



SYLLABUS
MENG 2223: MECHANICS OF SOLIDS
(Required Course - Spring 2024)

COURSE INSTRUCTOR

Dr. Yu Guo (yu.guo@msutexas.edu)

LAB INSTRUCTOR

N/A

TEACHER ASSISTANT

Admit Yonjan (ayonjan0615@d2lmail.msutexas.edu)

COURSE & LAB SCHEDULE

| <i>Days</i> | <i>Time</i> | <i>Location</i> |
|-------------|---------------------|-----------------|
| Monday | | |
| Tuesday | 11:00 am – 12:20 pm | MY 207 |
| Wednesday | | |
| Thursday | 11:00 am – 12:20 pm | MY 207 |
| Friday | | |

**Lab sessions are indicated with an asterisk.*

OFFICE HOURS

| <i>Days</i> | <i>Time</i> | <i>Location</i> |
|-------------|-------------------|-----------------|
| Monday | | |
| Tuesday | | |
| Wednesday | 1:00 pm – 2:00 pm | MY219A |
| Thursday | 1:00 pm – 3:00 pm | MY219A |
| Friday | 1:00 pm – 3:00 pm | MY219A |

MSU CATALOG DESCRIPTION

Analysis of structures using stress-strains diagrams, generalized Hooke's law. Stress and strain due to axial, torsional, shear, and flexural loads.

COURSE PRE-REQUISITES

MENG 2113 Statics.

OTHER PREREQUISITES

Basic computer skills, MS Excel, hand calculator

TEXTBOOK

Mechanics of Materials. R. C. Hibbeler, Pearson Prentice Hall.

SUPPLEMENTAL MATERIAL

Additional material will be distributed in the form of handouts if any.

LIST OF TOPICS COVERED

| | |
|--|--|
| <ul style="list-style-type: none">Stress and Strains | <ul style="list-style-type: none">Transverse Shear |
| <ul style="list-style-type: none">Mechanical Properties of Materials | <ul style="list-style-type: none">Combined Loadings (if time allows) |
| <ul style="list-style-type: none">Axial Loads | <ul style="list-style-type: none">Buckling of Columns (if time allows) |
| <ul style="list-style-type: none">Torsion Loads | |
| <ul style="list-style-type: none">Bending Loads | |

Additional material may be covered as time permits.

SPECIFIC GOALS OF INSTRUCTION

Table 1: A detailed list of course objectives matched with the ABET outcomes (1-7).

| COURSE OBJECTIVES | ABET OUTCOMES* | | | | | | |
|--|----------------|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Define normal and shear stresses (Hw, Exam) | X | | | | | | X |
| Define normal and shear strains (Hw, Exam) | X | | | | | | X |
| Apply Hooke's law and understand the relationship between stress and strain (Hw, Exam) | X | | | | | | X |
| Calculate normal stresses and strain for axially loaded member (Hw, Exam) | X | | | | | | X |
| Calculate the shear stresses and angle of twist for torsional loaded member (Hw, Exam) | X | | | | | | X |
| Find the internal shear force and bending moment in a beam (Hw, Exam) | X | | | | | | X |
| Estimate the stresses and deformation of a beam (Hw, Exam) | X | | | | | | X |
| Estimate shear stresses and shear flow in a beam (Hw, Exam) | X | | | | | | X |
| Apply superposition and estimate stresses caused by combined loadings (Hw, Exam) | X | | | | | | X |
| Define the principal stresses and the maximum in-plane shear stresses (Hw, Exam) | X | | | | | | X |
| Define the principal strains and the maximum in-plane shear strains (Hw, Exam) | X | | | | | | X |
| Define the buckling load for a beam column (Hw, Exam) | X | | | | | | X |

***Table 2:** Detailed descriptions of the ABET outcomes (1-7) listed in Table 1.

| ABET Outcome | DESCRIPTION |
|--------------|--|
| 1 | an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics. |
| 2 | an ability to apply engineering design to produce solutions that meets specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors. |
| 3 | an ability to communicate effectively with a range of audiences. |
| 4 | an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgements, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts. |
| 5 | an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives. |
| 6 | an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions. |
| 7 | an ability to acquire and apply new knowledge as needed, using appropriate learning strategies. |

COURSE ORGANIZATION AND STUDENT PERFORMACES ASSESSMENT

- Lecture Format

This course consists of three 50-minutes sessions per week. The three hours class will be spent mostly explaining and discussing concepts, and solving relevant case problems. Lectures will not be used to communicate the entire textbook course content and thus, students will have to study a set of course paragraphs specified by the instructor on their own to further their understanding. Student participation in class discussions is highly recommended and rewarded.

