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. Jeffery Roesler (jroesler@illinois.edu)
Credit: 4 undergraduate hours
Contact hours/week: 4 hours
Time/Location: Monday & Wednesday Lectures at 4:00-5:50 (0035 CIF)
Class Zoom Room:
https://illinois.zoom.us/j/88532433408?pwd=SHJhT2pZOHhPVFRFVGhpM3NuL25vZz09
Meeting ID: 885 3243 3408
Password: cee190
Office hours: Monday 3:00 – 4:00 pm & Friday 4:00 – 5:00 pm (TBA)

Course Instructors & resources: Prof. Art Schmidt aschmidt@illinois.edu (CEE), Prof. Jacob Henschen (CEE) jhensche@illinois.edu, Dr. Lance Schideman schidema@illinois.edu (ISTC), Morgan White mbwhite@illinois.edu (F&S)

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 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 class discussion charrettes first assist students and then eventually teams to come up with well-defined project ideas.

Discussion: The purpose of discussion assignments is to assist students individually on how 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 thinking,

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.

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

Schedule

Week	Monday		Wednesday	
1	8/22		8/24	
	Course + CEE@Illinois Overview+Intros	SOAR: Introduction & Sources	Case Study#1-Boneyard	Field Trip
2	8/29		8/31	
	Case Study #2- Material Recycling	In-class work time	SOAR: Objectives & Scope	Ideation #1
3	9/5		9/7	
	LABOR DAY		SOAR: Schedule	Ideation #2
4	9/12		9/14	
	Case Study #3-SHM	Faculty Ideation	SKL: Excel 1	Ideation #3
5	9/19		9/21	
	Case Study #4-Wastewater; Tour	SOAR:Conclusion Exec. Summary	SKL: Excel 2	Thomas Frankie, WJE
6	9/26		9/28	
	Case Study #5-Energy	SKL: Excel 2, con't	SKL: Tech Writing/Peer Review	*CEE495 Feedback*
7	10/3		10/5	
	Peer Review M#1	*M#1 Project time*	SKL: Excel 3	*M#1 Project time*
8	10/10		10/12	
	Case Study #6- Tunneling	*CEE495 feedback*	SKL: Professional Correspondence	
9	10/17		10/19	
	SKL: Tech Presentation		SKL: Entrepreneurial Mindset	Peer Assessment
10	10/24		10/26	
	Case Study#7 Construction	Field Trip	3-minute Presentation	*CEE495 Feedback*
11	10/31		11/2	
	UG curriculum overview	SOAR: Methodology	Peer Review M#2	*M#2 Project time*
12	11/7		11/9	
	Case Study #8- Transportation	*M#2 project time*	TBD	*CEE495 Feedback*
13	11/14		11/16	
	CEE Alumnus	Writing Conclusion	**CEE Seniors Experiences**	*CEE495 Feedback*
14	11/21		11/23	
	Thanksgiving Break		Thanksgiving Break	
15	11/28		11/30	
	Final Presentation Peer Review	*M#3 Project time*	Peer Review M#3 Report	
16	12/5		12/7	
	M#3 project & presentation time		Final Presentation Judging Session	

- D#, J# and M# are Discussion, Journal, amd Milestone assignments
- C# are Case Study assignments
- D#, J# C#, M# are assignments downloaded from *Canvas*

