Syllabus & Course Schedule

The purpose of this project-based learning course is to develop critical thinking and engineering problem solving skills by exploring and proposing sustainable solutions to current civil and environmental engineering problems facing the University of Illinois campus community. This class will help students begin to identify themselves as civil and environmental engineers, provide pre-requisite content for future CEE classes, and prepare them for opportunities for research and summer internships during their undergraduate studies.

Course Director: Prof. Jacob Henschen (jhensche@illinois.edu)
Credit: 4 undergraduate hours
Contact hours/week: 4 hours
Time/Location: Monday & Wednesday Lectures at 3:00-4:50 (3039 CIF)
Class Zoom Room:
https://illinois.zoom.us/j/88933755754?pwd=44P8UCvBIQULqyOeYHcGEtKhWMx21r.1Meeting ID: 889 3375 5754
Password: cee190
Office hours: (TBA)

Course Instructors (more information below):
Prof. Art Schmidt aschmidt@illinois.edu (CEE)
Prof. Jeffery Roesler (CEE) jroesler@illinois.edu

Learning Objectives
Upon completion of this course, student should be able to:

1. Develop, manage, and complete an open-ended team infrastructure feasibility project
2. Collect project data from interviews, surveys, measurements, or past studies
3. Estimate project schedule and cost
4. Explain the various civil and environmental engineering disciplines
5. Import data, apply functions and formulas, plot data, and format tables/figures in Excel
6. Identify more deeply as a civil and environmental engineer

Student Outcomes
1. Demonstrate an ability to manage and complete multiple assignments by specified deadlines
2. Demonstrate an ability to function effectively on a team with members providing leadership, creating a collaborative and inclusive environment, establishing goals, planning tasks, and meeting objectives.
3. Demonstrate an ability to communicate with a range of audiences through written, verbal, and graphic communications.
4. Demonstrate and ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics

Course Overview
The format of the course consists of a blend of case study discussions, skills development, site visits, and a team-based semester project. Instructors with expertise in a particular area of civil and environmental engineering will present each case study lecture. The purpose of the case study lectures and discussions

are to teach students the process of engineering problem solving by discussing real project challenges and solutions. Field site visits to local civil and environmental infrastructure facilities will be held during the regular class time. The team-based semester projects will develop feasible solutions to specific campus/community problems related to CEE, e.g., stormwater management, recycling, energy, structural feasibility studies, multi-modal transportation, etc.

By the end of the course, students will have improved their engineering problem solving skills through the pre-lecture readings, case study discussions, introductory computation exercises, semester project experience, peer review of project reports, and peer assessment of teammates. Specifically, the semester project will teach students to define the project objectives, scope of the project, break down the problem into solvable tasks, create and follow a schedule, gather and analyze relevant data, synthesize information, make data-driven decisions, and propose and communicate viable solutions to the problem. The following types of communication genres will be covered in the course: proposal writing, technical report, 30-second pitch, 3-minute overview presentation, final project presentation, and peer-review of proposal/reports.

Assignments Overview

Each assignment type in this course is designed to build skills and help students achieve the learning objectives of the course. All assignments are located on the CEE190 Canvas site (canvas.illinois.edu). All individual and team assignments must be turned into *Gradescope* (www.gradescope.com).

Journal: The purpose of journal assignments is to guide students through the engineering ideation process. In this course, the journaling process and classroom charrettes assist students and teams to come up with well-defined project ideas.

Discussion: The purpose of discussion assignments is to help students individually develop skills to write an engineering proposal and eventually a technical project report. The typical Sections Of A proposal Report (SOAR) are the introduction, objectives, scope, schedule, and references.

Skills: The purpose of the skill assignments are to introduce important competencies to students such as basic quantity and cost estimation, data analysis and visualization, professional correspondence, and entrepreneurial mindset.

Case Studies: The purposes of case study assignments are to (1) expose students to the various disciplines in civil and environmental engineering, (2) provide students pre-lecture readings to deepen background in CEE, and (3) actively engage students in discussion-driven case study lectures that demonstrates and teaches them the critical thinking process that leads to innovative solutions. Each case study has ***pre-lecture readings, a quiz, an in-class presentation and a reflection assignment***

Milestone Reports: The purpose of milestone report assignments is to guide student teams toward a final technical (feasibility) report on their project idea. Milestone reports start with a project proposal, then an interim report, and culminate in a final report. Peer review and instructor feedback is provided for each deliverable. Milestone#3 also includes a final presentation given to external judges.

