2017

MENG 3250: Mechanics of Elastic Bodies—A Peer Review of Teaching Project Benchmark Portfolio

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Course Portfolio for MENG3250 – Mechanics of Elastic Bodies

A sophomore-level mechanics course

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Course: MENG 3250 Mechanics of Elastic Bodies, Spring 2017

Abstract

This portfolio focuses on mechanics of materials (course title: Mechanics of Elastic Bodies), a sophomore level course taken primarily by civil engineering and architectural engineering majors on Omaha campus. It is a prerequisite for broad range of courses in mechanical, civil and agricultural engineering majors. This course studies the mechanics of solids with applications to science and engineering, including stress, strains and deformation in structural elements (axial, torsional and bending), shear and moment diagram for beams, and a brief introduction to material failure mechanisms.

This portfolio describes the teaching methods used to help students understand the fundamental knowledge about material mechanics and apply the basic principles to solving simple engineering problems. Midterm surveys were used to collect students' feedback and evaluate the effectiveness of teaching.

Keywords:

Undergraduate, Mechanics, Elastic, midterm survey, understanding.

Table of Contents

1 Introduction and Objectives of Course Portfolio

The objective of this Peer Review Course Portfolio is to develop and document the curriculum for MENG 3250, Mechanics of Elastic Bodies. This course is a required course for all students in civil engineering, architectural engineering, and mechanical engineering majors. On Omaha campus, this course has been historically taught by a faculty member with civil engineering background. I taught the class two times in the Spring Semester of 2016 and 2017.

The main purpose of this course portfolio is to examine how the course goals connect to course activities, and look for possible improvements. Specifically, the following aspects are examined:

- How to teach new knowledge effectively
- How to check and improve students' understanding on fundamental knowledge
- How to inspire students' interest in civil engineering

2 Benchmark Memo 1: Reflection on the Course Syllabus

2.1 About the Course

2.1.1 Description of the Course

- UNO course description:

Concept of stress and strain considering axial, torsional and bending forces. Shear and moments. Introduction to combined stresses and column theory. **Credits:** 3, **Prereq:** MATH 1970; MENG 2230 or EMEC 2230.

- Course description in my 17SP course syllabus:

This course provides an introduction to the mechanics of solids with applications to science and engineering. Topics covered include: static equilibrium, free body diagrams, analysis of stresses, strains and deformation in structural elements (axial, torsional and bending), states of stress (shear, bending, torsion), shear and moment diagram for beams, displacements and deformations, Mohr's circle etc. Course syllabus is included in **Appendix 1**.

2.1.2 Students

Most students were at sophomore or junior level in civil or architectural engineering majors. The pre-requisite course MENG2230 - Engineering Statics gives them necessary background in static equilibrium for rigid bodies. This course will extend application of the knowledge to elastic bodies. Students usually call this course as "E-body". The course has a reputation amongst students for being the most challenging course for civil engineering students. In addition, the student body on Omaha campus is slightly different from Lincoln campus. Many Omaha students have part-time or full-time jobs, with extra responsibility of work and family. A grade of "C" above is required for passing. On Omaha campus, the failure rate of this course is about 20-25% each year.

2.1.3 Curricula

This course is a required course for all students in civil engineering and architectural engineering majors. A corresponding course MENG 325 is offered in Lincoln campus. It is a prerequisite for broad range of courses in mechanical, civil and agricultural engineering majors. The course in Lincoln is usually taught by faculty in department of Mechanical Engineering; while in Omaha campus, the course is taught by faculty in civil or architectural engineering. As a civil engineering faculty, I see it as an advantage to introduce the concept of civil engineering structural analysis to students at early stage, and connect this course to civil engineering applications.

This course serves as the foundation for CIVE 341- Introduction to Structural Engineering, a required major course in civil engineering.

2.2 Goals and Objectives of this Course

The *Goal* of this course is to help students build fundamental understanding of simple structure's behaviors, including internal forces, stress and strain, and deformation under loads. This course will provide all civil engineering students necessary fundamental knowledge to perform basic mechanics analysis of structural members, and prepare students who are interested in taking structural engineering career.

2.2.1 Knowledge

By the end of this course, students will learn the knowledge how to analyze the stress and deformation in simple structural members, including axial bars, torsional bars and beams. Specifically, the following topics are covered:

- Stress and strain in axial bars, Hooke's law, displacement, Poisson's ratio, shear stress and shear strain.
- Indeterminate axial members.
- Torsion of bars of solid or hollow circular cross-sections, determination of shear stresses and angle of twist of such members and torsion of thin-walled hollow members.
- Shear force and bending moment diagrams of beams, relations between load, shear force, and bending moment.
- Pure bending of beams, flexure formula, section modulus, normal stress in beams.
- Deflection of beams, method of differential equation, and superposition method.
- Analysis of plane stress and plane strain, principal stresses and strains, maximum shear stress, Mohr's circle.
- Buckling of columns, Euler formula for long columns, various supports, secant formula, short columns.

2.2.2 Understanding

Students should understand the relationships among load, stress, strain, and deformation. By the end of this course, students will learn the knowledge how to analyze the stress and deformation in structural members, and apply the knowledge to simple engineering problems.

3 Benchmark Memo 2: Teaching Methods and Course Activities

3.1 Teaching Methods

Classroom time was two 75 minutes lectures per week. In order to cover all the topics listed in the syllabus, it is important that the course be structured efficiently. Lecturing is the primary mode of in-class instruction activity. Since mathematic derivations and step-by-step procedures are heavily involved in mechanic analysis, I used the document camera to project my hand written notes, slow down the pace and allow students to take their own notes and understand the new knowledge.

For lectures that include many figures and derivations, I prepared lecture notes in Word file, and distribute the notes in class. Students will write down the notes in blank areas. This will save in-class time spent on drawing figures. A sample lecture note is included in **Appendix 2**.

I also used presentation slides to present figures from textbook and real structure pictures from internet. There are ample resources on YouTube to demonstrate experiments and help student understand new concepts. A sample lecture note is shown in **Appendix 3**.