- Attendance

Attendance is required for each student. Absences of more than five lectures without proofs of legitimate excuses will result in a failing grade. **For each absences without proofs of acceptable excuses there will be 1 point off from Attendance & Class performance. If you are over 30 minutes late for the class, you are still allowed to sit in the class, but 1 absence will be counted.**

- Student Attitude

Once class starts, the use of cell phones, reading of newspapers, conducting private discussions, using the computer (unless requested by the instructor), working on anything that is not directly related to the course, and making derogatory remarks about your classmates or instructor will not be accepted and may result in your dismissal from the class. **Each time you are caught will result in 1 point off from Attendance & Class performance. Total grade for Attendance & Class performance is 10 points at beginning and it could become negative.**

- Homework

Homework will be assigned from a set of chosen chapters. It will be turned in each week, unless specified by the instructor. **Homework must be turned in at the beginning of class. Once class starts, late homework will be graded 80% of the full grade. If you arrived late, you homework will also be counted as late. Late homework will only be accepted until the end of due day.** You will not lose points if you make less than 3 mistakes total in one homework. However, if you copied from solution manual or from your classmates, you will receive zero points.

- Exams

There will be two regular exams plus one comprehensive exam at the end of the semester. Exam will be closed book, cheat sheet is not allowed. **Each exam is based on the course materials developed between two consecutive exams and possibly lab material if exist, except for the final which is comprehensive.** Students are expected to take the exam on the scheduled date and time it is given. However, if for some acceptable reason the student is not able to do so, then he must inform the instructor in advance in writing. The instructor will then decide whether he will be allowed to take a makeup exam, depending on the validity of his excuse. There is only one chance for makeup exam no matter what.

- Evaluation Method

Your performance will be tested regularly throughout the semester by in-class exams and homework assignments. There will be three exams.

- Course Grade

| | | |
|---|--------------------------------|----------------|
| 2 | Midterm | 20% (together) |
| 1 | Final | 55% |
| | Home works | 15% |
| | Attendance & Class performance | 10% |

***Bonus point in any case will only apply to those with a final grade lower than C.**

GENERAL GUIDELINES

- Plan on spending at least 6 hours outside of class to study the material and to work on homework assignments, and lab experiments. Do not wait until the last day to start working on your report, or prepare for the exam.
- Read the course material before coming to class.
- Utilize the office hours throughout the semester to seek explanations from the instructor.
- Use engineering paper for all homework assignments and exams. Use a systematic approach to solve problems. If a problem involves drawing a graph, use Excel, MATLAB, or any other graphic software tool to draw the graph. In engineering, neatness is a must, not a luxury. Be advised that you will be penalized for lack of neatness.
- You are strongly encouraged to study in group. Time to time a lab partner will be randomly selected for you.

CONFLICT RESOLUTION

- a. The student should contact the instructor face to face or via e-mail if there is an issue with the course or the instructor. The faculty and the student will discuss this face to face or via email. Hopefully, a resolution is reached on the issue.
- b. The student should notify the faculty via email again if the issue still did not get resolved after the first encounter or communication.
- c. The student can then contact the Chair of the McCoy School of Engineering, Dr. Desai, face to face or via email, (raj.desai@msutexas.edu), and discuss this issue. Dr. Desai will discuss the issue at hand with the faculty member. Dr. Desai will discuss the result of this discussion with the student. Hopefully, a resolution is reached on the issue after this.
- d. The student should notify the Chair via email if the issue still did not get resolved.
- e. The Chair will contact the Dean and try to resolve the conflict. In case the conflict deals with the student grade, she will forward the case to the Grade Appeals Committee if necessary.

GENERAL EDUCATION STATEMENT

Students in this course must demonstrate their competency in oral and written communication through written project tasks assignments. They must also demonstrate their ability to use the English language.

ACADEMIC INTEGRITY POLICY

Scholastic dishonesty will not be tolerated and will be prosecuted to the fullest extent. You are expected to have read and understood the current issue of the student handbook regarding student responsibilities & rights, and the intellectual property policy information about procedures and what constitutes acceptable on-campus behavior. Any form of plagiarism will not be accepted, and will be heavily reprimanded.

DISABILITY SUPPORT SERVICES

Students registered with Disability Support Services should have a letter verifying their disability and the appropriate accommodations.

DISCLAIMER STATEMENT

Information contained in this syllabus, other than grading, late assignments, and attendance policies, may be subject to change with advance notice, as deemed appropriate by the instructor.

Dr. Salim Azzouz, Dr. Sheldon Wang, Dr. Jan Brink, Dr. Yu Guo, and Dr. Jeong Tae Ok, 01/14/2014.