

1. Course Number and Name

- a. **MENG 4381:** Mechanical Engineering Capstone Design I, Spring 2022
- b. Section 010, R 08:00 – 08:50 am
- c. Section 020, R 9:30 – 11.20 am

2. Credits and Contact Hours

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

3. Instructor Information

- a. **Course Coordinator:** Mohammad Shafinul Haque, PhD
- b. **Instructor:** Mohammad Shafinul Haque, 325-486-5509, mohammad.haque@angelo.edu.
Office: VIN 281. For office hours see [faculty homepage](#).

4. Course Materials

- a. **Reference book:**
 - Dieter, G. E., and Schmidt, L. C. (2021), Engineering Design, (6th Ed.), McGraw Hill Education.
- b. **Other Supplemental Materials:** Will be posted on Blackboard.

5. Specific Course Information

- a. **Catalog Description:** Mechanical Engineering capstone experience. Engineering concepts integrated from topics taught in sequences of upper-division courses to produce practical, efficient and feasible solutions of mechanical engineering problems. Computer applications are included. Final oral and written reports are required.
- b. **Prerequisites and Corequisites:** Prerequisites: Senior standing within two semesters of graduation. Departmental permission.

6. Specific Goals for the Course

A. Course Learning Outcomes:

1. Apply the knowledge and skills acquired in their undergraduate curriculum to a physical design project.
 - a) be able to identify relevant topics from earlier courses and apply them to design project.
 - b) be able to critically evaluate designs using engineering criteria and predictive usage.
2. Develop the ability to address a broad range of design requirements such as performance, risk, safety, economic, environment, social, regulatory, and manufacturing.
 - c) be able to identify problem and specify design requirements applicable to realistic constraints.
 - d) be able to systematically develop a design from the problem statement to a detailed, proof of-concept design meeting all of the specifications.
3. Prepare for professional design environment through teamwork, communication and presentation.
 - e) be able to clearly communicate design ideas and information.
 - f) be able to work collaboratively and responsibly as a team.

- g) demonstrate the ability to facilitate their learning by identifying design issues and questions that require additional investigation beyond their basic undergraduate curriculum knowledge, then formulating appropriate courses of action.

B. Course Learning Outcome Mapping to ABET Criterion 3 Student Outcomes:

Table 1: Course Learning Outcomes mapped to ABET Student Outcomes

ABET Student Outcomes	a	b	c	d	e	f	g
1. Solve Problems	X	X		X			
2. Design	X		X	X			X
3. Communication					X	X	
4. Ethics & Professionalism		X					
5. Teamwork		X		X	X	X	
6. Experimentation		X		X			
7. Acquire New Knowledge		X					X

7. Evaluation

7.1 Course Structure and Communication

This course has one significant component: One 3 hours review sessions per week. On-time attendance of sessions is REQUIRED.

For each session, you are expected to have completed your assigned milestone and come prepared to present your weekly progress to the team. There will brief review sessions on specific topics at the beginning, followed by individual progress report, peer evaluation & feedback, set the next week goal. A team leader and associate team leader will be elected who will manage the overall progress, act as point of contact with industry/vendor/supplier, and coordinate.

A student’s responsibility includes but not limited to 1) plan your individual contribution, 2) clearly set your own goals and share with team, 3) monitor and assess your own progress, and evaluate/compare with your peers, 4) work alone, as a team, collaborate and support your team members as appropriate. The performance will be assessed based on your individual contribution and overall team achievements.

The value of the course to you will be highly dependent upon your preparation for class. We will be using both Blackboard, and email to communicate during this course. Lesson materials will be delivered via Blackboard.

7.2 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.

Table 2 presents the grade weighting

Table 2: Grade Weighting

Item	Percent
Attendance, Participation & Professionalism	15%
Peer Evaluation	10%
Concept Models	20%
Design Analysis	25%
Final proposal	30%
Total	100%

7.3 Homework

Problem sets will be due weekly and will be based on the previous week’s lecture and lab topics. Check Blackboard for specific due dates.

7.4 Punctuality

As a professional engineer you are expected to arrive at every class meeting on time and prepared. Attendance will be taken. Arriving late or leaving early will be counted as an absence. Should you find it necessary to miss a class for any reason, you are expected to notify your instructor as early as the absence is known—preferably before the absence.

7.5 Journal

You are expected to keep a written journal for this course. Your weekly presentation will represent the summary of your journal. These weekly individual and team presentations will be assessed for your performance, will be archived and may be carried on to your Capstone Design II course.

