

1 Course Number and Name

- a. **ENGR 2318:** Sustainable Development
- b. Section 010, Online

2 Credits and Contact Hours

- a. **Credits:** 3
- b. **Contact Hours:** Online, asynchronous (i.e., no scheduled meeting times)

3 Instructor Information

- a. **Course Coordinator:** Soyoon Kum
- b. **Instructor:** Soyoon Kum, 325-486-5508, soyoon.kum@angelo.edu. Office: VIN 282. Office hour: [see engineering homepage](#).

4 Required Course Materials

- Required text materials (all available online without fees):
 - Theis, T., & Tomkin, J. (Eds.). (2018). *Sustainability: A Comprehensive Foundation*. OpenStax CNX. <http://cnx.org/contents/1741effd-9cda-4b2b-a91e-003e6f587263>
 - Fiksel, J. R. (2009). *Design for environment: A guide to sustainable product development*. (Second edition.). McGraw-Hill; (Available via [Access Engineering](#) on ASU Library Website)

5 Technology Requirements

- A computer with a webcam and microphone
- This course requires Highspeed internet access and the ability to use the following online tools: Blackboard, Blackboard Collaborate, Adobe Acrobat (or another pdf maker), and YouTube.

6 Specific Course Information

- a. **Catalog Description:** Principles of sustainable development as they apply to engineering systems. In this course, students will learn and apply principles of sustainable energy, water, and materials, life cycle assessment, and economic analysis in a systems approach to developing a sustainable solution for their chose problem
- c. **Prerequisites:** Math 1314
- d. **Required or elective:** Required for the BSCE and BSME Majors.

7 Specific Goals for the Course

When you complete this course, you should be able to:

1. Understand the concept of Sustainable Development and engineering systems
2. Develop a personal definition of Sustainable Development and describe the engineer's responsibility in the process
3. Explain the characteristics of systems thinking and why it's essential to sustainable development
4. Describe the principles of sustainable energy, water, and materials
5. Perform economic analysis of an engineering system

6. Perform Life Cycle Assessment (LCA) of an engineering system and make recommendations for its sustainable development

Course Learning Outcome Mapping to ABET Criterion 3 Student Outcomes is shown in Table 1.

Table 1: Course Learning Outcomes mapped to ABET Student Outcomes

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

8 Topics Covered

1. Sustainability Concepts
2. Systems Engineering
3. Sustainable Energy Systems
4. Sustainable Water Systems
5. Sustainable Materials Systems
6. Life Cycle Assessment
7. Engineering Economic Analysis

9 Course Delivery and Communications

9.1 Delivery Method

This is an online course with learning resources and materials posted on [Blackboard](#)¹. If you choose, you can complete this course without visiting the ASU campus. There will be no scheduled synchronous meetings or lectures for the entire class. There will be a weekly schedule of assignments and deliverables. In order to complete this course successfully, students do have to participate in all course activities i.e. online participation assignments, group projects, weekly exercises, etc. Students are expected to engage in course activities and submit work by due dates and times. Students will be expected to work in individual or group to meet the learning outcomes and complete the course project. There will be individual assessments of students' knowledge (Quizzes and exam). Students will need access to a computer with a webcam and microphone and need high-speed internet connectivity to complete the course.

9.2 Communications

The primary mean of communication during this course is Blackboard. Lesson materials will be delivered via Blackboard. You will complete quizzes, online participation assignments, and weekly exercises via Blackboard.

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

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

Office hours or advising may be arranged with the assistance of Collaborate, Webex, Zoom, or another web meeting platform.

Your team will be required to create a Google Drive folder and work within this folder when preparing project submittals. You must invite all team members and your instructor to join your Google Drive.

9.3 Typical Weekly Course structure

Most weeks will start with a posting of assigned reading and video material on Monday. You are expected to read and watch the assigned materials and take notes. After completing the assigned readings and videos, you are expected to take quizzes by the end of the week (Sunday 11:59 pm). Also, complete and submit online participation assignments (e.g., write a short reflection (4-5 sentences) or answer questions) and/or a weekly exercise via Blackboard due by the end of the day on Saturday. You will work on a project throughout the semester with your team members. On designated Friday, you will finish a project task and upload on the Blackboard. Late assignments are not accepted without prior approval of faculty. Faculty reserve the right to deduct points for late assignments that are accepted past the original due date. Failure to take in a timely manner to quiz, online participation assignment, group project, and weekly exercise is an absence. Absences diminish the student's ability to meet course objectives and contribute to a failure of the course. If accumulation of absence is more than five, you will fail in this course.

