ME 2040 - S002: Mechanics of Materials – Spring 2019
3:30pm – 4:45pm TR, 201 Dillard Building

Instructor:
Dr. Garrett J. Pataky, Assistant Professor of Mechanical Engineering
Office: 245 Fluor Daniel EIB
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Email: gpataky@clemson.edu
Office Hours: by appointment

Text (Required): Mechanics of Materials (Tenth Edition), by R.C. Hibbeler

Other References:
Canvas, http://www.clemson.edu/canvas/
Mechanics of Materials (Second Edition), by M. Vable: http://madhuvable.org/books-2/introduction/

Graders: Ben Smith - bas2@g.clemson.edu

Course Objectives:
1. To demonstrate to the students how to develop approximate relationships that can be used to model the behavior of members comprising structures and machines.
2. To develop the students' ability to apply these relationships to practical situations in appropriate ways.
3. To develop the students' understanding of how materials and members with various geometric configurations respond to mechanical and thermal loads through application of these models.
4. To introduce the students to the role of solid mechanics in the design of structures and machines.

Student Learning Outcomes:
1. Students will be able to choose analysis methods that are appropriate to given situations, such as analysis of open vs. closed thin-walled section in torsion, statically indeterminate vs. statically determinate analysis, etc.
2. Students will be able to determine the stresses and deformations in members that have various cross-sectional shapes and are subject to given loads.
3. Students will be able to analyze statically determinate and statically indeterminate members and assemblies of members.
4. Students will be able to analyze stresses in 3D for simple members and assemblies.
5. Students will be able to determine the magnitude and location of maximum stresses in members.
6. Students will recognize the role of analysis in the design of structures and machines by using analysis methods to perform sizing of simple members.

Prerequisites:
- Required: MATH2060 and ME2010, each with a C or better
- Prerequisites or concurrent enrollment: MATH2080, ME2220, and MSE2100, each with a C or better

Academic Integrity Statement:

"As members of the Clemson University community, we have inherited Thomas Green Clemson's vision of this institution as a 'high seminary of learning.' Fundamental to this vision is a mutual commitment to truthfulness, honor, and responsibility, without which we cannot earn the trust and respect of others. Furthermore, we recognize that academic dishonesty detracts from the value of a Clemson degree. Therefore, we shall not tolerate lying, cheating, or stealing in any form."

Title IX:

Clemson University is committed to a policy of equal opportunity for all persons and does not discriminate on the basis of race, color, religion, sex, sexual orientation, gender, pregnancy, national origin, age, disability, veteran's status, genetic information or protected activity (e.g., opposition to prohibited discrimination or participation in any complaint process, etc.) in employment, educational programs and activities, admissions and financial aid. This includes a prohibition against sexual harassment and sexual violence as mandated by Title IX of the Education Amendments of 1972. This policy is located at http://www.clemson.edu/campus-life/campus-services/access/title-ix/. Mr. Jerry Knighton is the Clemson University Title IX Coordinator and Director of Access and Equity, located at 111 Holtzendorff Hall, 864-656-3181 (voice) or 864-565-0899 (TDD).

Disability Accommodation:

Students with disabilities who need accommodations should make an appointment to meet with a staff member in the Student Accessibility Services as soon as possible to discuss specific needs within the first month of classes. Students should present a Faculty Accommodation Letter from Student Disability Services **within the first month of classes**. Student Disability Services is located in Suite 239 Academic Success Building (864-656-6848; studentaccess@lists.clemson.edu). Please be aware that accommodations are not retroactive and new Faculty Accommodation Letters must be presented each semester.

Attendance:

Attendance is *highly* recommended but not required. Students are responsible for all in-class announcements and group exercises. All students are expected to arrive on time and remain in class for the full period. If arriving late/leaving early, students are expected to do so without creating a disturbance. Students are expected to wait for 15 minutes if the instructor is late for class.

Grading Policy:

Course grades will be assigned as follows:
A=90-100, B=80-89, C=70-79, D=69-60, F=0-59

The final grades will be broken down into the following components:
Homework: 10%; In-class Exercises: 5%; Test 1: 25%; Test 2: 25%; Final Exam: 35%

Make-up tests will not be given, except in the case for documented illness, immediate family emergency, or official university business. Make-up tests will be given **before** the scheduled testing time only. If the student must miss a test, the student is responsible for contacting the professor with at least **3 days advance notice** so that adequate testing arrangements can be made.