A clearly organized lesson plan was posted on Blackboard before each lecture to guide students to prepare and review lecture topics. I would like to give credit to Dr. Gary Krause for sharing his lecture notes and lesson plan. Homework assignments were also included in the lesson plan. (**Appendix 4**).

With computers and structural analysis software widely used in engineering analysis, I believe that conceptual understanding of structural behavior is more important than calculations and formulas. Many students are used to number crunching and expect to practice formula plug-in in this course, without good understanding of structural behavior. In order to correct this learning style, I design the course content and choose teaching methods to focus on understanding of fundamental concepts.

Shear and moment diagrams for beam members are the most important and challenging topic in this course, which are also the foundation for structural analysis and other structural engineering courses. In addition to lectures and assignments, I used to design 1-2 worksheets, each consisting of 4 problems, for in-class practice. In Spring 2017 semester, due to time limit in class, I did not have time to practice these worksheet problems in class, instead I used them as quiz problems, and explained the problems after grading.

New concepts: In a conversation with a colleague who is not in my specialty area, I learned that the major challenge of this course is abstract concepts. Students have difficulties to visualize the stress distribution in material and deformation of members. Therefore, before I introduced a new concept in class, I used Youtube videos and real life examples to demonstrate the application of the new concept and visualize the deformation of structural members. A short introduction to new concepts will also help students realize the value of knowledge and inspire their interest.

3.2 Assignments and Assessment

Weekly homework assignments were included in lesson plans and posted on Blackboard after each new lecture. Students usually had one week to complete the assignments, which were typically due on Wednesday at beginning of lecture unless specified otherwise. Most homework problems included two parts: Part A problems from the textbook, and one Part B problem that I made as supplement. Part B is usually more challenging, and similar to exam problems. Unlike textbook problems, students would not be able to easily find solutions on internet. Students were given full credit on Part A for simply providing a reasonable answer and showing proper procedures, and Part B problems were graded based on merit. The teaching assistant (TA) would complete grading by Tuesday, and met me to go over common mistakes in assignments. I would then go over these problems in class.

Quizzes are the most effective and efficient way to quickly evaluate students' understanding of new concepts. I gave 5-6 quizzes during the semester, and each quiz would be given after students turned in the last homework on each main topic (e.g. axial, torsion, bending, etc.) . Each quiz consisted of 3-5 short answer conceptual questions. No complex calculation was required, so that students were able to quickly answer these questions if they understood the concepts well. Each quiz took about 15 minutes class time. I graded all quizzes, which gave me a good way to quickly check student understanding and identify their confusions. A sample quiz is attached in **Appendix 5**.

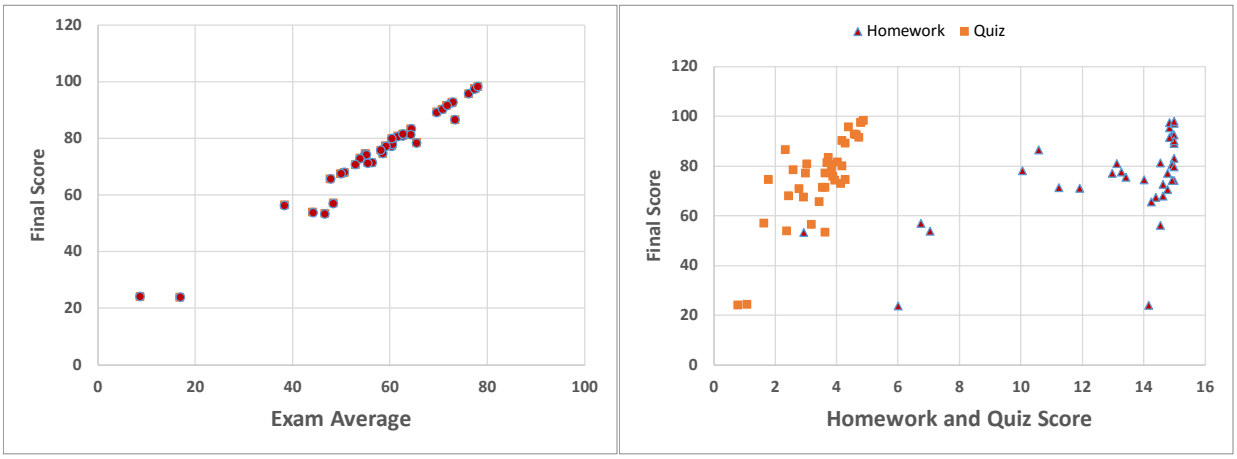
Student grades were comprised of homework assignments (15%), quizzes (5%), and three exams (25%, 25% and 30%). Exams consisted of a mix of multiple true/false, short answer, and problem-solving questions. Since 75 minutes class time was too short for exams, I reserved two 2-hour slots on Friday afternoons for mid-term exams (See syllabus in **Appendix 1**).

4 Benchmark Memo 3: Document and Analyze Student Learning

4.1 Correlation between final grades and quizzes

Figure 1 shows the correlation of the final score vs. averaged exam, homework and quiz scores. It is not surprise to see a strong correlation between final grade and exam scores, since the majority of class points were assigned to the exams (65%). Although quizzes only took 5% of the final grade, there is a clear

correlation between final grade and quiz scores. This finding supports my assumption that quizzes are an effective way to check student understanding. The homework grades (15%) did not correlate to the final grade well. It is partly because the homework were loosely graded, and also because many students worked together on homework assignments.



(a) (b)

Figure 1. *Correlation between exam, quiz, homework grades and the final grade.*

4.2 Grade distributions

Figure 2 presents grade distribution from 16SP and 17SP semesters. There were 22 students in 16SP, and 38 students in 17SP (2 students dropped from the class).