Table 2: Typical due dates for course assignments and quizzes

Monday	Course materials and assignments upload
Friday	Group project assignment due date
Saturday	Online participation and weekly exercise assignments due date
Sunday	Quiz due date

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 Quizzes

After most reading or video assignments, you will be required to take a short quiz designed to 1) ensure timely completion of the reading or video and 2) test your knowledge of the assigned material. These quizzes are individual assignments. Every week, take quizzes by the end of the week (Sunday 11:59 pm).

11.2 Online Participation (OP)

You are expected to write a short reflection (4-5 sentences) or answer questions provided during the lecture. The detailed guideline will be provided with the assignment. If you miss more than two online participation assignments, you will fail in this class.

11.3 Weekly Exercises

You will be required to submit an exercise demonstrating your understanding of the learning outcome from the course. These exercises may be individual or group exercises.

11.4 Course Project

You will be required to complete a major project related to sustainable development as the culminating experience for this class. This project will require you to define a significant engineering problem, identify the system in which the problem is enclosed, perform a system level analysis of the problem, and generate a sustainable approach to solving the problem. You will be able to define your own problem and establish your own teams with the guidance and approval of your instructor. Teams will include 3-4 students.

11.5 Exam

There will be an exam during the course. The exam is an individual exercise.

11.6 Grades: Weighting and Letter Grades

The weighting system shown in **Error! Reference source not found.** will be used in determining final grade for the course

Table 3: Grade Weighting

Item	Percent
Quizzes	10%
5 Online Participation assignments (OP)	20%
5 Weekly Exercises (WE)	25%
Exam	20%
Project	25%
	100%

The instructor will determine letter grades for the course using her 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

11.7 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](#)² for more information.

12 Classroom and University Policies and Student Support

All students are required to follow the policies and procedures presented in the [Angelo State University Student Handbook](#)³ and [Angelo State University Catalog](#)⁴.

12.1 Accommodations for Students with Disabilities

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](#).⁵ The employee charged with the responsibility of reviewing and authorizing accommodation requests is:

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

12.2 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: [Incident Reporting Form](#)⁶

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 the [Title IX website](#).⁷

12.3 Student Absence for Observance of Religious Holy Days

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](#)⁸ for more information.

12.4 Information About COVID-19

Please refer to ASU's [COVID-19 \(Coronavirus\) Updates](#)⁹ web page for current information about campus guidelines and safety standards as they relate to the COVID-19 pandemic.

12.5 Student Conduct Policies

12.5.1 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.

12.5.2 Plagiarism

Plagiarism is a serious topic covered in ASU's [Academic Integrity policy](#)¹⁰ 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 Center](#)¹¹.

12.5.3 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 the table. Detailed reading and homework assignments along with updates to this schedule will be provided via Blackboard. The following schedule may be modified as the semester progresses.

Table 4: Course Lesson Outline

Week	Start Date	Topic	Assignments /Exams	Project
Module1: Introduction				
1	8/23	Introduction to Sustainability Concepts	OP1	
2	8/30	Sustainable Development		
3	9/6	System Engineering	OP2	
4	9/13	[GP] Introduction to Group Project	WE1	
Module 2: Components of Sustainability				
5	9/20	Sustainable Energy Systems	OP3	Topic
6	9/27	Sustainable Water Systems	WE2	
7	10/4	Sustainable Materials	OP4	
8	10/11	[GP] Literature Review and Data Acquisition	WE3	Outline
Module 3: Life Cycle Assessment				
9	10/18	Life Cycle Assessment (LCA) 1	OP5	
10	10/25	Life Cycle Assessment (LCA) 2	WE4	Preliminary analysis
11	11/1	Life Cycle Assessment (LCA) Exercise		
Module 4: Engineering Economics				
12	11/8	Basic Engineering Economics		LCA
13	11/15	Cash Flow Equivalency	WE5	
14	11/22	Financial Analysis	Exam	
15	11/29	[GP] Group Project Week		Economic analysis
	12/6	Group project final presentation		

End Notes

- ¹ angelo.blackboard.com
- ² <https://www.angelo.edu/content/files/14197-op-1011-grading-procedures>
- ³ <http://www.angelo.edu/student-handbook/>
- ⁴ <https://www.angelo.edu/academics/catalog/>
- ⁵ <https://www.angelo.edu/current-students/disability-services/>
- ⁶ <https://www.angelo.edu/incident-form>
- ⁷ <https://www.angelo.edu/title-ix>
- ⁸ <http://www.angelo.edu/content/files/14206-op-1019-student-absence-for-observance-of>
- ⁹ <https://www.angelo.edu/covid-19/>
- ¹⁰ <http://www.angelo.edu/student-handbook/community-policies/academic-integrity.php>
- ¹¹ http://www.angelo.edu/dept/writing_center/academic_honesty.php