CEE 398PBL – Project Based Learning in Civil Engineering
Syllabus – Fall 2014

Course Director: Prof. Jeffery Roesler
Time: Wednesday, 4:00 – 6:00 pm
Location: 1233 Newmark Laboratory
Office: 1110 Newmark Laboratory
Office hours – Monday & Friday 3:00 – 4:30 pm
Email – jroesler@illinois.edu

Course Instructors: Prof. Art Schmidt (CEE), Prof. Lance Schideman (A&BE), Morgan Johnston (F&S)

Teaching Assistants: Paul Littleton and Alek Heilstedt
Office: Newmark basement room B226 (asphalt lab)
Office hours – Monday & Wednesday 12:00 – 2:00 pm
Email – littletn@illinois.edu or heilste1@illinois.edu

Writing Coach: Mary Hays
Office: 327B English Building
Office hours: Tuesday & Thursday 11:00 – 12:00 or by appointment
Email – maryhays@illinois.edu

Course website: https://compass2g.illinois.edu/

Pre-requisite or Co-requisite: CEE 195 or equivalent

Recommended Equipment: Laptop and iClickers

Course Objective and Description

The primary objective 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 and prepare them for opportunities for summer internships during their undergraduate studies. Through working on a team project and reviewing other team projects, students also develop professional skills such as communication (written and oral) and project management. The course is primarily for freshmen and sophomores with an objective of engaging them into the broad spectra of challenges and contemporary issues in civil and environmental engineering especially with regard to sustainability and design. Finally, the course will serve as a bridge course between CEE 195 and the introductory technical courses in CEE.

The format of the course consists of a blend of case study discussions, site visits, and a team-based semester project. Several case study lectures will be presented by faculty covering a particular area in infrastructure engineering and sustainability. The purpose of the case study lectures and discussions are to teach students the process of engineering problem solving by presenting and discussing real projects. Field site visits will be held during regular class time and will visit local civil and environmental infrastructure facilities. The team-based semester projects will develop feasible solutions to specific campus/community problems related to CEE, e.g., drainage, recycling, energy, building information modeling (BIM), 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, semester project experience, and peer evaluation process. Specifically, the semester project will teach students to scope problems, break down the problem into solvable components, gather and analyze relevant information, synthesize information, and propose and communicate viable solutions to the problem.

Course Topics

Sustainable construction material recycling; urban surface/subsurface water management; landscape architecture considerations relevant to urban design and human health; waste treatment and biofuel production; power generation and safety; Building Information Modeling; and smart cities and sensing.

Course Expectations

Students are expected to (a) complete the pre-lecture reading assignments and quizzes on time; (b) attend all classes; (c) actively participate in classroom discussions; (d) complete project assignments neatly and punctually; (e) attend all fields trips and act responsibly; (f) contribute positively and fairly in team projects; (g) communicate ideas, suggestions, concerns, and questions to the relevant resource persons and/or instructors.

Course Assessment

The performance of the students enrolled in CEE 398PBL will be assessed using the following scoring system:

Attendance	10%
Class participation	10%
Pre-lecture quizzes (7)	14%
Semester project	
Proposal	10%
Milestone #2	20%
Final report	25%
Poster/Presentation	11%

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

A+	96%+	C+	77 – 80%
A	92 – 96%	C	74 – 77%
A-	89 – 92%	C-	70 – 74%
B+	86 – 89%	D+	67 – 70%
B	83 – 86%	D	64 – 67%
B-	80 – 83%	D-	60 – 64%

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. This peer assessment will be part of the semester project grade.

Deliverables

All assigned project work and pre-lecture quizzes are due at the time listed in the class schedule. Project 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 not taken before the deadline will automatically receive a zero. All project assignments should be completed electronically. If you cannot turn your 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

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, web surfing, and cell phone 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 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 employees of the facility and do not disrupt their work.

Case study lectures and field trips are video recorded. If you have an excusable absence on the day of a case study lecture or field trip, you are required to watch the corresponding video and take a quiz in order to satisfy your participation requirement.

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, and personal laptop.

Semester Project

This course specifically utilizes Project Based Learning (PBL) to engage students in a semester long process of analyzing, evaluating, and creating solutions to an engineering problem facing the University of Illinois campus community. These projects assist students in learning important domain knowledge, technical content, and develop needed skills in critical thinking, teamwork, peer evaluation, and communications.

For this course, students will tackle an infrastructure engineering problem in the context of sustainability, which is directly or indirectly affecting the University of Illinois campus community, and propose a feasible solution. In order to simulate the environment encountered in real engineering projects, students will be compiled into teams of 3-4 students. The final team compositions will be decided by the faculty to ensure fair and diverse background of experience and knowledge. In general, the problems to be studied will be related to the various subject areas of the case studies discussed during class. Teams will be able to rank their interest in these problems before assignment by the faculty. Projects will be brainstormed during the first day of class and must be chosen by the end of the third day of class with intermediate milestones listed in the class schedule in order to report, orally or in writing, and receive feedback on the progress of the project. At the end of the semester, teams shall submit a detailed report and participate in a poster presentation on their findings. Each team will have a $100 budget to spend for expenses related to completing the project.

