CEVE 101 (Fundamentals of Civil and Environmental Engineering) Syllabus

Fall 2024

Course Description

Civil and Environmental Engineers (CEVEs) engage in the planning, design, construction, operation, retrofit, demolition, and reuse of infrastructure systems that form the backbone of societies and economies. CEVEs work at the dynamic interface of the built environment, information environment, and natural environment on topics like smart cities and construction, sustainable energy and buildings, connected and automated transportation systems, resilient infrastructure, climate change mitigation and adaptation, and water management. In this course, students will explore how data science, environmental science, economic analysis, structural design, and systems thinking can be integrated to promote sustainability, resilience, and equity. Through a mix of technical lectures, topical seminars on applications and ideas of interest, and team-based projects, students will develop an understanding of the broad field of civil and environmental engineering and its applications.

Course Information

Instructor

- James Doss-Gollin
- jdossgollin@rice.edu
- Ryon 215

Grader

TBD

Meetings

- T/Th
- 10:50AM – 12:05PM TR
- TBD

Prerequisites & Preparation

None

Course Objectives

This course is intended to introduce you to the discipline of civil and environmental engineering through examination of topics in energy systems, water systems, urban mobility, and coastal resilience. This course emphasizes analytical skills, systems thinking, communication, and teamwork.

The course aims to provide:

1. an understanding of the scope of civil and environmental engineering;
2. an understanding of the academic activities of the Rice CEVE department;
3. exposure to fundamental principles, concepts, and approaches that apply across CEVE disciplines, including quantitative reasoning and creative problem solving;
4. a context for applying information from other first-year courses, especially calculus and physics;
5. a background for higher level classes in civil and environmental engineering;
6. an appreciation for the many links between the practice of civil and environmental engineering and social goals including sustainability, resilience, and equity;
7. a sampling of possible career paths within the field of civil and environmental engineering, and their requirements;
8. and some experience with the fun of being an engineer.

On completing this course, students should be able to:

1. Identify civil and environmental engineering subfields
2. Successfully perform engineering problem solving in several civil and environmental subfields
3. Generate report-quality engineering calculations
4. Create and present an oral report on a design project
5. Collaborate with peers in project teams and in composing project reports

Required Materials

No textbook is required for this course. All materials will be posted as open source on the course website or on Canvas.

You will occasionally be assigned scientific papers to read. Where those are available through the Rice library, you will be expected to access them yourself. You are encouraged, though not required, to use Zotero (Rice students have free storage). See Fondren Library's Resources for resources.

A Community of Learning

Rice's core values are responsibility, integrity, community, and excellence. Our goal is to create a learning community aligned with these core values.

Core Expectations

Course success involves a dual responsibility on the part of the instructor and the student.

As the instructor, my responsibility is to provide you with a structure and opportunity to learn. To this end, I commit to:

- provide organized and focused lectures, in-class activities, and assignments;
- encourage students to regularly evaluate and provide feedback on the course;
- manage the classroom atmosphere to promote learning;

- schedule sufficient out-of-class contact opportunities, such as office hours;
- allow adequate time for assignment completion;
- make lecture materials, class policies, activities, and assignments accessible to students.

Students are responsible for their own learning in the course and should commit to:

- attending all lectures;
- doing all required preparatory work before class;
- actively participating in online and in-class discussions;
- beginning assignments and other work early; and
- attending office hours as needed.

> **!** What If I'm Sick?
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> Please stay home if you're feeling sick! This is beneficial for both for your own recovery and the health and safety of your classmates. We will also make any necessary arrangements for you to stay on top of the class material and if whatever is going on will negatively impact your grade, for example by causing you to be unable to submit an assignment on time.

Diversity, Equity, and Inclusion

Rice is committed to building and maintaining an equitable and inclusive campus community. Diversity can refer to multiple ways that we identify ourselves, including but not limited to race, color, national origin, language, sex, disability, age, sexual orientation, gender identity, religion, creed, ancestry, belief, veteran status, or genetic information. Each of these diverse identities, along with many others not mentioned here, shape the perspectives our students, faculty, and staff bring to our campus. We, at Rice, will work to promote diversity, equity and inclusion not only because diversity fuels excellence and innovation, but because we want to pursue justice. We acknowledge our imperfections while we also fully commit to the work, inside and outside of our classrooms, of building and sustaining a campus community that increasingly embraces these core values.

Each of us is responsible for creating a safer, more inclusive environment.

Accommodation for Students with Disabilities

If you have a documented disability or other condition that may affect academic performance you should: 1) make sure this documentation is on file with the Disability Resource Center (Allen Center, Room 111 / adarice@rice.edu / x5841) to determine the accommodations you need; and 2) talk with me to discuss your accommodation needs.