Homework:
Representative problems will be assigned for all topics discussed in class. Hard copies of homework assignments must be turned in **AT THE BEGINNING** of class on each due date. Late homework will **NOT** be accepted. Homework will be graded and returned one week after the assignment is due. Solutions to the homework problems will be posted on blackboard after the assignment is due. You must attend the entire class in order to turn in homework.

You may, and are encouraged to, work on the homework problems with your classmates. Each student should complete each homework problem and submit an individually written work. History has shown that it is essential that significant and consistent effort be made to complete all the homework assignments in order to be successful on the tests and final exam. Use discussions with your fellow classmates to *understand* the material, not simply complete it.

Neatly write all solutions, in an organized fashion, on a single side of a regular letter sized (8.5" x 11") paper. Title each homework in the following format, with a **CLEAR** indication between each problem. Up to one point make be taken off the homework grade if the pages are titled incorrectly. Homework that is sloppy, unintelligible, or unorganized will be graded "0".

ME2040	HW #	Last, First Name	Page #/Total Pages

Quizzes/Tests/Final Exam:

- Short in-class exercises (individual or group) will be given without notice to encourage discussion. Quizzes will not be returned after grading and there will not be make-up quizzes.
- Two in-class tests will be given. In-class tests will be returned after grading.
- A comprehensive final exam will be given at the scheduled exam time.
- Tests/exams will be closed book, individual efforts.
- Equation sheets will be provided with the exam, if necessary.
- No final exam exemptions will be given in this class.

Re-grading of Tests: Re-grading of a test can only occur by submitting the test to me (Dr. Pataky), along with a written statement explaining why you feel the test should be re-graded. This must be done within two class days from when the tests are returned in class.

I will reconsider the grade of the exam and adjust if necessary. It is understood that in the regarding process, a lower score can result.

Final Exam: The comprehensive final exam will be on Friday, May 3rd at 11:30 AM until 2:00 PM.

*****The above information is subject to change with notice*****

ME2040 – Mechanics of Materials – Tentative Course Schedule

L#	Date	Topic	Text	HW #	Due
1	1/10	Introduction, review of statics	1.1-1.2	1	1/17
2	1/15	Normal stress, shear stress, allowable stress	1.3-1.7		
3	1/17	Strain, mechanical properties of materials	2.1-2.2, 3.1-3.7	2	1/24
4	1/22	Axial deformation	4.1-4.2		
5	1/24	Statically indeterminate axial systems	4.3-4.5	3	1/31
6	1/29	Thermal Stress, stress concentration	4.6-4.7		
7	1/31	Torsion of circular shafts, power transmission, angular deformation	5.1-5.4	4	2/7
8	2/5	Statically indeterminate circular shafts, thin-walled closed sections, stress concentrations	5.5-5.8		
9	2/7	Review			
	2/12	**Test 1: Ch. 1-5**			
10	2/14	Shear and moment diagrams, symmetric bending	6.1-6.2	5	2/21
11	2/19	Symmetric bending, flexural formula, stress concentrations	6.3-6.5, 6.9		
12	2/21	Shear stresses in beams, shear formula	7.1-7.2	6	2/28
13	2/26	Shear flow in built-up/thin-walled members	7.3-7.4		
14	2/28	Thin-walled pressure vessels, combined stresses	8.1-8.2	7	3/7
15	3/5	Combined stresses	8.2		
16	3/7	Stress Transformations	9.1-9.2	8	3/14
17	3/12	Principle stresses, Mohr's circle	9.3-9.4		
18	3/14	Mohr's circle, Absolute max shear stress	9.4, 9.5		
	3/19	**Spring break**			
	3/21	**Spring break**			
19	3/26	Plane strain, material property relationships	10.1-10.2, 10.6	9	4/2
20	3/28	Failure theory	10.7		
21	4/2	Review			
	4/4	**Test 2: Ch. 6-10**			
22	4/9	Beam deflections by integration	12.1-12.2		
23	4/11	Beam deflections by discontinuity functions	12.3	10	4/18
24	4/16	Beam deflections by superposition	12.5		
25	4/18	Statically indeterminate beams	12.6-12.7	11	
26	4/23	Statically indeterminate beams	12.9		
27	4/25	Final Review (Ch. 1-12)			
	5/3	**Final Exam - 11:30 - 2 PM**			

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