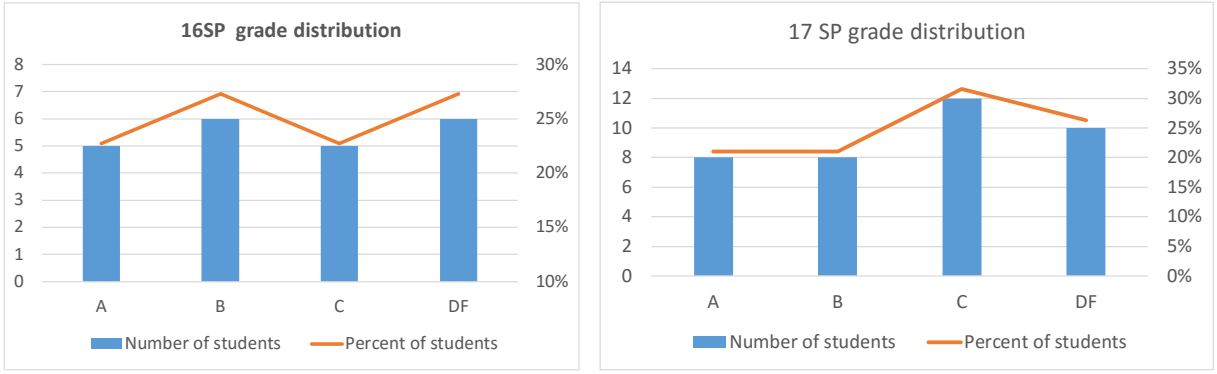


Figure 2. *Student grade distribution for 16SP and 17SP semesters.*

The percentages of students with grade "A" (including A+ and A-) were similar in 16SP and 17SP semesters (23% vs. 21%). The failure rates in both years were also similar (27% vs. 26%). There were more grade "C" in 17SP semester than in 16SP. More data will be collected in future. My goal is to reach 25% for grades "A" and "B", and hopefully reduce the failure rate to 20%. Many factors outside classroom affect students' learning performance and final grade, such as learning disability, academic dishonest, busy schedule and heavy workload.

4.3 Midterm Survey

A midterm survey was assigned on Blackboard after the first midterm exam. To encourage student participation, the survey was assigned as an assignment (16 SP) or a quiz (17 SP). Students who completed

the survey before deadline will received full credit for the extra homework assignment or quiz as a bonus. All students had chance to drop one lowest homework or quiz grade. In Spring 2017, the participation rate was 70% (28 out of 40 students).

The survey contained 10 questions (17SP survey), including both multiple choice and essay questions. The questions and answers are summarized in Table 1. Full survey results are shown in **Appendix 6**.

From Table 1, it can be seen that most students believed the homework assignments were very helpful (answers to questions 1, 8 and 10). Compared to 16SP semester, more students were satisfied with the pace of lecture and their progress. In 17SP semester, more students spent 4 hours or more on homework than in 16SP.

I find the essay questions are especially helpful to me. In question 8, students listed many aspects of the course that they thought were helpful. These include quizzes focusing on conceptual questions, homework assignments, connection to real structures or their current job, Youtube videos etc. In question 9, I asked students to list areas that they liked to see improvements. These suggestions include:

- more examples in class,
- prepare worksheets and lecture notes to save time on drawing free-body diagrams,
- group activity in class,
- go over homework problems,
- list Friday exams in course schedule or Mavlink

I will address some of the suggestions in next section "Plan for changes".

It was for the first time I included question 10 in the survey "*What suggestions will you give to next year's students*?" I find these answers are very interesting and informative. I will give these suggestions to my students when I teach this course next time.

Table 1. Midterm survey results and comparison between 16SP and 17SP

Questions	Answers (17SP)	16SP
1) The homework assignments are helpful for me to check my understanding of the course materials	85% Agree or Strongly agree (ASA)	89%
2) I feel that the pace of the lecture is …	82% (Satisfactory)	72%
3) I feel I am making satisfactory progress in the course so far.	75% ASA	60%
4) My exam grade properly reflects my knowledge of this course.	21% (disagree)	17%
5) If you answer 'not' to the above two questions, please indicate what might be causing the problem.	See Appendix 6	
6) How many hours do you spend on each HW assignment?	50% >=4hrs	33% >=4hrs
7) My instructor has made the objectives of the course clear.	78% ASA	72%
8) What in this course has helped you the most or do you like the best?	See Appendix 6	
9) What suggestions do you have to improve this class?	See Appendix 6	
10) If you were to give suggestions to students who will take this course next year, what will you suggest?	See Appendix 6	

5 Planned Changes

Lecture style: I believe using document camera with handwritten notes is an effective way to present lectures. For efficient use of classroom time, I will distribute blank lecture notes and examples with drawings, so that students can focus on concepts and problem solving strategies instead of spending time on drawings.

Recitation session: A very common suggestion from students is that they like to see more examples in class. However, due to time limit, I could only present a few typical examples for each new concept. Students may have difficulties when they try to tackle homework problems. The TA expressed interest in offering a recitation session to help students on homework. Therefore, I plan to add a recitation session on Friday afternoon. Midterm exams will also be arranged during the recitation session. Adding the recitation session will also give me extra class time to organize group activities and give a review before each exam.

Dimension analysis: Many conceptual problems in quizzes and exams did not have specific numbers. Symbols were used to represent distance, force or material properties. I found many students were used to plug in numbers in all calculations, but did not know how to handle analysis using symbols. When they worked on symbols, their answers did not have the same dimension as expected. If they worked on numbers, they could make mistakes due to inconsistent units. I believe a main reason for this challenge is the students lack dimension analysis background. When I teach this course next time, I will spend one or half lecture time explaining dimension analysis, and emphasize the importance of dimension consistency.

6 Summary

Through the Peer Review of Teaching Project, I documented my teaching and developed a teaching portfolio for MENG 3250 course. This project provided me an opportunity to critically reflect my current teaching methods. Analyzing the student grades and survey result is useful for me to exam the areas need to improve and confirm current effective teaching activities.

7 Acknowledgements

I like to acknowledge my colleague Dr. Gary Krause for sharing his syllabus and lecture notes to me, which was very helpful when I taught this course for the first time in 2016 Spring.

