1. **Course Number and Name**
   a. **MENG 4279**: Mechanical Engineering Capstone Design I, Fall 2021
   b. Section 010, Monday, and Thursday 08:00 – 08:50 am (Online via BB Collaborate)
   c. Section 01Z, TBA.

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**
      (The reference book is optional, does not required)
   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

<table>
<thead>
<tr>
<th>ABET Student Outcomes</th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e</th>
<th>f</th>
<th>g</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Solve Problems</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Design</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Communication</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>4. Ethics &amp; Professionalism</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Teamwork</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Experimentation</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>7. Acquire New Knowledge</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

7. Evaluation

7.1 Course Structure and Communication

This course has one significant component: Two one hour review sessions per week and one three hours asynchronous lab session 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 be 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. A capstone project is time sensitive, you are expected to reply each email within 48 hours, if you do not have a specific answer, you should email saying when you will be able to reply and/or send your questions or any help needed. 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>
<thead>
<tr>
<th>Item</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attendance, Participation, weekly progress &amp; Professionalism</td>
<td>20%</td>
</tr>
<tr>
<td>Peer Evaluation</td>
<td>10%</td>
</tr>
<tr>
<td>Concept Models</td>
<td>20%</td>
</tr>
<tr>
<td>Design Analysis</td>
<td>20%</td>
</tr>
<tr>
<td>Final proposal</td>
<td>30%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>

7.3 **Assignment, Presentation, and Final Report**

You are required to submit individual weekly progress report as an assignment. An individual weekly report must include the work you completed in the previous week and your proposed task for next week. Your team is required to present a 1st draft proposal and a 2nd revised proposal presentation and submit presentation slides to your client, ME faculty, and department chair. A final comprehensive design report is due at the end of the semester.

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

ENGR 2302-3
Table 3: Grading Scale

<table>
<thead>
<tr>
<th>Letter Grade</th>
<th>Number Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>≥ 90</td>
</tr>
<tr>
<td>B</td>
<td>80 – 90</td>
</tr>
<tr>
<td>C</td>
<td>70 – 80</td>
</tr>
<tr>
<td>D</td>
<td>60 – 70</td>
</tr>
<tr>
<td>F</td>
<td>&lt; 60</td>
</tr>
</tbody>
</table>

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 Anglo 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.
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 Day⁶ 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 policy⁷ 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 Center⁸.

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. **Course Outline**

The course outline is presented below. 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>
<thead>
<tr>
<th>Week</th>
<th>Review/Discussion Session</th>
<th>Project Milestone</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction and Presentation of Design Project</td>
<td>Project identification and requirements</td>
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<tr>
<td>(June 7-11)</td>
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<tr>
<td>2</td>
<td>Concept generation, decision making and selection</td>
<td>Primary Design Concept</td>
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<tr>
<td>(June 14-18)</td>
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<td></td>
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<tr>
<td>3</td>
<td><strong>June 21, 2021</strong></td>
<td>First Design Proposal</td>
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<tr>
<td>(June 21-25)</td>
<td></td>
<td></td>
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<tr>
<td>4</td>
<td>Cost Evaluation</td>
<td>Material selection, part identification, component list</td>
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<tr>
<td>(June 28 -July 2)</td>
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<tr>
<td>5</td>
<td>Risk, Reliability, and Safety</td>
<td>Using Standards</td>
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<tr>
<td>(July 5 -July 9)</td>
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<tr>
<td>6</td>
<td><strong>July 12, 2021</strong></td>
<td>Second detail Design Proposal</td>
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<td>(July 12 -July 16)</td>
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<tr>
<td>7</td>
<td>Incorporate committee Feedback</td>
<td>Purchase list and sourcing</td>
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<tr>
<td>(July 19 -July 23)</td>
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<tr>
<td>8</td>
<td><strong>July 30, 2021</strong></td>
<td>Final Complete Design Proposal</td>
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<td>(July 26 -July 30)</td>
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</tbody>
</table>

*Approval of final Report*  
Ready for Capstone Design II

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

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**End Notes**

2. [http://www.angelo.edu/catalogs/](http://www.angelo.edu/catalogs/)
3. [http://www.angelo.edu/services/disability-services/](http://www.angelo.edu/services/disability-services/)
4. [http://www.angelo.edu/incident-form](http://www.angelo.edu/incident-form)
5. [http://www.angelo.edu/title-ix](http://www.angelo.edu/title-ix)
6. [http://www.angelo.edu/content/files/14206-op-1019-student-absence-for-observance-of](http://www.angelo.edu/content/files/14206-op-1019-student-absence-for-observance-of)