

1: Course Number and Name

- a. **ENGR 2332:** Mechanics of Materials, Summer 2022 (8 Weeks)
- b. Section DM1/D1Z, Online

2: Credits and Contact Hours

- a. **Credits:** 3
- b. **Contact Hours:** 8 hours/week (Equivalent Classroom/Lab Time)

3: Instructor Information

- a. **Course Coordinator:** Armita Hamidi
- b. **Instructors:**
 - i. Armita Hamidi, armita.hamidi@angelo.edu. Office: VIN 273. For office hours see [faculty homepage](#)¹. Office hours will be virtual unless arrangements to meet on campus are made.

4: Required Course Materials

- a. **Required Textbook:** None
- b. **Recommended Textbook:** Hibbeler, R.C., Mechanics of Materials. 9th or higher ed., Pearson Prentice Hall, 2014, ISBN: 978 0 13 325442 6.
- c. **Software:** Microsoft Excel
- d. **Other Supplemental Materials:** Materials posted on Blackboard® Learning Management System

5: Technology Requirements

To successfully complete this course, you need to access to the Blackboard® Learning Management System. Homework will be submitted and subsequently graded online through Blackboard. Official email correspondence will be sent through Blackboard to your ASU email account.

- a. **Smartphone**
 - i. Ability to take pictures, record video, and upload content
 - ii. Ability to scan documents into .pdf files using your choice of free apps
 - iii. Ability to use Flipgrid app to post video responses and comments
 - iv. Ability to access Blackboard Collaborate, use telephone for instructor office hours, and/or use GroupMe to contact instructor if assistance is needed
 - v. Ability to watch posted course videos on YouTube
- b. **Computer/Tablet**
 - i. Ability to use Microsoft Word, Excel, and PowerPoint or equivalent software to create reports, tables, and graphs for lab assignment and select homework assignments
 - ii. Ability to access Google docs (through ASU Gmail account) for collaborative assignments

6: Specific Course Information

- a. **Catalog Description:** Stresses, deformations, stress-strain relationships, torsions, beams, shafts, columns, elastic deflections in beams, combined loading, and combined stresses.
- b. **Prerequisites:** ENGR 2301 Engineering Mechanics – Statics; MATH 2314 Calculus II
- c. **Required or elective:** Required for the BSCE and BSME Majors.

7: Specific Goals for the Course

- a. Course Learning Outcomes:
 1. Explain the concepts of stress and strain as it relates to elastic and inelastic materials
 2. Calculate forces and deformations in one-dimensional systems due to axial loads and torsional loads
 3. Perform stress and strain transformations, including construction of Mohr’s circle to identify principal stresses
 4. Explain and apply basic material failure theories, particularly Tresca’s and von Mises’s criteria
 5. Analyze forces, stresses, and deformations in elastic members due to transverse bending, shear, torsion, axial forces, and combined loadings
 6. Solve for the internal forces and stresses in pressure vessels
 7. Define the critical elastic buckling load for a column using a boundary theory approach
 8. Design and conduct appropriate experiments to test engineering theories in relation to stress and strain in a team setting
 9. Interpret and analyze experimental data to develop conclusions that reflect sound engineering judgment
- b. Course Learning Outcome Mapping to ABET Criterion 3 Student Outcomes:

Table 1: Course Learning Outcomes mapped to ABET Student Outcomes

| ABET Student Outcomes | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|------------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 1. Solve Problems | X | X | X | X | X | X | X | | |
| 2. Design | | | | | | | | | |
| 3. Communication | | | | | | | | | X |
| 4. Ethics & Professionalism | | | | | | | | | |
| 5. Teamwork | | | | | | | | X | X |
| 6. Experimentation | | | | | | | | X | X |
| 7. Acquire New Knowledge | | | | | | | | | |

8: Topics Covered

1. Stress, Strain, Material Properties
2. 1D Bars: Deflection, Torsion, Temperature Effects, Statically Indeterminate Systems
3. Stress and Strain Transformation, Mohr’s Circle
4. Failure Theories: Tresca’s and von Mises’s Criteria
5. Elastic Beam Behavior: V, M Diagrams, Bending Stress, Transverse Shear Stress, Bending Deflections by Integration
6. Pressure Vessels
7. Buckling: Elastic Flexural Buckling
8. Combined Stresses
9. Laboratory Experiments (Covering Topics 1-7)

9: Course Delivery and Communications

9.1: Delivery Methods

This is an online course. Lesson materials will be organized and updated on the [Blackboard](#)² website for the course per week. You should have access to the lesson handouts by either printing the handouts or having them available for modification on your computer/tablet. The handouts only outline the material for a given class and will need to be completed using the posted videos for the student to have the relevant information. Some of the material presented will correlate with the textbook, but other material will not and/or may be presented differently.