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Mechanics of Elastic Bodies

ME 3250-003 Spring 2017

Instructor Dr. Jinying Zhu
Office: PKI 205B; Phone: 402-554-4459; E-mail: jyzhu@unl.edu
Office hour: Immediately after class and M/W 3:00-4:00pm

Prerequisite MENG 2230 or EMEC2230; and MATH1970

Lecture: M/W 12:00 - 1:15 am PKI 263

TA: Hossein Arian Nejad h.a.nejad19@gmail.com
office hour: Tu 3-5pm, W 1030-1150am, PKI 305

Textbook
- Mechanics of Materials, 7th Ed. By Beer et al.

Course Website Blackboard

Course Description: This course provides an introduction to the mechanics of solids with applications to science and engineering. Topics covered include: static equilibrium, free body diagrams, analysis of stresses, strains and deformation in structural elements (axial, torsional and bending), states of stress (shear, bending, torsion), shear and moment diagram for beams, displacements and deformations, Mohr's circle etc.

Grading:

Quizzes:	5%
Homework:	15 %
Exam 1:	25 %
Exam 2 :	25 %
Final:	30%

Grading scale:
100 >= A+ >97 > A >= 93 > A- > =90
90 > B+ > =87 > B = > 83 > B- => 80
80 > C+ > =77 > C > =73 > C- > =70
70 > D+ > =67 > D > =63 > D-> =60
60 > F >= 0

Homework: Students are encouraged to discuss course topics in groups. However, assignments must be carried out by each student independently and turned in by the **beginning** of class on the due date. Late assignments will **not** be accepted unless pre-arrangement has been made at least 24 hours before the homework is due. Plagiarism will not be tolerated, and suspect cases will be turned over to the Dean of Students for disciplinary action.

Homework Format:

All assignments should contain the following:

- The assignment should include your name, assignment number, course number, and date on the first page. No cover page is needed unless specified.
- Each homework assignment should have neatly solved problems on engineering paper (white paper acceptable, no lined notebook paper). Each problem must include: problem statement, problem sketch, free body diagrams, solution steps, and final answer (underlined or boxed). A straight edge should be used for all sketches and

tables. Any homework that misses the required items and/or unclearly organized will receive a zero grade.
- Homework is due in one week on Wednesday unless specified otherwise.

Quizzes:
- Will be closed book, closed notes
- Will cover both theoretical aspects and problem solving skills
- No makeup quizzes

Exams: There will be two 2-hour midterm exams during the course of the semester. All students must take all of the exams. Missing an exam without a valid medical excuse or previous arrangement with the instructor will result in a zero for that exam. Exams will be given on **Fridays at scheduled time** (TBD).

Exams will be closed book/notes. Formulas and other necessary information will be provided on the exam day.

Attendance: Regular class attendance is expected in accordance with the University's General Information catalog and the School of Engineering policy.

If you cannot attend a class because you must participate in an outside event, or because of illness or emergency, let me know ahead of time. If you miss a class, you are still responsible for any assignments due in class.

Classroom behavior: Show respect to instructor and other students, please
- Be on time to class. If you are late, please quickly find a seat and sit down quietly.
- Come to *class* prepared with assignments completed.
- Do not talk with other classmates while the instructor is speaking.

Scholastic Dishonesty Policy: Scholastic dishonesty will not be tolerated and incidents of dishonesty will be reported. Students who violate University rules on scholastic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course and/or dismissal from the University. Since such dishonesty harms the individual, all students, and the integrity of the University, policies on scholastic dishonesty will be strictly enforced. For further information, visit the Student Judicial Services web site http://stuafs.unl.edu/ja/community/.

Students are encouraged to discuss course topics in group, but homework assignment must be carried out by each student independently. **Copying homework (exams) from other students or old assignments (exams) or solution manuals or other online sources, or allowing someone to copy your homework are academic dishonesty.**

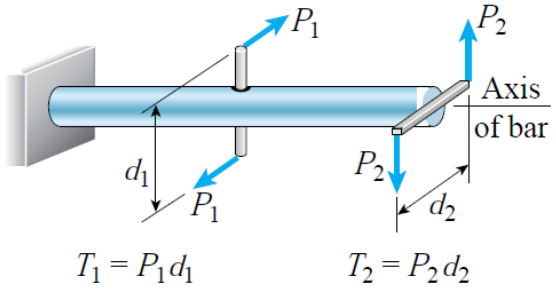
Students with Disabilities: The University of Nebraska at Lincoln provides, upon request, appropriate academic accommodations for qualified students with disabilities. For more information, contact the Division of Diversity and Community Engagement, Services for Students with Disabilities, (402)472-3787 (voice) or (402)472-0053 (TTY) or http://www.unl.edu/ssd/.