Accommodation for Scheduling Conflicts

If any of our class meetings conflict with your religious events, student athletics, or other non-negotiable scheduling conflict, please let me know ASAP so that we can make arrangements for you.

Getting Help

You can ask questions through Canvas Discussions and Office Hours. We will make an effort to respond to all Canvas discussion questions within 24 hours, though this won't always be possible (travel, weekends, etc.). Please do not use email for questions about course content or labs, since other students may have related questions. You *should* use email for questions about personal matters, such as scheduling conflicts, accommodations, etc.

Academic Integrity

This class is designed to encourage collaboration, and students are encouraged to discuss their work with other students. Engineering as a profession relies upon the honesty and integrity of its practitioners (see *e.g.* the American Society for Civil Engineers' Code of Ethics). **All work submitted must represent the students' own work and understanding**, whether individually or as a group (depending on the particulars of the assignment).

If you are ever unclear about academic integrity, please ask! Additionally, always err on the side of providing more information.)

Rice Honor Code

More specifically, all students will be held to the standards of the Rice Honor Code, a code that you pledged to honor when you matriculated at this institution. If you are unfamiliar with the details of this code and how it is administered, you should consult the Honor System Handbook at honor.rice.edu/honor-system-handbook/. This handbook outlines the University's expectations for the integrity of your academic work, the procedures for resolving alleged violations of those expectations, and the rights and responsibilities of students and faculty members throughout the process.

AI/ML Resource Policy

Large language models (LLMs), like GPT, are powerful tools for generating text that can be used for coding and doing data analysis. This is at once empowering (LLMs are powerful and can save you time) and risky (LLMs can make mistakes that are hard to detect).

Our general view is that LLMs are powerful tools that you will encounter and use when you leave this classroom, so it's important to learn how to use them responsibly and effectively. You are generally permitted to use LLMs in this course, but ultimately, you are responsible for guaranteeing, understanding, and interpreting your results. In particular:

- One of the best applications of LLMs is to write code. This can help accelerate your workflow, especially when you are learning new syntax. However, LLMs can make bad decisions about how to structure your code, can introduce bugs, and can mislead you about what your code is doing. You are responsible for understanding and debugging your code, and for ensuring that it does what you intend it to do.
- LLMs should not be used to generate text that you submit as your own work. If you are assigned a writing assignment, the point is to stimulate your thought process, and you shortcut this if you ask a LLM to generate the response for you. This leads to shallow thinking! However, you *may* use tools including LLMs (but also Grammarly, spell-check, etc.) to help you edit your writing. This can sometimes be a fine line; it's always better to ask if you're not sure, and to disclose your use of these tools in your submission

Policy on Web Posting of Course Materials

Uploading course materials to web sites is not an authorized use of the course material. Both the poster and the user are in violation of the university policy, which is actionable.

Grading

Assignment	Format	Weight
Project 1	Oral presentation	25%
Project 2	Policy brief	25%
Project 3	Digital presentation	25%
Project 4	Final Report	25%

I reserve the right to curve the scale dependent on overall class scores at the end of the semester.

Late Work Policy

Late projects will be subjected to a 10% penalty per day. Specifically, your grade will be multiplied 0.9^d where d is the number of days late.

Preliminary Schedule

The following schedule outlines our planned topics and readings for the semester.

> **Note**
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> This schedule is subject to change. Updated versions will be posted on the Schedule page of the course website.

Week	Date	Topic	Reading	Exam/Project
1	Tues, Aug 27			
	Thurs, Aug 29			
2	Tues, Sep 3			
	Thurs, Sep 5			
3	Tues, Sep 10			
	Thurs, Sep 12			
4	Tues, Sep 17			
	Thurs, Sep 19			
5	Tues, Sep 24			
	Thurs, Sep 26			
6	Tues, Oct 1			
	Thurs, Oct 3			
7	Tues, Oct 8			
	Thurs, Oct 10			
8	Tues, Oct 15	NO CLASS – MIDTERM RECESS		
	Thurs, Oct 17			

Week	Date	Topic	Reading	Exam/Project
9	Tues, Oct 22			
	Thurs, Oct 24			
10	Tues, Oct 29			
	Thurs, Oct 31			
11	Tues, Nov 5	NO CLASS – ELECTION DAY		
	Thurs, Nov 7			
12	Tues, Nov 12			
	Thurs, Nov 14			
13	Tues, Nov 19			
	Thurs, Nov 21			
14	Tues, Nov 26			
	Thurs, Nov 28	NO CLASS – THANKSGIVING RECESS		
15	Tues, Dec 3			
	Thurs, Dec 5			