The course will have assignments due twice a week for class, at 11:59pm on Mondays and Thursdays. These assignments may include completing course notes using posted videos, solving homework problems, designing laboratory experiments, and using lab data to draw experimental conclusions. For lab assignments, some will be completed individually and others will be completed with your lab group.

Academic integrity is expected from all students at all times in accordance with [Part I, Section B.1](#)³ of the Angelo State University *Code of Student Conduct*.

Respect for your fellow classmates is required.

9.2: Communications

Important course announcements and changes will be posted in Blackboard Announcements and sent by email via Blackboard. Students are expected to regularly check their Angelo State University email for these messages.

Students should feel free to contact the instructor regarding any issues with the class.

Virtual office hours are available for students to directly meet with the instructor. Dr. Hamidi's office hours can be found on his [faculty website](#)⁴.

Students can also email Dr. Hamidi with any questions and concerns. Dr. Hamidi will usually respond to email within a few hours, but definitely within 24 hours Monday through Friday. Weekend replies may take longer. You can also email Dr. Hamidi if you need to meet her out of the office hours. All private communication will be done exclusively through your ASU email address.

You are invited to be a part of a GroupMe the instructor has set up for the course. By joining, you will be able to text the group any questions you have and others, including the instructor, can respond to answer you. You can also just post cool engineering mechanics related stuff! In the GroupMe app, you can also direct message the instructor which could help get a faster reply to any questions you have. Faculty will respond to email within 24 hours during working hours Monday through Friday. Weekend messages may not be returned until Monday.

10: Ramgineer Professionalism

Professional engineering standards apply in this class. You are expected to demonstrate a behavior consistent with the conduct of an individual practicing in the engineering profession. You are expected to: (1) come prepared for class; (2) respect faculty and peers; (3) demonstrate responsibility and accountability for your own actions; (4) demonstrate sensitivity and appreciation for diverse cultures, backgrounds, and life experiences; (5) offer and accept constructive criticism in a productive manner; (6) demonstrate an attitude that fosters professional behavior among peers and faculty; (7) be punctual to class meetings; (8) maintain a good work ethic and integrity; and (9) recognize the classroom as a professional workplace.

11: Graded Material

11.1: Final Grades

Table 2: Grade Weighting

| <u>Item</u> | <u>Percent</u> |
|---|----------------|
| Course Note Completion | 10% |
| Laboratory Assignments | 15% |
| Homework (including Flipgrid Assignments/Replies) | 20% |
| Exam I | 15% |
| Exam II | 20% |
| <u>Final Exam</u> | <u>20%</u> |
| Total | 100% |

All grades will be assigned on an absolute scale as a minimum. The instructor reserves the right to adjust the weights given to the assignments/homework/exams listed above. Any adjustments will be applied evenly to the entire class and never to the detriment of your grade.

11.2: Grading Scale

| | |
|---------------|----------|
| 90.0% - 100% | A |
| 80.0% - 89.9% | B |
| 70.0% - 79.9% | C |
| 60.0% - 69.9% | D |
| < 60.0% | F |

11.3: Class Attendance, Participation, Timeliness and Teamwork

- A portion of your grade will be based on participation.
- Participation points will be assigned at the discretion of the instructor, and may be based upon the following:
 - Completion of class notes
 - Submission of video summaries and video homework assignments
 - Participation in online discussions / Flipgrid responses
 - Effort displayed during group activities
- The instructor recognizes that you might have a busy work schedule as well as other family obligations throughout the semester. As long as you readily communicate delays to the instructor and provide a reasonable timeline for submission, the instructor will accept "late" work.

11.4: Laboratory Assignments

- Throughout the semester, you will need to complete laboratory experiments, assignments, and reports. These assignments will be longer and/or more comprehensive than a typical homework problem.
- Use of Microsoft Word, Excel, and PowerPoint (or equivalent software) may be required to receive full credit.