MENG 3250-003 Lecture Schedule

Week	Topic	HW	Reading
1	**#1 Review:** Introduction, Free body diagrams, 2D Equilibrium	**#1**	1.1, 1.5
Jan 9	**#2 Axial Members:** Stress and Strain		1.2A, 2.1A
2	**MLK day**		
Jan 16	**#3 Axial Members:** Mechanical Properties	**#2**	2.1, 2.4- 2.7
3	**#4 Axial Members:** Deformation		2.1G
Jan 23	**#5 Axial Members:** Statically Indeterminate	**#3**	2.2
4	**#5 Axial Members:** Statically Indeterminate		2.3
Jan 30	**#6 Axial Members:** Thermal Effects	**#4**	1.2BC, 2.7
5	**#7 Bolted Members:** Shear Stress and Strain	**#5**	3.1
Feb 6	**#8 Torsion Members:** Shear Stress and Strain	**#6**	3.2
6	**#9 Torsion Members:** Deformation		3.4
Feb 13	**#10 Torsion Members:** Thin-walled Hollow Shaft		
7	**#11 Exam 1 Review**		
Feb 20	**#12 Flexural Members:** Shear and Moment Diagrams	**#7**	5.1-5.2
	Exam 1		
8	**#13 Flexural Members:** Shear and Moment Diagrams		5.1-5.2
Feb 27	**#14 Flexural Members:** Shear and Moment Diagrams	**#8**	
9	**#15 Flexural Members:** Shear and Moment Diagrams		
Mar 6	**Flexural Members:** Shear and Moment Diagrams worksheets		
10	**#16 Flexural Members:** Normal Stress & Strain due to Moment		4.1-4.2
Mar 13	**#17 Flexural Members:** Design Beam for bending (ASD)	**#9**	5.3
11	**Spring Break (Mar 20 -25)**		
12	**TBD**		
Mar 27	**#18 Flexural Members:** Shear Stress and Strain, beam Curvature	**#9**	6.1-6.2
13	**#19 Flexural Members:** Sketch deflected shape Deflection		9.1
Apr 4	**#20 Flexural Members:** Deflection	**#10**	9.4
14	**#21 Columns:** Elastic Buckling, Stability		10.1
Apr 10	**#22 Plane Stress:** Combined Loading		
	Exam 2	**#11**	1.4, 8.3
15	**#23 Plane Stress:** Combined Loading		7.1-7.2
Apr 17	**#24 Plane Stress:** Principal Stress and Mohr's Circle	**#12**	8.1
16	**#25 Plane Stress:** Failure Theory		7.5
Apr 24	**#26 Plane Stress:** Summary		
	Final Exam: Monday, May 1, 12:00pm		

Lessons 8-10 Torsion

Torques - Moments that produce twisting of a bar



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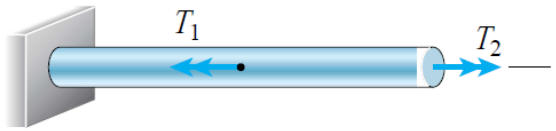

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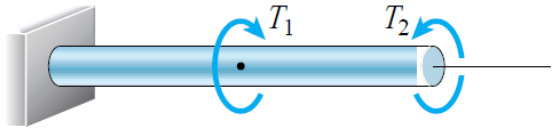
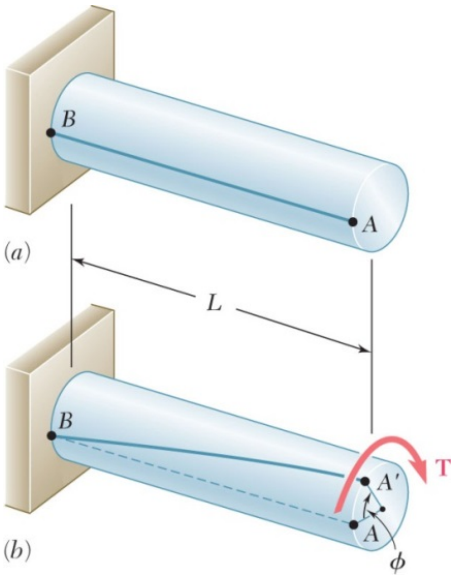
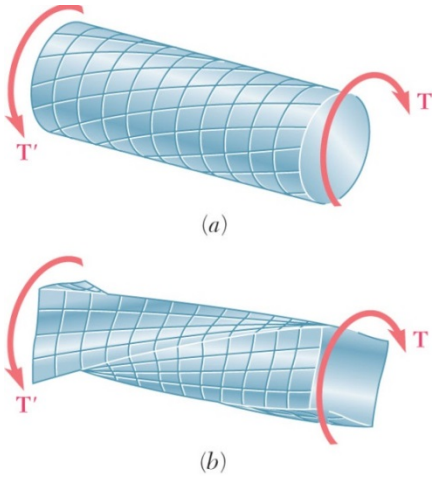


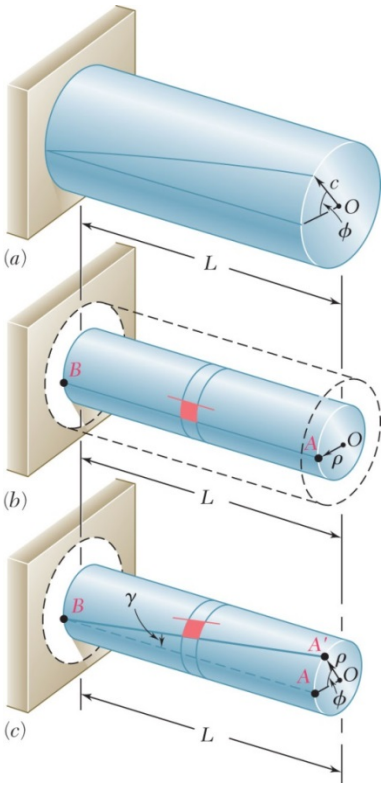
Angle of Twist AND Deformation of Torsion

https://www.youtube.com/watch?v=4SfNv7MxjjQ





Shear Strain on surface



Shear Stress and Strains Within the Bar

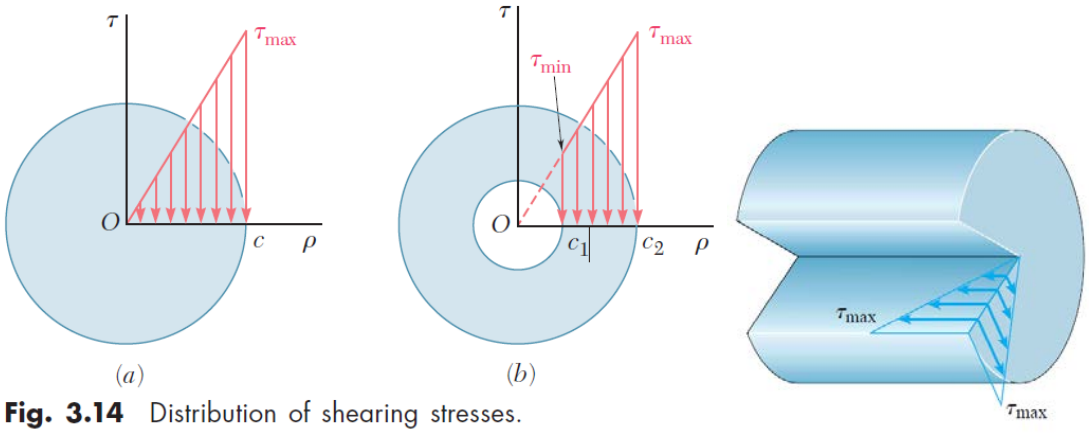
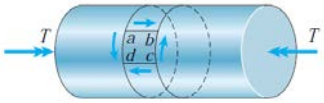


Fig. 3.14 Distribution of shearing stresses.