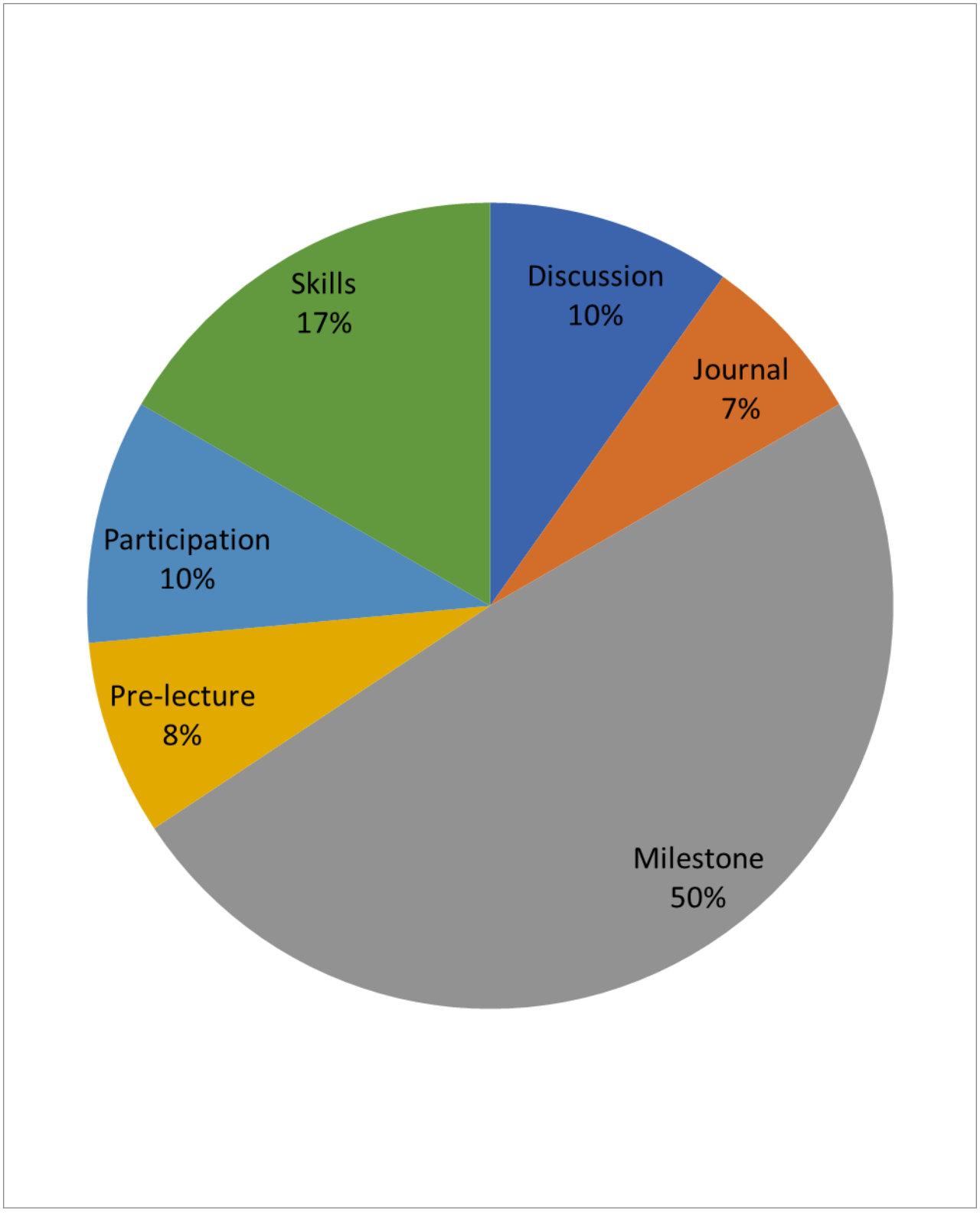
Assignment Schedule

Week	Month	Day	4:00 to 4:50 pm	5:00 to 5:50 pm	Assigned	Due
1	Aug	22	Course + CEE@Illinois Overview+Intr	SOAR: Introduction & Sources	C1, D1	
		24	Case Study#1-Boneyard	Field Trip	J1, C2	C1
2		29	Case Study #2- Material Recycling	In-class work time		C2
	Sep	31	SOAR: Objectives & Scope	Ideation #1	J2, D2	D1, J1
3		5	LABOR DAY	No CLASS		
		7	SOAR: Schedule	Ideation #2	J3, C3, D3	J2, D2
4		12	Case Study #3-SHM	Faculty Ideation		C3
		14	SKL: Excel 1	Ideation #3	C4, J4	J3
5		19	Case Study #4-Wastewater; Tour	SOAR: Conclusion Executive Summary		C4
		21	SKL: Excel 2	Thomas Frankie, WJE	M1,C5,D4	D3, J4
6		26	Case Study #5-Energy	SKL: Excel 2, con't		C5
		28	SKL: Tech Writing/Peer Review	CEE495 Feedback		D4
7	Oct	3	Peer Review M#1			
		5	SKL: Excel 3	M#1 Project time	C6	
8		10	Case Study #6- Tunneling	CEE495 feedback		C6
		12	SKL: Professional Correspondence	0	M2	M1
9		17	SKL: Tech Presentation	0		
		19	SKL: Entrepreneurial Mindset	Peer Assessment	C7	
10		24	Case Study#7 Construction	Field Trip		C7
		26	3-minute Presentation	CEE495 Feedback		
11	Nov	31	UG curriculum overview			
		2	Peer Review M#2		C8	
12		7	Case Study #8- Transportation			C8
		9	SKL: Tech Presentation	CEE495 Feedback	M3	M2
13		14	CEE Alumnus	Writing Conclusion		
		16	CEE Seniors Experiences	CEE495 Feedback		
14		21	***Thanksgiving Break***	***Thanksgiving Break***		
		23	***Thanksgiving Break***	***Thanksgiving Break***		
15		28	Final Presentation Peer Review			
	Dec	30	Peer Review M#3 Report			
16		5	M#3 project & presentation time			
		7	Final Presentation Judging Session			M3 Present
						M3 Report