Schedule

Week	Monday		Wednesday	
1	8/26		8/28	
	Course + CEE@Illinois Overview+Intros	SOAR: Introduction & Sources	Case Study #1- Boneyard	Field Trip
2	9/2		9/4	
	LABOR DAY		Case Study #2- Material Recycling	Ideation #1
3	9/9		9/11	
	SOAR: Objectives & Scope	CEE Present	SOAR: Schedule	Ideation #2
4	9/16		9/18	
	Case Study #3 - Transportation	Faculty/F&S Ideation (EC opportunity)	SKL1: Excel 1 (cost and estimating)	Ideation #3
5	9/23		9/25	
	Wastewater Treatment Plant Tour	WWTP tour, con't	Case Study #4 - Wastewater Plant	SOAR: Conclusion
6	9/30		10/2	
	Case Study #5 - Energy	SKL2: Excel 2	Case Study #6 - Tunneling	SKL3: Tech Writing/Peer Review
7	10/7		10/9	
	Peer Review M#1	*CEE4XX Feedback*	Peer Review M#1	SKL4: Excel 3
8	10/14		10/16	
	M#1 Project time	*CEE4XX feedback*	SKL5: Entrepreneurial Mindset	Fall 2022 Project Presentations
9	10/21		10/23	
	SKL6: Professional Correspond & Conduct	M#2 project time	SKL7: Tech Presentation	M#2 project time
10	10/28		10/30	
	M#2 project time	M#2 project time	3-minute Presentation	*CEE4XX Feedback*
11	11/4		11/6	
	Case Study #7 - Construction	Build Construction Robot	Peer Review M#2	M#2 Project time
12	11/11		11/13	
	Case Study #8 - Structures & Wind	M#2 project time	**UG Curriculum**	*CEE4XX Feedback*
13	11/18		11/20	
	SOAR Methodology	Peer Assessment M#2	M#3 Report& Presentation	*M#3 project time*
14	11/25		11/27	
	Thanksgiving Break		Thanksgiving Break	
15	12/2		12/4	
	M#3 Presentation Peer Review	*M#3 project time*	Peer Review M#3 Report	*CEE4XX Feedback*
16	12/9		12/11	
	Engr Ethics; M#3 project & presentation time	8-minute practice on zoom	Final Presentation Judging Session	