Stress and Strain in Pure shear



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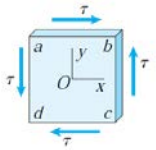
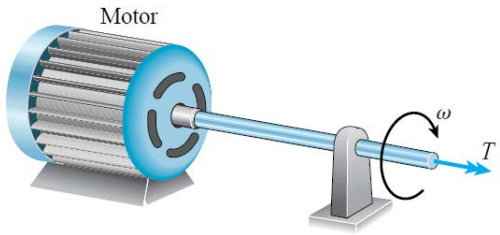


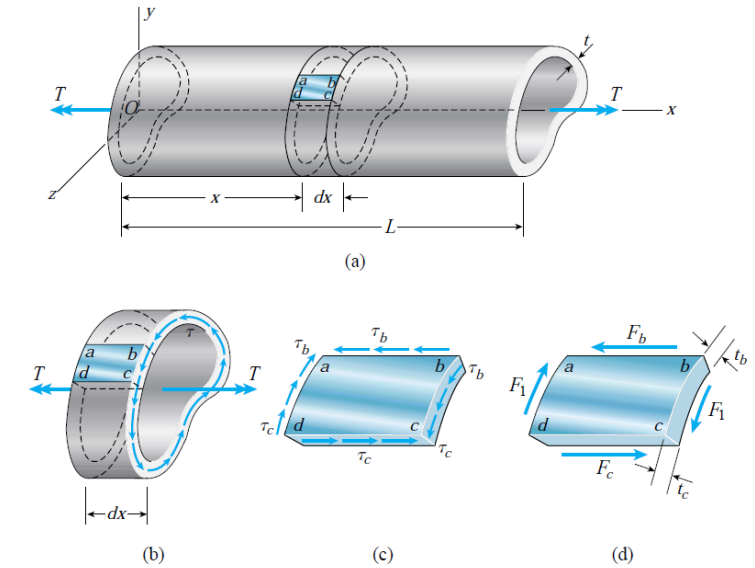
(b)

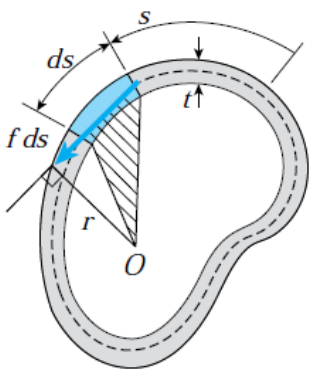
Power of transmission Shaft



Thin-Walled Tube

Shear Stresses and Shear Flow





Lesson 3: Axial Members - Mechanical Properties

- Stress-Strain Diagram for different materials (mild steel, aluminum and brittle materials)

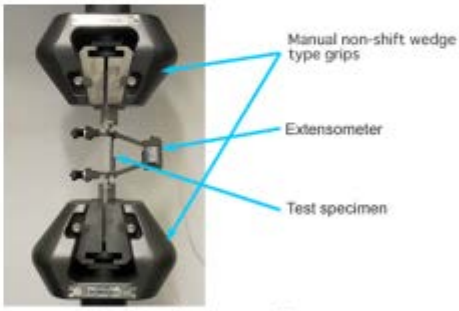
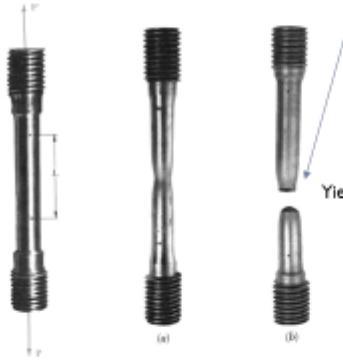


Fig. 2 Test Specimen and Extensometer

https://www.youtube.com/watch?v=D8U4G5kcpcM

Stress-Strain Diagram for mild steel (ductile)

- Mild steel has a clearly defined Yield point.
- Yield strength is used in design
- Elongation at rupture can be >200 times of deformation at yield



Fracture surface forms a 45° angle to the load

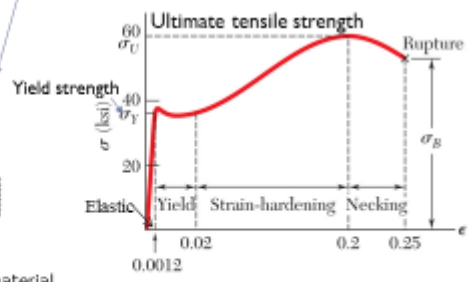


Photo 2.3, 2.4 Tensile test of ductile material specimens: (a) with cross-section necking, (b) ruptured.

(a) Low-carbon steel

Lesson Plan for MENG 3250 Mechanics of Elastic Bodies

Lesson #5 Axial Members: Statically Indeterminate

Orientation:

In this lesson we will tackle the issue of how to analyze an indeterminate structure for reactions and internal forces. Specifically we will work with indeterminate axial fore members, but the step-by-step process we will develop can be used on indeterminate beams, trusses and frames as well.

