ABE 498 Engineering Design for Solar Smart Home
University of Illinois at Urbana-Champaign
Spring 2026

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TA Office Hours: By Appointment

Class Time
Build Team: Mondays, 6:30pm - 7:30pm
@ Hydrosystems Lab 3019
Design Team: Tuesdays, 6:00pm - 7:00pm
@ Hydrosystems Lab 3019
Concept Team: Thursdays, 7:00pm-8:00pm
@ Hydrosystems Lab 3019

All assignments and grading for this course will take place on Canvas.

General Course Description

Students will work as an interdisciplinary team to design a Net-Zero building for the Solar Decathlon Design and Build teams. These will include an innovative architectural design, efficient HVAC system, photovoltaic power generation, high-efficiency water systems, smart lighting, appliances and home automation, and construction and financial planning. Students will work directly with industry partners and participate in DoE green building training. The goal of the course is to sensitize students towards sustainable practices while also helping them become confident team-players, ready to take up leadership roles or other complex challenges in their academic and professional careers.

Registered Student Organization Description:
https://www.illinoissolardecathlon.com/

Design Team (Annual)
The multi-disciplinary team of students will develop a fully-functional and integrated design for a building/set of building types chosen from a list of options provided by the relevant competition. The design will be communicated through a 15-minute presentation, supplemented

by a detailed 60 page narrative. Each student is expected to understand and be able to intelligently present the concepts underlying all systems of the complex. To this end, the course will ask students to routinely present their work to the group and/ or to outside reviewers. In addition, productive communication and collaboration with each sub team is a paramount objective of the course.

Build Team (Bi-Annual)
The Illinois Solar Decathlon Build Team works during a two-year period to design, build, and operate their houses in their own region, with student work culminating in a constructed home being donated to a family through Habitat for Humanity. Participants design and build complete, functional houses in their communities to demonstrate creative solutions for real-world issues in the building industry.

Each student is expected to understand and be able to intelligently present the concepts underlying all systems in the complex. To this end, the course will ask students to routinely present their work to the group and/or to outside reviewers. In addition, productive communication and collaboration with each sub team is a paramount objective of the course.

Concept Team
The Illinois Solar Decathlon Concept Team is made up of primarily newer members of the organization that wish to learn and develop the skills necessary to meaningfully contribute to the Solar Decathlon Competition. Students research old and new sustainable building designs and incorporate these designs in smaller scale projects, thus gaining an intuitive understanding of the process flow for overall design. Students also learn how to use software such as Revit and Procore, and pool various skill sets to improve upon designs of previous Solar Decathlon builds.

Course Structure

The deliverable related tasks will cover the majority of the course. Along with it, based on the number of credits the student has registered for (1, 2 or 3 credit hours), students will fulfill additional requirements to ensure they remain involved and active. The Project Manager will coordinate with sub-team leaders to ensure integration of sub-team tasks, while the leaders will ensure effective distribution and management of work and timely completion of tasks within their teams.

	1 Credit Hour	2 Credit Hour	3 Credit Hour
Attendance & Task Completion	50%	20%	20%
End of Semester Peer Evaluation	20%	25%	25%
Final Report	10%	5%	5%

Biweekly Plan-of-Attack Assignments	20%	30%	30%
Deliverable-Related Work	--	20%	20%
Total:	**100%**	**100%**	**100%**

Attendance
(1, 2, and 3 Credit Hour Students)

Attendance to the respective Build, Design, or Concept Team Meetings and All-Team Meetings will count towards student grades, but requirements will vary based on the number of credit hours as outlined below. Attendance will be taken by the Project Manager, or someone delegated by the PM. Each student may have **two** unexcused absences dropped at the end of semester (i.e. a student may have one unexcused absence and receive full credit). Students registered for 2 credit hours are required to attend two weekly meetings. For subteam leads, this refers to the weekly project meetings and project leadership meetings if applicable. For executive board members, this refers to weekly executive meetings as well as at least one of the Build, Design, or Concept team meetings depending on the relevancy of the executive role. Students registered for 3 credit hours are required to attend three weekly meetings. For project managers this refers to the weekly project meetings, weekly leadership meetings, and at least one subteam meeting. For executive board members, this refers to weekly executive meetings, at least one of the Build, Design, or Concept team meetings, and at least one project leadership meeting.

If a student seeks an excused absence, it is the responsibility of the student to reach out to the TA ahead of time. University approved events, illnesses, and personal family emergencies are examples of excused absences; needing to study for other classes, work, and personal meetings are not reasons for excused absences. Arriving late is not acceptable: **3 late arrivals,** defined as 10 minutes late or more, will count as **one absence.**

Biweekly Plan-of-Attacks & Follow-Up
(1, 2, and 3 Credit Hour Students)

Students must submit their Biweekly Plan-of-Attacks on Canvas. The purpose of these posts is to keep students continually engaged and allow leadership to ensure everyone is working on topics that interest them.