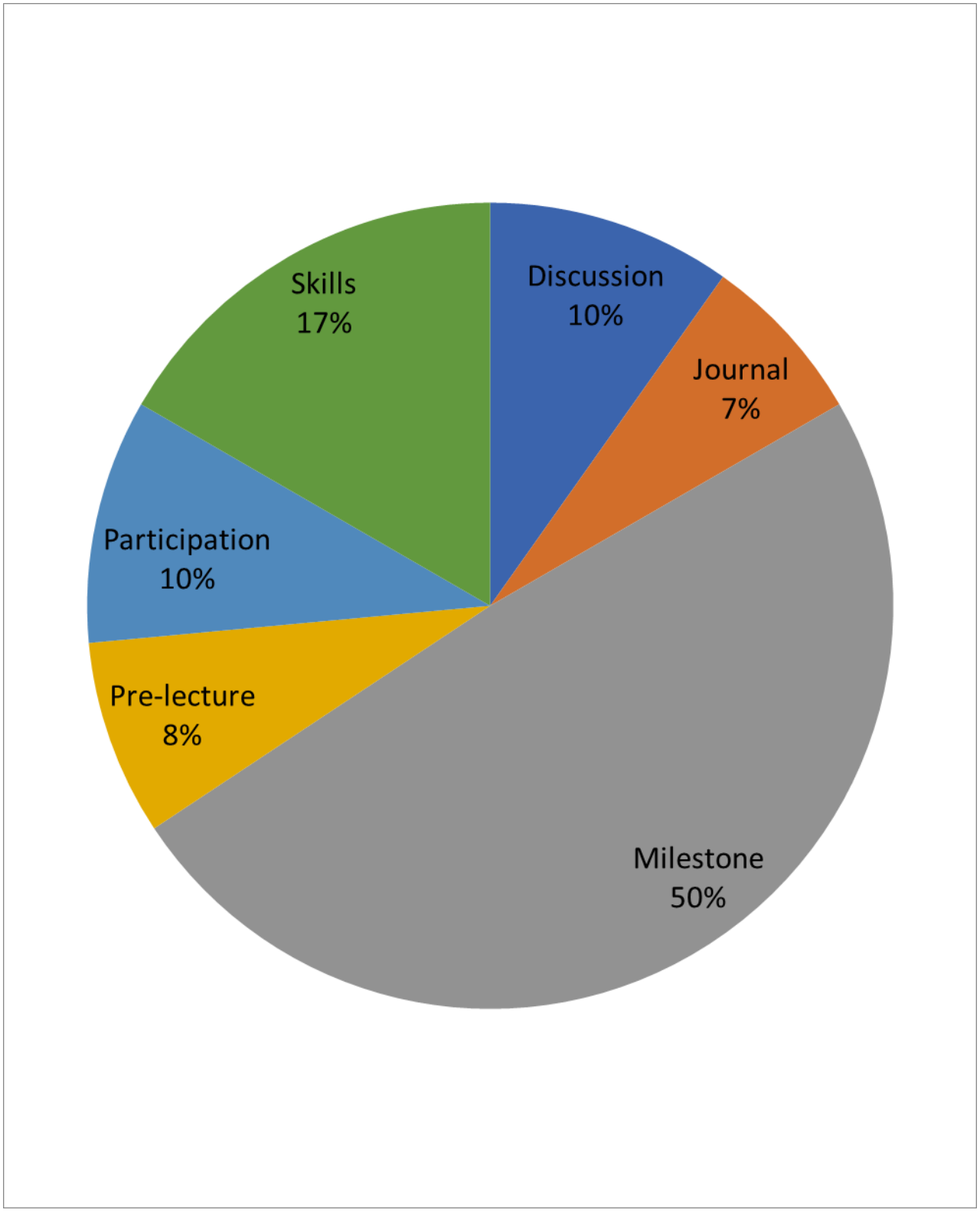
Assignment Schedule

Week	Assignment Due				Assigned				Field Trip/Lab
1									
	CS1		CS1-FT		CS1	CS2	D1	J1	Boneyard Creek
2									
	CS2		D1	J1			D2	J2	
3									
			D2	J2	CS3		D3	J3	
4									
	CS3			J3	CS4			J4	
5									
	CS4-FT		D3	J4	CS5		D4		Wastewater Plant
6									
	CS5-FT	CS6	D4		CS6			M1	Powerplant (Fir)
7									
									Powerplant (Fri)
8									
				M1					
9									
								M2	
10									
					CS7				
11									
	CS7				CS8				Construction Robot
12									
	CS8			M2				M3	
13									
14									
15									
16									
				M3P					
	M3R due			12/13					

Assignments

Discussion		**Compose technical proposal**	**100**
	D1	Introduction and Sources	25
	D2	Objectives and Scope	25
	D3	Schedule & Quantity and Cost Estimation	25
	D4	Conclusion & Revisions	25
Journal		**Brainstorm and project ideation**	**70**
	J1	5 project ideas	15
	J2	3 synthesized project ideas	15
	J3	1 proposed project idea	20
	J4	Team Project Idea Outline	20
Milestone		**Demonstrate team project feasibility**	**500**
	M1	Project Proposal	150
	M2	Interim Report	200
	M3R	Final Project Report	100
	M3P	Final Presentation	50
Pre-lecture		**Recognize the built environment**	**80**
	CS1-FT	Stormwater Management	10
	CS2	Material Recycling	10
	CS3	Transportation	10
	CS4-FT	Wastewater Treatment	10
	CS5-FT	Power & Energy	10
	CS6	Tunneling	10
	CS7	Construction Sensing & Technology	10
	CS8	Structures & Wind	10
Skills		**Build professional competency**	**170**
	SKL1	Excel 1: Cost Estimation & Scheduling	10
	SKL2	Excel 2: Importing Data + Graphing	15
	SKL3	Technical Peer Review	10
	SKL4	Excel 3: Statistical Analysis	15
	SKL5	Entrepreneurial Mindset	5
	SKL6	Professional Correspondence	5
	SKL7	Technical Presentation	10
	SKL8	Upload Draft M1,M2,M3R,M3P for peer review	20
	SKL9	Conduct Peer Assessments (3 times)	30
	SKL10	Conduct Peer Reviews for M1;M2;M3-R;M3-P	40
	SKL11	Engineering Ethics	10
Participation		**Learn together**	**105**
		Pre-semester Quiz	5
		Boneyard Field Trip	5
		Wastewater Treatment	5
		Abbott Power Plant	5
		Construction robotics lab	5
		CS1	10
		CS2	10
		CS3	10
		CS4	10
		CS5	10
		CS6	10
		CS7	10
		CS8	10
Total			**1025**
		Class grades based on 1000 points	