Before Lesson Reading: Section 2.2

Lesson Objectives:

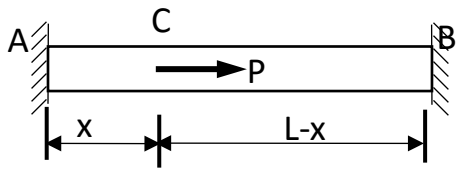
After this lesson the student will be able to:
• Define a Determinate structure
• List 3 conditions for solving Indeterminate Structures
• Apply the 3 conditions using the Method of Consistent Deformations to calculate reactions and internal forces in an indeterminate axial force member

Homework: Homework #3

Part A: Do problems Chap2 -18, 41, 45, and 2.130

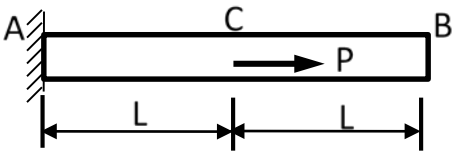
Part B: An axial member AB is s fixed at both ends, and subject to a load P, as shown in the figure. Young's modulus is E, and area is A. Express your solution with parameters P, E, A, and L.

1) If x=L/3, find reactions at A and B, and plot stress variation diagram along the member.
2) If x=L/2, repeat the question 1).
3) For x=L/2, find displacement at C.

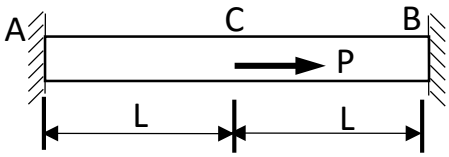


MENG3250 (ZHU) QUIZ #1 (2/8/2016) Name:

1. (4pts) The axial member has Young's Modulus E, and cross section area A. A force P is acting at the midpoint of the member. Find the displacement at B under the load.



2. (4pts) If the right end is fixed, what are the reactions at A and B?



3. (1pt) List one ductile material, and one brittle material.

4. (1pt) Name two types of materials that have Poisson's ratio of 0 and 0.5, respectively.

5. (Bonus points 2pts) In prob.2, does point C move? If yes, calculate δc.

Survey Statistics: MENG3250-Midterm Course Survey

The statistics are calculated based only on the attempts being used in the grading option (Last attempt, First attempt, Lowest Score, Highest Score, or Average of Scores). If Average of Scores is the grading option, then all attempts are included in the statistics.

Name	MENG3250-Midterm Course Survey
Attempts	28 (Total of 28 attempts for this assessment)
Instructions	Please complet the survey by April 18, 10pm.
Alignments	

Question 1: Multiple Choice

The homework assignments are helpful for me to check my understanding of the course materials.

	Percent Answered
Strongly disagree	3.571%
Disagree	0%
Neutral	10.714%
Agree	42.857%
Strongly agree	42.857%
Unanswered	0%

Question 2: Multiple Choice

I feel that the pace of the lecture is.

	Percent Answered
Too Slow	0%
Slow	0%
Satisfactory	82.143%
Fast	14.286%
Too fast	3.571%
Unanswered	0%

Question 3: Multiple Choice

I feel I am making satisfactory progress in the course so far.

	Percent Answered
Strongly disagree	0%
Disagree	10.714%
Neutral	14.286%
Agree	50%
Strongly agree	25%
Unanswered	0%

Question 4: Multiple Choice

My exam grade properly reflects my knowledge of this course.

	Percent Answered
Strongly disagree	0%
Disagree	21.429%
Neutral	35.714%
Agree	25%
Strongly agree	17.857%
Unanswered	0%

← OK

Question 5: Essay

If you answer 'not' to the above two questions, please indicate what might be causing the problem.

Unanswered Responses

8

Given Answers

We need more extra credit oppurtuinities.

missing a lot of points for silly mistakes

the concept is harder to understand by this course only, we need more visualizing or 3D model

N/A

I wasn't sure what to expect on the first exam so my score was lower than what I believe on could have obtained with my understanding of the concepts.

I have not had any problems with the course.

I tried my best and we will see how I do in the end.

Other assignments and tests in other classes moving at the exact same pace makes it hard sometimes. Also because exams are on Fridays and no designated time slot was scheduled when making class schedules/registering for classes and that is frustrating because it ruins my plans and schedule to get other classwork done.

Lack of time for completing the homework that would reinforce my lecture learning.

I feel like my understanding of this course is far above average yet in the test I had a low 80's due to a stupid mistake.

I need to get better at V M diagrams.

I didn't spent enough time

I think I was at a disadvantage on test one taking it ahead of time because there were equations provided to the class when they took it that I left out on my cheat sheet. I feel I would have missed significantly less points had the circumstances been different.

Na

the short answer is vague

...

the instructor goes throw the material not that deep. most of the time I do not understand what going on in the class. I feel the instructor understand the material well but she does not know how to transfer this knowledge to the student.

Question 6: Multiple Choice

How many hours do you spend on each HW assignment?

	Percent Answered
1 Hour	0%
2 Hours	14.286%
3 Hours	35.714%
4 Hours	21.429%
> 4Hours	28.571%
Unanswered	0%

Question 7: Multiple Choice

My instructor has made the objectives of the course clear.

	Percent Answered
Strongly disagree	0%
Disagree	0%
Neutral	21.429%
Agree	60.714%
Strongly agree	17.857%
Unanswered	0%

Question 8: Essay

What in this course has helped you the most or do you like the best?

Unanswered Responses

1

Given Answers

I believe the lectures have been crystal clear and thereby the most helpful.

I feel that the homework is what help me the most to understand the cocepts

The way we can get points back on our test and to learn our mistakes we made on the test.

We need more extra credit oppurtuinities.

N/A

I enjoy seeing the ties between the course material & my current job.

the note

I like how the quizzes are less about plugging in the numbers but about the knowledge that you have on the subject. It helps us realize how much knowledge we have of a topic.

What has helped me the most in this class is the examples and explanations that go on during lecture. I am better able to understand the material and I actually sort of enjoy doing certain problems.

In class examples and homework are most helpful to me. I learn best through examples. The lecture has been helpful too.

Handouts in class and lots of diagrams have made things very helpful. Also the large amount of questions that are conceptual that make sure we understand the material.

the lecture helped me understand the materials and solve homeworks and exams

I like the practical applications of the material

homework

the quizzes for sure have been more than helpful to understand what are the important take away for this class also it helps to know what you are struggling with..