- Some laboratory assignments may be completed and submitted individually, while others may be submitted in groups.
- It is noted that nearly all worthwhile accomplishments from raising a family to launching the space shuttle are the work of teams. Civil engineering is no exception. All significant civil engineering projects are completed by teams. You will be assigned to laboratory teams throughout the semester and are expected to participate, communicate, and work effectively together with your team on group assignments.
- Specific information regarding laboratory experiments, including any necessary safety precautions, and subsequent assignments and reports will be posted to Blackboard and discussed during class.
- For the summer session, laboratory work will be recorded, and students have to watch the videos to observe the experiments. After the labs, all students will work with their lab teams or individually to submit associated lab assignments.

11.5 : Homework

- Homework should be uploaded to Blackboard by 11:59pm on the day specified on the course schedule.
- Late homework may not be accepted for full credit, unless previous arrangements with the instructor are made.
- No late homework will be accepted after homework solutions is posted on Blackboard.
- Late homework is subject to additional deductions at the discretion of the instructor. In general, it is more beneficial to turn in late homework that you have tried to complete than it is to turn in “junk” on time.
- Neatness counts! As an engineer and a professional, your work will often be read and scrutinized by others. In some instances, it could be a legal document or a piece of evidence in a court of law. It is your responsibility that the work you prepare is presented in a legible, methodical, and logical manner.
- Any handwritten homework should be performed directly on the printout of the homework, on one side of 8.5” x 11” engineering computation paper, either the “green” paper or a black and white copy of it (available on Blackboard), or on plain white paper.
- Each problem should start on a separate page.
- The solution should include: the problem statement, solution steps, and answer. Key intermediate values should be indicated by underlining or some other means, and the final answer should be boxed/circled.
- Units should be included with all answers.
- Sketches/diagrams should be made with a straight edge.
- Name, date, and problem info should be included on each page. See the example homework solution posted to Blackboard, which meets all of these requirements.
- Students may collaborate to complete the homework; however, each student must turn in his/her own assignment for grading. Direct copying of other’s work is not allowed and may be subject to disciplinary actions.
- Homework problems will be graded out of 10 pts unless otherwise noted (if 2 problems, 20 pts total; if 4 problems, 40 pts total).
- At the end of the semester, 30 pts will be added to your homework total. This will account for any lost points or missed problems.

11.6 : Exams

- Exams will be open textbook and notes, in the online format of this course. However, it is still suggested that you create and use a formula/cheat sheet to aid in your studies and provide a quick summary for future reference.
- Exams will be targeted for 1.5 to 2 hours long and will have limited availability on Blackboard to download, complete, and submit. The exam availability is indicated on the detailed course schedule. Note that the university's standard schedule ([Angelo State University Final Exam Schedule](#)⁵) does not indicate a final exam time for this 8-week course. However, the final exam will take place during the final week of class and must be uploaded by Friday, July 29, 2021 at 11:59pm.

12: Classroom and University Policies and Student Support

12.1: General Policies

All students are required to follow the policies and procedures presented in the [Angelo State University Student Handbook](#)⁶ and [Angelo State University Catalog](#)⁷.

12.2 : Student Disability Services

ASU is committed to the principle that no qualified individual with a disability shall, on the basis of disability, be excluded from participation in or be denied the benefits of the services, programs or activities of the university, or be subjected to discrimination by the university, as provided by the Americans with Disabilities Act of 1990 (ADA), the Americans with Disabilities Act Amendments of 2008 (ADAAA) and subsequent legislation.

Student Disability Services is located in the Office of Student Affairs, and is the designated campus department charged with the responsibility of reviewing and authorizing requests for reasonable accommodations based on a disability. It is the student's responsibility to initiate such a request by contacting an employee of the Office of Student Affairs, in the Houston Harte University Center, Room 112, or contacting the department via email at ADA@angelo.edu. For more information about the application process and requirements, visit the [Student Disability Services website](#)⁸. The employee charged with the responsibility of reviewing and authorizing accommodation requests is:

Dallas Swafford
Director of Student Disability Services
Office of Student Affairs
325-942-2047
dallas.swafford@angelo.edu
Houston Harte University Center, Room 112

12.3 : Title IX at Angelo State University

Angelo State University is committed to providing and strengthening an educational, working, and living environment where students, faculty, staff, and visitors are free from sex discrimination of any kind. In accordance with Title VII, Title IX, the Violence Against Women Act (VAWA), the Campus Sexual Violence Elimination Act (SaVE), and other federal and state laws, the University prohibits discrimination based on sex, which includes pregnancy, and other types of Sexual Misconduct. Sexual Misconduct is a broad term encompassing all forms of gender-based harassment or discrimination and unwelcome behavior of a sexual nature. The term includes sexual harassment, nonconsensual sexual contact, nonconsensual sexual intercourse, sexual assault, sexual exploitation, stalking, public indecency, interpersonal violence (domestic violence or dating violence), sexual violence, and any other misconduct based on sex.

