

EGR 355
Sustainable Resource Engineering & Design
Spring 2024



Monday/Wednesday Section A 8:00-9:20, Section B 9:30- 10:50

Instructors: Dr. Kurt DeGoede, Ph.D., Professor of Physics & Engineering
Dr. Brenda Read-Daily, Ph.D., P.E., Associate Professor of Engineering

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Office Hours: Dr. DeGoede: M 12-1:30; Tu 9-10:30; W and Th 2:30-4:00 or by appointment.
Dr. Read-Daily: M, W 2-3:30; Tu, Th 9-10; or by appointment.

Please feel free to stop by our offices anytime, if we are not available, please leave a note on the whiteboard.

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Textbook: None. Digital provided through the High Library.

Course Description

Engineering and design practices to make use of natural resources such that environmental impacts are minimized and benefits to human civilization are maximized. Design of renewable energy systems. Social justice cost-benefit analysis of sustainability solutions on global and local communities.

Course Objectives & Student Learning Outcomes

Course Objectives (ABET outcomes in parentheses)

1. Students will design a grid tied PV system for a US residence within appropriate constraints. (1, 2, 7)
2. Students will design a wind farm system for a small community within appropriate constraints. (1, 2, 7)
3. Students will develop equitable paths to sustainability and reduce the impact of climate change. (4, 7)
4. Students will evaluate and advocate for proposals to advance sustainability in a local context. (4, 7)

ABET-1: An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.

ABET-2: An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.

ABET-4: An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.

ABET-7: An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Grades will be determined based on the following:





16 4-point major assignments

- 4: Mastery (A)
- 3.5: Approaching Mastery (A-/B+)
- 3: Good (B)
- 2: Acceptable, Demonstrates core proficiencies (C)
- 1: Poor/Marginal, Demonstrates some proficiency (D)

Some assignments will be individual, others will be done in groups.

Round up opportunity: Diversity Equity and Belonging (DEB) Campus events will be posted in Canvas. Attend one event not required for any other course and submit a thoughtful 150-word reflection to earn 1 additional point.

Semester Grade (64 + 1 points possible):

Points	Grade	Sustainability Certification
59+	A	
54+	A-	 Platinum
49+	B+	
44+	B	
39+	B-	 Gold
34+	C+	
29+	C	
24+	C-	 Silver
19+	D+	
14+	D	
9+	D-	 Certified

Outline of Topics

Date			Topics
Jan	–	17	Equity Design Activity
	22	24	Energy Reduction Challenge
	29	31	PV Modules
Feb	5	7	Inverters and PV-Inverter Pairing
	12	14	Electrical Code and Wiring Design
	19	21	Grid-Tied System Design (Field Trip)
	26	28	Wind Power and Turbine Spacing
	4	6	SPRING BREAK
Mar	11	13	Wind Prospecting and Resources, Wind Lab
	18	20	Wind Farm Design
	25	27	UN Climate Action Simulation
Apr	1	3	Human Impact and Social Justice
	8	10	Capstone Social Justice
	15	17	Game Week
	22	–	Equity Design Reprise
May	29	1	Local Community Impact
			FE: Town Hall Simulation

Ethics: It is very important to us that our classroom, and the larger Etown College community, be a place of mutual respect, belonging, and affirmation. We consider this classroom to be a place where you will be treated with respect, and we welcome individuals of all ages, backgrounds, beliefs, ethnicities, genders, gender identities, gender expressions, national origins, religious affiliations, sexual orientations, ability - and other visible and non-visible differences. If we do something to inadvertently cause hurt or offense, please let me know.

All members of this class are expected to create and uphold a respectful, welcoming, and inclusive learning environment towards the instructor and one another, at all times. Failure to adhere to these expectations will result in being asked to leave and application of the student conduct process for disruptive and disorderly conduct, harassment, or other violations as applicable. The [student code of conduct](#) and the NSPE code of ethics (Cannons attached, with Etown Engineering Professional Obligations) applies in the classroom, other learning spaces, and to participation in all virtual activities, including, for example, Zoom sessions and Canvas.

All work should represent each student's individual efforts. **Students are encouraged to discuss assignments with other students and/or the instructor, however submitted assignments should reflect the student's own work and understanding.** Any solution obtained from any source should be properly referenced.

This includes AI. In this course, students shall give credit to AI tools whenever used, even if only to generate ideas rather than usable text or illustrations. When using AI tools on assignments, add an appendix showing (a) the entire exchange, highlighting the most relevant sections; (b) a description of precisely which AI tools were used (e.g. ChatGPT private subscription version or DALL-E free version), (c) an explanation of how the AI tools were used (e.g. to generate ideas, turns of phrase, elements of text, long stretches of text, lines of argument, pieces of evidence, maps of the conceptual territory, illustrations of key concepts, etc.); (d) an account of why AI tools were used (e.g. to save time, to surmount writer's block, to stimulate thinking, to handle mounting stress, to clarify prose, to translate text, to experiment for fun, etc.). Students shall not use AI tools during in-class examinations, or assignments unless explicitly permitted and instructed. Overall, AI tools should be used wisely and reflectively with an aim to deepen understanding of subject matter.