Topics

SOAR		***S*ections *O*f *A* *R*eport**
	D1	Introduction
		Sources
	D2	Objectives
		Scope
	D3	Schedule
		Quantity and Cost Estimation
	D4	Executive Summary
		Conclusion
CS		**Case Study**
	1	Stormwater Management
	2	Material Recycling
	3	Structural Health Monitoring
	4	Wastewater Treatment
	5	Power & Energy
	6	Tunneling
	7	Construction Management
	8	Transportation Systems
SKL		**Skills**
	1	Excel 1: Cost Estimation & Scheduling
	2	Excel 2: Importing Data + Graphing
	3	Technical Writing and Peer Review
	4	Excel 3: Statistical Analysis
	5	Professional Correspondence
	6	Technical Presentation, Part 1
	7	Entrepreneurial Thinking
	8	Upload Draft Milestone for review
	9	Conduct Peer Assessments
	10	Conduct Peer Project Review

Assignments



Assignment Totals (1000 points)

Discussion		**Compose technical proposal**	**100**
	D1	Introduction and Sources	25
	D2	Objectives and Scope	25
	D3	Schedule & Quantity and Cost Estimation	25
	D4	Executive Summary & Conclusion	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	Structural Health Monitoring	10
	CS4-FT	Wastewater Treatment	10
	CS5	Power & Energy	10
	CS6	Tunneling	10
	CS7-FT	Construction Management	10
	CS8	Transportation	10
Skills		**Build professional competency**	**180**
	SKL1	Excel 1: Cost Estimation & Scheduling	10
	SKL2	Excel 2: Importing Data + Graphing	10
	SKL3	Technical Peer Review	10
	SKL4	Excel 3: Statistical Analysis	10
	SKL5	Professional Correspondence	10
	SKL6	Technical Presentation	10
	SKL7	Entrepreneurial Thinking	10
	SKL8	Upload Draft M1,M2,M3R,M3P peer review	20
	SKL9	Conduct Peer Assessments (3 times)	30
	SKL10	Conduct Peer Reviews for M1;M2;M3-R;M3-P	60
Participation		**Learn together**	**100**
		Boneyard Field Trip	5
		Wastewater Treatment	5
		Construction Site	5
		Abbott Power Plant	5
		CS1	10
		CS2	10
		CS3	10
		CS4	10
		CS5	10
		CS6	10
		CS7	10
		CS8	10
Total			**1030**
		Class grades based on 1000 points	

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.

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 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. All arrangements should be made ahead of the due date.

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.

Course Resources
Pre-lecture readings, presentation files, i-Clicker cloud student app, and personal laptop.

Contact Information

Course Director	Prof. Jeffery Roesler Transportation/Materials jroesler@illinois.edu	**Lead TA**	Casey Rodgers caseyjr2@illinois.edu
Course Instructors	Prof. Art Schmidt Water Resources aschmidt@illinois.edu Prof. Jacob Henschen Materials & Structures jhensche@illinois.edu Dr. Lance Schideman ISTC/Environmental schidema@illinois.edu	**Teaching Assistants**	Anthony Finucane ajf9@illinois.edu Daniel Gentile dtg2@illinois.edu Zack Gold zgold3@illinois.edu Abhilasha Maharjan am84@illinois.edu
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