You are encouraged to report any incidents involving sexual misconduct to the Office of Title IX

Compliance and the Director of Title IX Compliance/Title IX Coordinator, Michelle Miller, J.D. You may submit reports in the following manner:

Online: [Angelo State's Online Incident Report](#)⁹

Face to Face: Mayer Administration Building, Room 210

Phone: 325-942-2022

Email: michelle.miller@angelo.edu

Note, as a faculty member at Angelo State, I am a mandatory reporter and must report incidents involving sexual misconduct to the Title IX Coordinator. Should you wish to speak to someone in confidence about an issue, you may contact the University Counseling Center (325-942-2371), the 24-Hour Crisis Helpline (325-486-6345), or the University Health Clinic (325-942-2171).

For more information about resources related to sexual misconduct, Title IX, or Angelo State's policy please visit: [Angelo State's Title IX Webpage](#)¹⁰

12.4 : Observance of Religious Holy Day

A student who intends to observe a religious holy day should make that intention known in writing to the instructor prior to the absence. See ASU Operating Policy 10.19 Student Absence for [Observance of Religious Holy Day](#)¹¹ for more information.

12.5 : Incomplete Grade Policy

It is policy that incomplete grades be reserved for student illness or personal misfortune. Please contact faculty if you have serious illness or a personal misfortune that would keep you from completing course work. Documentation may be required. See ASU Operating Policy 10.11 [Grading Procedures](#)¹² for more information.

12.6 : Student Conduct Policies

12.6.1 : Academic Integrity

Students are expected to maintain complete honesty and integrity in all work. Any student found guilty of any form of dishonesty in academic work is subject of disciplinary action and possible expulsion from ASU. The College of Science and Engineering adheres to the university's [Statement of Academic Integrity](#)¹³ (Page 97).

12.6.2 : Plagiarism

Plagiarism is a serious topic covered in ASU's [Academic Integrity policy](#)¹⁴ in the Student Handbook. Plagiarism is the action or practice of taking someone else's work, idea, etc., and passing it off as one's own. Plagiarism is literary theft.

In your discussions and/or your papers, it is unacceptable to copy word-for-word without quotation marks and the source of the quotation. Other people have worked hard to accomplish these pieces of writing just as you work hard to accomplish your degree. Just as you would not want someone stealing your hard work, it is expected that you will summarize or paraphrase ideas giving appropriate credit to the source both in the body of your paper and the reference list.

Papers are subject to be evaluated for originality via Turnitin or SafeAssign. Resources to help you understand this policy better are available at the [ASU Writing Center](#)¹⁵.

12.6.3 : Copyright Policy

Students officially enrolled in this course should make only one printed copy of the given articles and/or chapters. You are expressly prohibited from distributing or reproducing any portion of course readings in printed or electronic form without written permission from the copyright holders or publishers.

13: Instructor Specific Information

The instructor reserves the right to change the policies and procedures of this course when he deems it necessary. Any such changes will be implemented fairly and will typically not be a detriment to your grade. The instructor will notify you of any such changes in a timely manner.

13.1: Photo/Video Policy

- Students are allowed to take photos/videos of lectures and classroom activities provided the following conditions are met:
 - The capturing of the photo/video is not disruptive to other students or the professor.
 - The photos/videos are for personal use only (not posted publicly), unless otherwise discussed.
 - Fun photos/videos are shared with the professor 😊
- Photos/videos of class activities and student assignments can be posted using a shared folder on Google Drive- the link is one of the tabs on Blackboard. The photos/videos are for personal use only in the course and should never be posted publicly, unless authorization from the creator is granted.

13.2: Diversity and Equity Statement

The instructor strives to promote a living and learning environment for outstanding growth and productivity among all students, faculty and staff. Diversity is broadly defined to include such characteristics as, but not limited to, race, ethnicity, gender, religion, age, disability, sexual orientation, or socio-economic background. Diversity also entails different viewpoints, philosophies, and perspectives. Course activities and attention to these aspects of diversity will help promote a culture of inclusion and belonging, and an environment where diverse opinions, backgrounds and practices have the opportunity to be voiced, heard and respected. All students in my classroom are expected to show respect for one another.

14: Course Outline

The course outline is presented in Table 3. Detailed reading and homework assignments along with updates to this schedule will be provided via Bb. The following schedule may be modified as the semester progresses.