Dishonest practice will result in a minimum of a one full letter grade reduction in the final course grade; repeated violations can result in failure of the course and possibly expulsion from the college.

Re-Grading: Written requests, with full rationale, for re-grading of all coursework will be accepted the next class period after original materials are returned to the students.

Statements on Disability Services and Religious Observances:

[Link to Statements](#)

Fine Print: The preceding information represents the *intent* of the course and is subject to change at the discretion of the instructor.

Elizabethtown Engineering Program Code of Ethics

- I. Hold paramount the safety, health, and welfare of fellow students.**
- II. Perform project tasks and assignments only in the areas of their competence.**
- III. Submit assignments only in an objective and truthful manner.**
- IV. Act for team members, instructors, or employers as faithful agents or trustees.**
- V. Avoid deceptive acts.**
- VI. Conduct themselves responsibly, ethically, lawfully, and in line with the integrity policy so as to enhance the honor, reputation, and usefulness of the profession and college's engineering department.**

Professional Obligations (Etown Engineering Students)

- 1. Engineering students shall be guided in all their relations by the highest standards of honesty and integrity.**
 - A. Be honest about your mistakes.
 - B. Do not cheat on exams or assignments.
 - C. Do not plagiarize or falsify data.
 - D. Do not aid or abet another student in unethical behavior.
- 2. Engineers shall at all times strive to gain the knowledge to serve the public's interest.**
 - A. Your goal in class should be to gain knowledge to justify your intended degree, not just to obtain a high grade.
 - B. Work for the advancement of society and the profession by engaging in the community, and recruiting youth to the engineering profession.
 - C. Inform professors of unethical requests from other students.
- 3. Engineers shall avoid all conduct or practice that deceives other students, instructors, or the public.**
 - A. In lab work, be truthful with ALL data, even if it is not favorable.
 - B. All assignments should be your own original work unless otherwise noted.
 - C. Do not finish and submit team projects without the approval of ALL your other team members.
- 4. Engineers shall not disclose confidential information concerning their own group work to any person outside of their group except for the professor.**
 - A. Do not put individual assignments in your public folder.
 - B. Do not spread the word of quiz questions or unannounced assignments to later sections of a course.
 - C. Engineering students who are or have been a TA shall not disclose information about tests and grades of other students.
 - D. Do not disclose or use information learned from the internships that have to do with processes, or techniques of production.
- 5. Engineering students shall not be influenced in their scholastic duties by conflicting interests.**
 - A. Do not attempt to receive a favorable grade or recommendation by establishing an unprofessional relationship with a professor.
 - B. In peer assessments or as a TA, do not allow friendships or grades to sway judgment
 - C. Do not attempt to gain favor in class or for assignments through flattery of professors.

6. **Students should not attempt to gain advancement by downgrading other students' work or by other questionable methods.**
 - A. Credit should be awarded where it is deserved when submitting group work.
 - B. If another student does exceptional work, do not take credit for it if it is not your work.
 - C. If another student is performing inadequate work, calmly confront them about it before addressing it to the professor.
 - D. Students shall not sabotage the projects or advancements done by other students.
 - E. Do not blame group members for their own behavior.
 - F. Do not blame professors or staff for their grades.
7. **Engineering students should not attempt to injure the reputation of the engineering department or the reputation of professors and engineers in the department.**
 - A. If other engineering students are injuring the reputation of the department, you should inform the head of the department or the professor of their actions.
 - B. Every student in the department's actions should coincide with the integrity policy of the college to avoid degrading the department.
 - C. Students shall report malicious activities to the Head of the Engineering Department, or appropriate instructor. Yet, the student shall not tell others of the issue.
8. **Engineering students should accept personal responsibility for all of the work they do for the department and for their group.**
 - A. Students shall act truthfully when accused of misconduct.
 - B. Blame for violations of the integrity policy should not be placed on the department or professors, but rather on the individual who committed them.
 - C. Students should also accept the blame if their group submits unethical work because it is their responsibility to ensure any submission with their name on it is held to high ethical standards.
9. **Engineering students shall give credit for engineering work to those to whom credit is due, and will recognize the proprietary interests of others.**
 - A. Students shall not steal programs or work from other engineers or students from the internet through illegal networks.
 - B. Students shall properly cite information in all manners of presentation such as research papers, essays, PowerPoints, etc.

*Obligations written by Etown Engineering students Class of 2021
Cannons adapted from: <https://www.nspe.org/resources/ethics/code-ethics>*