1. Course Number and Name
   a. **MENG 4380**: Mechanical Engineering Capstone Design II, Spring 2021
   b. Section 010, (F) 11:00 – 11:50 am
   c. Section 01Z, (F) 1.00 – 4.50 pm

2. Credits and Contact Hours
   a. **Credits**: 3
   b. **Contact Hours**: 1 hours/week (Classroom) & 4 hours/week (lab)

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**:
   b. **Other Supplemental Materials**: Will be posted on Blackboard.

5. Technology Requirement
   To successfully complete this course, you may need to use a wide range of software depending on your project need, you may find most of the software’s on the Virtual Engineering Machine and/or you can contact IT Service Center to install in your personal computer.

6. 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: Mechanical Engineering Capstone Design I. Department Permission.

7. 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 work with vendors to purchase parts/elements and apply basic manufacturing skills to build and assemble prototype.
         b) be able to perform meaningful tests and evaluate prototype for verification and validation of the design (proposed in Capstone design I) and meeting client specification and criteria requirements. Propose any improvements for future (if you were to make another one). Be able to deliver a working prototype to the project client in time.
      2. Develop the ability to address a broad range of design requirements such as performance, risk, safety, ethics, economic, environment, social, regulatory, and manufacturing.
         c) be able to identify problem and specify design requirements applicable to realistic constraints.
d) be able to perform risk assessment of your prototype.
e) be able to create a user manual that include safety handling, servicing information.

3. Prepare for professional design environment through teamwork, communication, and presentation.
   f) be able to clearly communicate design ideas and information by preparing presentation and detail report.
   g) be able to work collaboratively and responsibly as a team.

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></td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
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<tr>
<td>2. Design</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Communication</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>4. Ethics &amp; Professionalism</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>5. Teamwork</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>6. Experimentation</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>7. Acquire New Knowledge</td>
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<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

8. Topics Covered

1. Safety and Risk assessment
2. Environmental and Sustainability consideration
3. Report writing
4. Project Presentation
9. Course Delivery and Communications

9.1 Delivery Method

This course has two significant components: One 1-hour review sessions per week and one 4 hours laboratory session per week. On-time attendance of sessions is REQUIRED. This is a face-to-face course with learning resources and supplemental materials posted in Blackboard.

For each review 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.

For each laboratory session, you are expected to work on your physical model of your project.

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.

9.2 Communication

Faculty will respond to email within 24 hours during working hours Monday through Friday. Weekend messages may not be returned until Monday.

Written communication via email: All private communication will be done exclusively through your ASU email address. Check frequently for announcements and policy changes. In your emails to faculty, include the course name and section number in your subject line.

Virtual communication: Office hours and/or advising may be done with the assistance of the telephone, Collaborate, Skype, etc.

10. 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 Class Attendance, Participation, Timeliness and Teamwork

You are expected to meet every class meeting on time and prepared. Attendance will be taken. 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. It’s important that you communicate clearly your instructors.
Your online assignments will be due at the time specified on Blackboard. Any assignments submitted in hard copy are due at the beginning of class on the due date. Your instructor may assess penalties for late work.

11.2 **Homework**

There is no HW assignment, your main goal is to complete constructing the physical prototype, submit the final report and present to the committee.

11.3 **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.

11.4 **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.

11.5 **Grades: Weighting and Letter Grades**

Table 2 presents the grade weighting

<table>
<thead>
<tr>
<th>Item</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attendance, Participation &amp; Professionalism</td>
<td>10%</td>
</tr>
<tr>
<td>Committee Evaluation</td>
<td>10%</td>
</tr>
<tr>
<td>Functional Prototype</td>
<td>20%</td>
</tr>
<tr>
<td>Design, Safety, Risk Analysis</td>
<td>25%</td>
</tr>
<tr>
<td>Final report</td>
<td>30%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100%</td>
</tr>
</tbody>
</table>

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>
<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>
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 and Angelo State University Catalog.

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. 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

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-form. 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-ix.
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\(^6\) 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\(^7\) for more information.

12.6 **Required Use of Masks/Facial Coverings**

As a member of the Texas Tech University System, Angelo State University has adopted the mandatory Facial Covering Policy\(^8\) 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.

12.7 **Student Conduct Policies**

12.7.1 **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.

12.7.2 **Plagiarism**

Plagiarism is a serious topic covered in ASU’s Academic Integrity policy\(^9\) 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\(^10\).

12.7.3 **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.

### 13. Course Outline

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>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Weekly meeting and Lab</td>
<td>Status update, review design prepared in Capstone Design I, and plan project construction.</td>
</tr>
<tr>
<td></td>
<td>Safety and Risk assessment (literature &amp; Standards)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Weekly meeting and Lab</td>
<td>Build project, Update client, Record in report with detail procedure (image, numerical detail, instrument etc.)</td>
</tr>
<tr>
<td></td>
<td>Environmental and Sustainability (Standards)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Weekly meeting and Lab</td>
<td>Build project, Update client, Record in report with detail procedure (image, numerical detail, instrument etc.)</td>
</tr>
<tr>
<td></td>
<td>Safety and Risk assessment (literature &amp; Standards)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Weekly meeting and Lab</td>
<td>Build project, Update client, Record in report with detail procedure (image, numerical detail, instrument etc.)</td>
</tr>
<tr>
<td></td>
<td>Environmental and Sustainability (Standards)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Weekly meeting and Lab</td>
<td>Build project, Update client, Record in report with detail procedure (image, numerical detail, instrument etc.)</td>
</tr>
<tr>
<td>6</td>
<td>Weekly meeting and Lab</td>
<td>Complete Physical Project</td>
</tr>
<tr>
<td>7</td>
<td>Weekly meeting and Lab</td>
<td>Prepare prototype test plan and prepare</td>
</tr>
<tr>
<td>8</td>
<td>Weekly meeting and Lab</td>
<td>Perform test on prototype and analyze</td>
</tr>
<tr>
<td>9</td>
<td>Weekly meeting and Lab</td>
<td>Improve and/or recommendation</td>
</tr>
<tr>
<td>10</td>
<td>Weekly meeting and Lab</td>
<td>Submit user manual, Safety and Risk assessment, Environmental and Sustainability report</td>
</tr>
<tr>
<td>11</td>
<td>Weekly meeting and Lab</td>
<td>Submit draft report (Version 1)</td>
</tr>
<tr>
<td>12</td>
<td>Weekly meeting and Lab</td>
<td>Submit PowerPoint presentation (Version 1)</td>
</tr>
<tr>
<td>13</td>
<td>Weekly meeting and Lab</td>
<td>Address feedback</td>
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</tr>
<tr>
<td>14</td>
<td>Weekly meeting and Lab</td>
<td>Finalize presentation and report</td>
</tr>
<tr>
<td>15</td>
<td></td>
<td>Final presentation to IAC members and Committee</td>
</tr>
</tbody>
</table>

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

14. **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)
7. [https://www.angelo.edu/content/files/14197-op-1011-grading-procedures](https://www.angelo.edu/content/files/14197-op-1011-grading-procedures)