Table 3: Course Lesson Outline

| Lesson | Due Date | Text | Notes/Topic | Assignments Due |
|--------|----------------|-----------------------|---|-----------------|
| 01 | Monday, 6/6 | | Syllabus, Course Discussion, First Day Rap Up | HW 00, FLIP 00 |
| 02 | Thursday, 6/9 | 3.1-2 | Stress vs Strain | HW 01; FLIP 01 |
| 03 | Monday, 6/13 | 3.3-4; 3.6 | Material Properties | |
| | Monday, 6/13 | | Lab 01: Stress vs Strain Material Tests | Lab 01 |
| | Monday, 6/13 | | Lab Team Names and Goals | HW 02; FLIP 02 |
| 04 | Thursday, 6/16 | 4.1-2 | 1D Bars- Deflection I | |
| 05 | Thursday, 6/16 | 4.3-5 | 1D Bars- Deflection II | HW 03; FLIP 03 |
| | Monday, 6/20 | | Lab 02 | |
| 06 | Monday, 6/20 | 4.6-7 | 1D Bars- Deflection III | |
| 07 | Monday, 6/20 | 5.1-2 | 1D Bars- Torsion I; Lab 02C | HW 04; FLIP 04 |
| 08 | Thursday, 6/23 | 5.4-5 | 1D Bars- Torsion II | Lab 02 |
| 09 | Thursday, 6/23 | | Exam I Review | HW 04B; FLIP 05 |
| | Monday, 6/27 | | EXAM I | |
| 10 | Monday, 6/27 | 9.1-3 | Stress Transformation, Principal Stresses | HW 05 |
| 11 | Thursday, 6/30 | 9.4-5 | Mohr's Circle | |
| 12 | Thursday, 6/30 | 10.1-2; 10.5-6 | Strain Transformation and Gages | HW 06; FLIP 06 |
| | Tuesday, 7/5 | | Lab 03 | Lab 03 |
| 13 | Tuesday, 7/5 | 10.7 | Failure Theories | HW 07; FLIP 07 |
| 14 | Thursday, 7/7 | 6.1-3 | V, M Diagrams | |
| 15 | Thursday, 7/7 | 6.4-5 | Bending Stresses I; Lab 05A | HW 08; FLIP 08 |
| 16 | Monday, 7/11 | 6.4-5 | Bending Stresses II | |
| 17 | Monday, 7/11 | | Exam II Review | HW 09; FLIP 09 |
| | Thursday, 7/14 | | EXAM II | |
| 18 | Thursday, 7/14 | 12.1-2; 12.7 | Beam Deflections | |
| | Monday, 7/18 | | Lab 04 | Lab 04 |
| 19 | Monday, 7/18 | 7.1-2 | Shear Stresses | HW 10; FLIP 10 |
| 20 | Thursday, 7/21 | 8.1 | Pressure Vessels | |
| 21 | Thursday, 7/21 | 13.1-3 | Buckling | HW 11; FLIP 11 |
| 22 | Monday, 7/25 | 8.2; 11.1- 2; 11.4 | Combined Loadings | |
| 23, 24 | Monday, 7/25 | | Final Review | HW 12; FLIP 12 |
| | Friday, 7/29 | | FINAL EXAM | |

15: End Notes

- 1 <https://www.angelo.edu/live/profiles/10187-armita-hamidi>
- 2 <https://blackboard.angelo.edu/>
- 3 <https://www.angelo.edu/student-handbook/code-of-student-conduct/misconduct.php>
- 4 <https://www.angelo.edu/live/profiles/10187-armita-hamidi>
- 5 <https://www.angelo.edu/current-students/registrar/final.php>
- 6 <https://www.angelo.edu/current-students/student-handbook/>
- 7 <https://www.angelo.edu/academics/catalog/>
- 8 <https://www.angelo.edu/current-students/disability-services/>
- 9 <http://www.angelo.edu/incident-form>
- 10 <https://www.angelo.edu/current-students/title-ix/>
- 11 <http://www.angelo.edu/content/files/14206-op-1019-student-absence-for-observance-of>
- 12 <https://www.angelo.edu/content/files/14197-op-1011-grading-procedures>
- 13 <https://www.angelo.edu/live/files/27603-student-handbook-2020-21#page=97>
- 14 <http://www.angelo.edu/student-handbook/community-policies/academic-integrity.php>
- 15 https://www.angelo.edu/current-students/writing-center/academic_honesty.php