXAM #1	
17 Sep	Columns	11.3–11.6
20 Sep	Columns	11.6-11.10
22 Sep	Torsion w/ Circular Members	4.1-4.5
24 Sep	Design Based on Torsion	4.7-4.8
27 Sep	Angle of Twist	4.9-4.11
29 Sep	Beam Loadings and Reactions	5.1-5.3
1 Oct	Shear and Moment Diagrams	5.7-5.8
4 Oct	Shear and Moment Diagrams	5.9
6 Oct	Shear and Moment Diagrams	5.9
8 Oct	Centroids and Moments of Inertia	6.1-6.9
11 Oct	Bending Stresses	7.1-7.5
13 Oct	Review	
14 Oct	EXAM #2	
15 Oct	Beam Design and Stress Concentrations	7.6-7.12
18 Oct	Shear in Beams	8.1-8.6
20 Oct	Beam Deflection – General	9.1-9.4
22 Oct	Beam Deflection - Integration	9.5-9.6
25 Oct	Deflection Formulas & Superposition	9.7
27 Oct	Indeterminate Beams	9.8
29 Oct	Indeterminate Beams	9.8
1 Nov	Combined Stresses	10.1-10.4
3 Nov	Review	
4 Nov	EXAM #3	
5 Nov	Combined Stresses	10.5-10.7
8 Nov	Principal Stresses	10.8
10 Nov	Mohr's Circle	10.9
12 Nov	Mohr's Circle	10.9

15 Nov	Mohr's Circle	10.9
17 Nov	Thin Walled Pressure Vessels	12.1-12.4
19 Nov	Thin Walled Pressure Vessels	12.1-12.4
22-26 Nov	**Holiday Again!!! Isn't Materials class better than turkey?!**	
29 Nov	TBA	
1 Dec	TBA	
3 Dec	Review	
6 Dec (MON)	**Final Exam 8-10 am**	

More Tidbits

Instructor: Kenny Stevens Office: EC III Rm 383

Office Hours: 3:00-4:30 MTWF Ph. 646-2491

1. Final Grade will be based on the following breakdown:

   Homework – 18%
   Exams – 4 @ 18% each = 72%
   Quizzes – 10%
   Extra Credit for Student Organization involvement (3 meetings) 5%

2. Homework will be assigned during one class period and will be due at the start of the next class period. A minimum of a 50% homework grade will be needed to successfully complete the class. The maximum grade on late homework will be 50%.

3. Homework should be submitted on engineering paper and each sheet should contain only one problem (within practical limits). Multiple pages should be stapled in the upper left-hand corner and folded with the open side to the right. Your name and the problems contained in the homework should be written on the outside.

   Problems should be neat and organized. Make sure and include the problem statement (The Given) and the information that is to be found or calculated (The Find). Include all (repeat all) your calculations and any necessary sketches and/or free-body diagrams. Please enclose the final answer in a box.

   Since you are juniors and we will be bidding you a fond farewell in a few years, full credit will not be given unless the homework is presented in a professional manner, i.e. something that you would show to your employer. Something torn out of a notebook with all the little “flecks” hanging off of it will be given the attention it deserves.

4. At the discretion of the instructor, missed exams will be covered by the final exam.

5. If work or classes need to be missed, let the instructor before (repeat before) the class. The chances for an understanding ear are greatly diminished after-the-fact.

6. Cheating makes everybody mad. So just don’t. The university has all sorts of painful rules that nobody likes getting into. So just don’t (just the opposite of the NIKE commercial).

7. If you have a registered disability requiring appropriate accommodations, you can self-identify by providing documentation to the office of Disabled Student Programs in Garcia Annex. (646-1921). Appropriate accommodations may then be provided for you.