CEE 398 (PBL) – Project Based Learning in Civil Engineering
Case Study & Semester Project Schedule – Fall 2014

Week	Case Studies		Semester Projects	
	Pre-class prep for Case Study	**Case Study**	**Pre-class prep for Semester Project**	**In-class Activity**
Week 0 (Aug. 20)	Online Survey	Watch course video on Compass 2g. The video covers introduction to PBL & sustainability, course overview, format, logistics, semester projects.		
Week 1 (Aug. 27)	Class introduction to case studies, semester project & field trips – **Prof. Jeff. Roesler (CEE)** Room 1233 NCEL		Prepare for selecting your semester project by reviewing descriptions of possible projects and take the project survey available on Compass 2g	Take the pre-class survey and brainstorm campus-community infrastructure problems to investigate as semester projects
Week 2 (Sep. 3)	Pre-lecture Quiz #1	Construction Material Recycling case study lecture **Prof. Jeff Roesler (CEE)** Room 2312 NCEL	Compile your list of semester projects that interest you	Refine semester project idea and form project team
Week 3 (Sep. 10)	No Case Study Room 1233 NCEL		Review 2013 proposals	Develop project scope and write proposal. Complete team charter and **SUBMIT at end of class**

CEE 398 (PBL) – Project Based Learning in Civil Engineering
Case Study & Semester Project Schedule – Fall 2014

Week	Case Studies		Semester Projects	
	Pre-class prep for Case Study	**Case Study**	**Pre-class prep for Semester Project**	**In-class Activity**
Week 4 (Sep. 17) Field Trip	Pre-lecture Quiz#2	Urban Surface/Subsurface Water Management lecture **Prof. Art Schmidt (CEE)** Room 2312 NCEL	Field Trip – Boneyard Project: Runoff and Stormwater	
Week 5 (Sep. 24)	Pre-lecture Quiz#3	Urban Design and Human Health case study lecture **Prof. William Sullivan (Dept. of Landscape Architecture),** Room 2312 NCEL	Collect data	**Milestone #1** (project proposal) bring to class 3 printed copies of your group's proposal for in-class peer review Participate in peer review of other group project proposals

CEE 398 (PBL) – Project Based Learning in Civil Engineering
Case Study & Semester Project Schedule – Fall 2014

Week	Case Studies		Semester Projects	
	Pre-class prep for Case Study	**Case Study**	**Pre-class prep for Semester Project**	**In-class Activity**
Week 6 (Oct. 1st)	No Case Study Room 1233 NCEL		Incorporate peer review comments into your project proposal. Obtain Prof Mary's review of your proposal prior to the Week 5 submittal deadline	**Submit Milestone #1,** at beginning of class Assess the current state of the problem; develop plan to acquire/compile and analyze relevant technical data
Week 7 (Oct. 8th) Field Trip	Pre-lecture Quiz#4	Waste Treatment & Biofuel Production case study lecture **Prof. Lance Schideman**	Collect data	Field Trip – Wastewater Treatment Plant, **Prof. Lance Schideman**
Week 8 (Oct. 15)	No Case Study Room 1233 NCEL		Collect data	Analyze data, research, and brainstorm for possible solutions. Search for proven solutions (precedents) and adapt them to suit your situation if applicable.

CEE 398 (PBL) – Project Based Learning in Civil Engineering
Case Study & Semester Project Schedule – Fall 2014

Week	Case Studies		Semester Projects	
	Pre-class prep for Case Study	**Case Study**	**Pre-class prep for Semester Project**	**In-class Activity**
Week 9 (Oct. 22)	No Case Study Room 1233 NCEL		Obtain Prof Mary's review of your project update prior to the Week 9 submittal deadline. Finish collecting data.	**Submit Milestone #2** (project update) at beginning of class. Participate in peer review of other group project updates
Week 10 (Oct. 29) Field Trip	Pre-lecture Quiz#5	Power Generation and Infrastructure case study lecture **Dr. Jack Dempsey**	Incorporating peer review comments into your project update	**Re-submit Milestone #2 at** beginning of class Field Trip – Abbott Power Plant (Mike Larsen)
Week 11 (Nov. 5)	No Case Study Room 1233 NCEL		Review expert feedback of your project update	Work with experts in class to revise your project update
Week 12 (Nov. 12)	Pre-lecture Quiz#6	Smart Cities case study lecture **Prof. Bill Spencer (CEE)** Room 2312 NCEL		Begin work on final report

CEE 398 (PBL) – Project Based Learning in Civil Engineering
Case Study & Semester Project Schedule – Fall 2014

Week	Case Studies		Semester Projects	
	Pre-class prep for Case Study	**Case Study**	**Pre-class prep for Semester Project**	**In-class Activity**
Week 13 (Nov. 19) Field Trip	Pre-lecture Quiz#7	Building Information Modeling (BIM) lecture **Prof. Golparvar-Fard (CEE)** Room 2312 NCEL	Field Trip – Tour of ECE building then return to 2312 NCEL to review student's photos in the BIM system.	
Thanksgiving Break November 22 – November 30th				
Week 14 (Dec. 3)	No Case Study Room 1233 NCEL			Work on Projects & Poster. Participate in peer review of the final Project Report.
Week 15 (Dec. 10) (3hrs)	Poster Session & Presentations in the Newmark Yeh Student Center **SUBMIT final project report** (will be graded)			
Week 16 (Dec. 17)	No Final Exam			