The homework is a critical part of this course without it. I would be completely lost!

The homeworks are really helpful to make you understand the materials and the instructor is helpful to clear anything that you don't understand.

....

The scope of the course is large and I have acquired a general understanding of the behavior of beams and columns. I am happy to say that this course has increased my interest in the subject. Quizzes have been beneficial to my exam grades and I like that they are not a significant portion of the final grade. I've enjoyed how you have incorporated real world examples into the class and I feel that what I have learned can be applied in my career.

Doing examples in class

The lectures focus on the concepts and the homework helps apply those concepts. This is helpful in understanding the material.

Shear and Moment diagrams/

Office hours and one on one time with the instructor have been the most helpful to me in the course.

I like the way the course is structured and how the concepts are clear before the homework is assigned. It may help to have all of the homework assignment posted at the beginning of the semester in case we understand the concept quickly and have time to complete it before it's formally assigned.

The instructor's organization of course material in the lecture.

Homework

YouTube helped me a lot, asking the TA whenever having hard time understanding one concept

Question 9: Essay

What suggestions do you have to improve this class?

Unanswered Responses

1

Given Answers

i think how to provide the knowledge to the student

We need more extra credit oppurtuinities.

N/A

Nothing.

One suggestion I can make for this class is have a mix between concept and actual questions on the quizzes. I'm one of those people that would rather use numbers rather than letters to show that I understand something the material. Besides that this has been a really great class.

I would have liked to have a scheduled time for test taking coming into the semester so that I was not trying to fit it into my schedule after the fact.

One way to improve the class is to post the answers to the homework after we turn it in. Also to do a review sheet before the test. When you did it for the first time it helped me know better what to study and look at. Another thing to improve the class is to have problems that we solve in groups for practice during class. If you did this it would help the students stay focus during class and it will let them have a chance to ask question about something they don't like understand before they start the homework.

I would suggest trying to collaborate with the other Elastic Bodies teacher to make sure both classes are getting the same material and similar emphasis. Whenever I study with students from the other class it seems that we go over slightly different topics and on varying levels of emphasis. It would be nice to have basically the same lessons so in the future we are all on the same page.

Make a designated time slot of Fridays to take the exam because it really screws things up for people who have classes all day Thursday and labs on Fridays. It crams the schedules and really makes it hard to get everything done for this class and others because there was a lack of organization when making the class times originally.

I would suggest having more worksheets and lecture notes made. Drawing free-body diagrams is time consuming and I find it easier to focus on the main points you are trying to present when I am not also rushing to draw my diagrams. It would be beneficial if you listed supplementary practice problems from the book. I found it difficult to prepare for the conceptual questions seen on exams and if there was any way to quiz us or give homework over these concepts I would have had a better understanding.

Have tests on class days, or at least mention in on Mavlink (when someone signs up for the class) that tests are not on class days.

more examples done in class.

I actually think more homework would have helped me, or at least suggested problem numbers to practice outside of the homework.

nothing

Give out a list of extra problems to the class for a test review. Students can then use those problems to help themselves figure out what needs to be studied more.

Provide more examples in class.

Spend more time over V M diagrams, although that may just be me. I know we spent a lot of time already over it.

do more practice in the class

I think it would be helpful to have a course schedule on Blackboard or in a handout so we will know what to expect. It would also be helpful to suggest some review problems to study for the tests.

more examples in the class

explain the superposition method to get the moment diagram.

review session for the midterms.

reasonable quizzes based on the lectures.

More examples that reflect problems from exams

slow down the pace of the course

I am satisfaied with the way that the instructor is teaching.

It would be nice if we could spend 15 min at the beginning of class to talk about some homework problems

Possibly set up a weekly review session similar to the way statics was structured.

None

I think the exam schedule needs to be set ahead of time and there should be a Friday time period set aside for testing time on MavLink when students register for the course.

Question 10: Essay

If you were to give suggestions to students who will take this course next year, what will you suggest?

Unanswered Responses

1

Given Answers

Do your homework!

do your homework

and please do your homework

This class is more for CIVE major, for mechanical engineering is not a good idea to take it in Omaha campus.

should be familiar with beams and material.

study hard for this course

Take the time to do the homework yourself or work through it in a small group. But I would say the homework is very helpful if you take the time to understand it.

Go to office hours!

My suggestion to students that will be taking the course next year is to find a group of people that you can study with it helps when you are stuck on a homework problem and when you are studying for the test. It helped me a lot and I know it helped others.

....

Attend class, take good notes, do the homework, and practice.

focus on lecture the instructor gives and try to solve problms as much as you can

Offsetting this course in days in the week if Dynamics is taken along with it or things start to get cramped in your schedule especially when exams are on days where there is no designated time slot.

Attend the class because it is important. Everything on the test comes from the notes and the homework. Practice the homework problems alot and you'll be good to go.

To have a good understanding of moments for the second half of the class.

Make sure you get to the lecture and go in for help early to gain understanding because the concepts build on one another.

Complete the assigned readings. Look over your notes as soon as possible after lecture and rewrite them. Do all the homework and study for each quiz like you would a test. Find problems in the book that are similar to the in class examples and homework and use them to study for the exams. The chapter summaries in the book are useful for study as well.

I would say just make sure you do the homework and understand the notes. Both of those things go hand in hand for ensuring a successful semester.

Do the homework

Make sure to complete the homework & ask questions up front.

Take this course after the statics course

To studie hard , this cours is not easy.

Keep the material fresh. Don't stop studying when you 'understand' a concept.

I would suggest that they do all the homework because it helped me practice for the tests.

Skim the text at the very least before every class period.

to write all the note, and sit close to the teacher

Take the class and enjoy it.

I would suggest taking careful notes with a straight edge and on engineering paper. At the beginning of the semester I just used a regular notebook but then switch over to an engineering pad and it helped organize my notes substantially.

read ahead review your notes frequently. keep the material fresh in your mind.

self study is the most important thing to pass this class

sure, it's an easy course