7.6 Grades

The instructor will determine letter grades for the course using his professional judgment, and the following standards as described in the [University Catalog](#):

A = excellent work, B = good work, C = average work, D = poor work, F = failing work

Table 3: Grading Scale

Letter Grade	Number Grade
A	≥ 90
B	[80 – 90)
C	[70 – 80)
D	[60 – 70)
F	< 60

8. Classroom and University Policies and Student Support

8.1 General Policies

All students are required to follow the policies and procedures presented in the [Angelo State University Student Handbook](#)¹ and [Angelo State University Catalog](#)².

8.2 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](#)³. 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

8.3 Title IX at Angelo State University

The University prohibits discrimination based on sex, which includes pregnancy, sexual orientation, gender identity, and other types of Sexual Misconduct. Sexual Misconduct is a broad term encompassing all forms of gender-based harassment or discrimination including: sexual assault, sex-based discrimination, sexual exploitation, sexual harassment, public indecency, interpersonal violence (domestic violence and/or dating violence), and stalking. As a faculty member, I am a Responsible Employee meaning that I am obligated by law and ASU policy to report any allegations I am notified of to the Office of Title IX Compliance.

Students are encouraged to report any incidents of sexual misconduct directly to ASU's Office of Title IX Compliance and the Director of Title IX Compliance/Title IX Coordinator at:

Michelle Boone, J.D.
Director of Title IX Compliance/Title IX Coordinator
Face to face: Mayer Administration Building, Room 210
325-942-2022, michelle.boone@angelo.edu

You may also file a report online 24/7 at www.angelo.edu/incident-form⁴

If you are wishing to speak to someone about an incident in confidence you may contact the *University Health Clinic and Counseling Center at 325-942-2173* or the *ASU Crisis Helpline at 325-486-6345*.

For more information about Title IX in general you may visit www.angelo.edu/title-ix⁵.

8.4 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](#)⁶ for more information.

8.5 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 for more information.

8.6 Student Conduct Policies

8.6.1 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](#).

8.6.2 Plagiarism

Plagiarism is a serious topic covered in ASU's [Academic Integrity policy](#)⁷ 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. 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. Resources to help you understand this policy better are available at the [ASU Writing Center](#)⁸.

8.6.3 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.

9.7 Required Use of Masks/Facial Coverings by Students in Class

As a member of the Texas Tech University System, Angelo State University has adopted the mandatory [Facial Covering Policy](#) to ensure a safe and healthy classroom experience. Current research on the COVID-19 virus suggests there is a significant reduction in the potential for transmission of the virus from person to person by wearing a mask/facial covering that covers the nose and mouth areas. Therefore, in compliance with the university policy students in this class are required to wear a mask/facial covering before, during, and after class. Faculty members may also ask you to display your daily screening badge as a prerequisite to enter the classroom. You are also asked to maintain safe distancing practices to the best of your ability. For the safety of everyone, any student not appropriately wearing a mask/facial covering will be asked to leave the classroom immediately. The student will be responsible to make up any missed class content or work. Continued non-compliance with the Texas Tech University System Policy may result in disciplinary action through the Office of Student Conduct.

9. Course Outline

The course outline is presented in **Error! Reference source not found.**. 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.

Week	Review/Discussion Session	Project Milestone
1	Introduction and Presentation of Design Project	Project identification and requirements
2	Product Development Process and Team Behavior	Background, Problem identification, task distribution
3	Concept generation, decision making and selection	Primary Design Concepts
4	--	First Design Proposal
5	Incorporate Committee feedback	Detail design analysis
6	Embodiment Design	Detail design analysis
7	Detail Design	Material selection and part identification
8	Cost Evaluation	Prepare detail components list
9	Risk, Reliability, and Safety	Finalize drawings
10	--	Second detail Design Proposal
11	Incorporate committee Feedback	Complete components list
12	Legal and Ethical Issue	Purchase list and sourcing
13	--	Final Complete Design Proposal
14	Review final Feedback	Incorporate feedback, Correction, ready for Capstone Design II.

*Schedule subject to change. Any changes will be announced on Blackboard and via email.

End Notes

¹ <http://www.angelo.edu/student-handbook/>

² <http://www.angelo.edu/catalogs/>

³ <http://www.angelo.edu/services/disability-services/>

⁴ <http://www.angelo.edu/incident-form>

⁵ <http://www.angelo.edu/title-ix>

⁶ <http://www.angelo.edu/content/files/14206-op-1019-student-absence-for-observance-of>

⁷ <http://www.angelo.edu/student-handbook/community-policies/academic-integrity.php>

⁸ http://www.angelo.edu/dept/writing_center/academic_honesty.php