Assignments



Course Assessment

Participation includes attending class and field trips and engagement in classroom discussions. The weighted percentages from the above will earn the following grades:

A+	95%+	C+	76 – 80%
A	92 – 95%	C	73 – 76%
A-	89 – 92%	C-	70 – 73%
B+	86 – 89%	D+	66 – 70%
B	83 – 86%	D	63 – 66%
B-	80 – 83%	D-	60 – 63%

This course will not be graded on a curve. The student's grade will be based on individual participation and the quality of the team-oriented semester project. Individual student contributions to their team's semester project will be assessed by their fellow team members through a peer assessment tool. The results of this peer assessment can affect a student's grade for each semester project deliverable. Students peer-assessed below the fellow teammates will have their project deliverable reduced at least one letter grade.

Deliverables

All individual project ideation journal, skill, and discussion assignments should be submitted to Gradescope. Likewise, team project assignments should also be submitted to Gradescope. Re-submittals up until the due date are permitted and only the last submission will be graded.

All assignments are due on the dates listed in the class schedule before the start of the class. Project and discussion assignments turned in after this time will be considered late and will be deducted 20% on the first day late and 10% per day thereafter. Pre-lecture quizzes, SKL assignments, and journal ideation assignments not completed before the deadline will automatically receive a zero. All team project assignments should be completed electronically. If you cannot turn your team project assignment in on time and have a valid excuse, please contact the course director about making alternate arrangements for submitting the assignment.

Illnesses need to documented, and you should communicate with the course director and head TA for any missed work. Religious accommodations will be made following the recommendations from the University of Illinois. These accommodations need to be arranged by the student at least 2 weeks in advance of any missed due dates or class activities.

Students may request a re-grade of an assignment question in Gradescope that is accompanied with a detailed written response submitted to the course director. Re-grades will be completed by the instructors and the ***entire assignment will be re-graded***. The final score may be higher, lower, or the same as the previous graded work.

Class Etiquette/Participation

Download iClicker cloud student app to phone and bring laptop computer to class every day.

During the classroom case studies, you are encouraged to ask questions, comment, and participate in the discussion. Unless directed, individual student conversations will not be permitted since it disrupts the instructor and other students from learning. Furthermore, working on other homework, watching videos, internet surfing, and texting are distractions and are strictly prohibited. A portion of your grade will be based on class participation and etiquette. It is strongly encouraged to discuss academic or personal matters that may affect performance in the course with the course director as soon as possible and not the last week of class.

Please be punctual to class and field trips. During field trips, be mindful of your surroundings and adhere to all safety precautionary measures; conduct yourself as a representative of the University of Illinois; be respectful and courteous to the facility employees and do not disrupt their work. Participation will be accounted for during every class and field trip.

Students will be expected to respect and to maintain the university policy on **academic integrity**. For a discussion of academic integrity, please refer to the *Code on Campus Affairs and Regulations Applying to All Students*. If you are uncertain as to whether a certain action constitutes an infraction of academic integrity, please discuss it with the instructor before carrying out that action. Cheating on quizzes will result in an automatic zero and referral to university officials.

The use of a large-language model (LLM) is acceptable, but you must include a disclaimer in your reports where it was used and how it was used. You must also be aware that there are privacy concerns with the use of some models so you should proceed with caution. Most importantly, while LLM's excel at certain aspects, there are commonly problems with computation and citations so you should always review the output of any LLM that you use.

Course Resources that you should bring every day

Pre-lecture readings (Canvas)
Presentation files (Canvas)
i-Clicker cloud student app (app or physical remote)
Personal laptop (try to make sure it is charged)

Contact Information

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