1: **Course Number and Name**
   a. **MENG 4331**: Materials Design, Spring 2021
   b. Section 010, MW 12:00 p.m. - 12:50 p.m.; Lab Section 01Z, M 3:00 p.m. - 5:50 p.m.

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

3: **Instructor Information**
   a. **Course Coordinator**: Gustavo Vargas-Silva
   b. **Instructor**: Gustavo Vargas-Silva, 325-486-5540, gustavo.vargas-silva@angelo.edu. Office: VIN 270. For office hours see faculty homepage.

4: **Required Course Materials**
   It is recommended that you purchase a binder to organize your notes for the class.

5: **Technology Requirements**
   To successfully complete this course in an on-line fashion, you need the following technology:
   - Computer capable of running Windows 7 or later, or Mac OSX 10.8 or later
   - The latest version of a web browser (e.g., Google Chrome, Internet Explorer, Firefox, Safari)
   - Microsoft Office Suite or a compatible Open Office Suite
   - Adobe Acrobat Reader
   - High-Speed Internet Access
   - Ethernet adapter cable required (wireless connections can drop during Bb Collaborate sessions)
   - Webcam

6: **Specific Course Information**
   a. **Catalog Description**: Mechanical engineering design considerations for materials selection, fabrication, materials design strategies, and property compatibility for industry application needs. Economic and energy factors. Composite material design. Properties and processing of metals, ceramics, elastomers, polymers, and emerging materials. Related test specifications and materials characterization for different materials.
   c. **Prerequisites**: ENGR 3331; Mechanical Engineering Majors only, or Departmental permission.

7: **Specific Goals for the Course**
   a. **Course Learning Outcomes**:
      1. Learn about design-oriented materials selection.
      2. Analyze materials selection case studies for multiple constraints.
      3. Study environmental aspects of engineering materials.
      4. Analyze selection, production, use and disposal of materials.
      5. Explore human dependence on materials and its environmental consequences.
6. Provide perspective, background, methods, and data for designing with materials to minimize their environmental impact.

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>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Solve Problems</td>
<td></td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Design</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>3. Communication</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Ethics &amp; Professionalism</td>
<td>X</td>
<td>X</td>
<td>X</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>X</td>
<td>X</td>
</tr>
<tr>
<td>6. Experimentation</td>
<td></td>
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<td></td>
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<tr>
<td>7. Acquire New Knowledge</td>
<td></td>
<td></td>
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<td></td>
<td>X</td>
</tr>
</tbody>
</table>

8. Topics Covered

1. Material dependence
2. Resource consumption and its drivers
3. The material life cycle
4. Eco-data
5. Eco-audits and eco-audit tools
6. Material selection strategies
7. Eco-informed materials selection
8. Sustainability and materials
9. Material efficiency
10. Material profiles
9: Course Delivery and Communications

9.1: Delivery Method(s)

Examples:

This is a face-to-face course with learning resources and supplemental materials posted in Blackboard.

The course will meet two 1-hour lectures per week, and one 3-hour lab session per week, where the instructor will be communicating engineering theories and information to the students.

9.2: Communications

Faculty will respond to email and/or telephone messages 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, Bb 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

The number one complaint of engineering clients is the timeliness of deliverables (reports, drawings, specifications, etc.). As a professional engineer you will be expected to arrive at scheduled meetings on time and prepared. Late proposals are not generally accepted. Late specifications or drawings may cost the engineer a monetary penalty. Professional engineering standards apply in this course.

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.

11.2: Reading Assignments and Homework

You will be given individual reading and homework assignments nearly every week. Reading assignments and other materials will be provided.

Homework should be solved handwritten and be turned-in at the beginning of the class on the day it is due (course schedule).
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. Homework grades will primarily be based on thoroughness, neatness and completeness. All pages must be stapled together.

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.

Graded exams, homework and/or lab reports will be returned individually.

11.3: Assessments

This course will have short-term team projects as lab sessions, and a final group project. There will be rotation of work teams, defined by the instructor.

11.4: Grades: Weighting and Letter Grades

The weighting system shown in Table 2 will be used in determining final grade for the course.

<table>
<thead>
<tr>
<th>Item</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
<td>30%</td>
</tr>
<tr>
<td>Lab reports</td>
<td>50%</td>
</tr>
<tr>
<td>Final project</td>
<td>20%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

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.

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

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  
Mayer Administration Building, Room 210  
325-486-6357, 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 resources related to sexual misconduct, Title IX, or Angelo State’s policy please 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 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 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 Policy⁹ 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.

12.7.2: Plagiarism

Plagiarism is a serious topic covered in ASU’s Academic Integrity policy¹⁰ 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 or SafeAssign. Resources to help you understand this policy better are available at the ASU Writing Center¹¹.

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.

13: Course Outline

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

Table 3: Course Lesson Outline

<table>
<thead>
<tr>
<th>Lesson</th>
<th>Week</th>
<th>Day</th>
<th>Date</th>
<th>Lab session</th>
<th>Notes/Topic</th>
<th>Homework</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>M</td>
<td>Jan 25</td>
<td>1</td>
<td>Introduction</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>W</td>
<td>Jan 27</td>
<td></td>
<td></td>
<td>Materials and the Environment</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>M</td>
<td>Feb 01</td>
<td>2</td>
<td></td>
<td>Materials and the Environment</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>W</td>
<td>Feb 03</td>
<td></td>
<td></td>
<td>Sustainability</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>M</td>
<td>Feb 08</td>
<td>3</td>
<td></td>
<td>Sustainability</td>
<td></td>
</tr>
</tbody>
</table>
14: Instructor Prerogative
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.

15: Modifications to the Syllabus
This syllabus, including grade evaluation and course schedule, is subject to modification. In particular, the COVID-19 pandemic may require significant changes in course delivery and content on potentially short notice.

16: End Notes

1 http://angelo.blackboard.com
2 http://www.angelo.edu/student-handbook/
3 http://www.angelo.edu/catalogs/
4 http://www.angelo.edu/services/disability-services/
5 http://www.angelo.edu/incident-form
6 http://www.angelo.edu/title-ix
7 http://www.angelo.edu/content/files/14206-op-1019-student-absence-for-observance-of
8 https://www.angelo.edu/content/files/14197-op-1011-grading-procedures
9 http://www.texastech.edu/downloads/ttus-policy-face-coverings.pdf
10 http://www.angelo.edu/student-handbook/community-policies/academic-integrity.php
11 http://www.angelo.edu/dept/writing_center/academic_honesty.php