For 1 Credit Hour Students, each discussion post must be at least **100 words.** For 2 & 3 Credit Hour Students, each discussion post must be at least **150 words.** In the initial discussion post, the student must answer the following questions:

1. What task, or set of tasks, will you perform to contribute to Illinois Solar Decathlon over the next two weeks? Tasks should be determined through consultation with Sub-Team leaders, the PM, or direct discussion at Team meetings. **If a student doesn't have work, it is the responsibility of the student to reach out and ask leads what work is available.**
2. What is your plan-of-attack to research and complete the task at hand?

3. What is your feedback on the work you're doing? Do you feel interested/engaged, or do you want to get involved in other topics within Illinois Solar Decathlon?

At the end of each week, students will submit a follow-up response, detailing the progress made the past week in achieving the goals outlined in the bi-weekly plan of attack, and steps taken to remedy obstacles hindering the achievement of these goals (if such obstacles exist) before the creation of a new bi-weekly plan of attack the following week. 1 Credit Hour Students must respond with at least **50 words** and 2 & 3 Credit Hour Students must respond with at least **100 words.**

Final Report

1 & 2 Credit Hour Students:
Submit a comprehensive **500-word** reflection detailing your personal journey throughout the semester in Illinois Solar Decathlon. Your report should not only narrate the tasks you have completed but critically analyze your contributions to your subteam. Highlight specific skills that you have acquired, and evaluate your performance based on quantifiable metrics established throughout the semester. Reflect on the lessons learned, the challenges faced, and how this experience has contributed to your professional and personal growth. This reflection should encapsulate your dedication, learning outcomes, and vision for how you can apply this knowledge in future endeavors.

3 Credit Hour Students:
Craft a detailed **1000-word** reflection that encapsulates your leadership journey throughout the semester in Illinois Solar Decathlon. Your report should delve into your contributions to team management, leadership roles, quality assurance, delegation, and communication. Assess your performance against quantifiable expectations, detailing your success with deliverables and providing evidence of your strategic planning and execution. Discuss the lessons learned, unforeseen challenges, and the impact of your leadership on the project's trajectory. Your reflection should also address the broader implications of your work and how it can inform future projects and leadership roles.

Deliverable-Related Work
(2 and 3 Credit Hour Students ONLY)

2 Credit Hour Students:
Compile a portfolio that comprehensively represents the specialized work you contributed throughout the semester. This portfolio should include a curated selection of your work, such as critical communications that showcase problem-solving and decision-making processes, detailed documentation of technical tasks including software tasks, engineering calculations, architectural renderings, design elements, cost calculations, and any other tangible work you have completed.

Highlight your role in the assembly of major deliverables as well, such as semi-final and final presentations, narratives, proposals, and similar work items. Accompany these with supplementary materials that provide context for your contributions, including, but not limited to, important meeting notes and important correspondences. Your submission should reflect the value of your work, its significance to the project's outcomes, and your adaptability and innovation in meeting project goals.

3 Credit Hour Students:
Construct a detailed portfolio that reflects the depth of your engagement with and the strategic impact of your work within Illinois Solar Decathlon. Your portfolio should be a testament to your leadership, containing essential communications, technical work, and analytical tasks that you have overseen, which can also include organizational tasks, logistics, and managerial duties. It should also include visual documentation of leadership decisions and actions that informed your project's direction, as well as work you delegated to & were consulted with your team members. Provide a comprehensive overview of your influence on major deliverables throughout the semester and dissect the strategies you used to approach them. This portfolio should not only showcase the culmination of your efforts but also the thought leadership and collaborative expertise that you brought to the RSO.

End of Semester Peer Evaluation
Required for all students enrolled in ABE 498

Students will complete the peer evaluation forms and submit a screenshot of the completed form for assignment credit.

Course Grading Scale

A+	97 - 100		C+	77 - 80
A	93 – 97		C	73 - 77
A-	90 - 93		C-	70 - 73
B+	87 - 90		D	65 - 70
B	83 - 87		F	<65
B-	80 - 83			

Notes:

1.   Late work will be deducted by 10% grade for each day it is late. Exceptions will only be made if arranged before the deadline, or in the case of emergency as defined by University of Illinois policies.

ACADEMIC INTEGRITY

Academic misconduct (plagiarism, cheating, or other forms of misconduct as defined by the university) will not be tolerated in this course. Academic Misconduct is defined as any activity which tends to compromise the academic integrity of the institution or subvert the educational process. According to Article 1 of the Student Rights and Responsibilities - Part 4 (Academic Integrity and Procedure): No student shall use or attempt to use in any academic exercise materials, information, study aids, or electronic data that the student knows or should know is unauthorized. This includes copying, direct quotation without citation, paraphrasing without citation, or providing false or misleading information for the purpose of gaining an academic advantage. Please see Academic Integrity Infractions at: http://studentcode.illinois.edu/article1_part4_1-402.html for a complete outline.

STUDENTS WITH DISABILITIES

Students with disabilities who have not registered for services with the Division of Rehabilitation Education Services and who wish to request accommodations should contact the coordinator for Student Services with the Division at 333-4603 (voice or TTY). Reasonable efforts will be made to accommodate students with disabilities in this course. Inform the instructor as soon as possible if you require accommodations.

FERPA

Any student who has suppressed their directory information pursuant to Family Educational Rights and Privacy Act (FERPA) must self-identify to the instructor to protect the privacy of their attendance in this course.