

Saving Campus, One Heated Sidewalk at a Time...



**The Grainger College
of Engineering**

UNIVERSITY OF ILLINOIS URBANA-CHAMPAIGN

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THE WORLD'S GATHERING PLACE FOR ADVANCING CONCRETE



Objectives

- List outcomes of an introductory, project-based CEE course
- Outline the primary project of the course
- Describe the scaffolding and resources that will can help lead to successful projects.

Course Context

- Common course required for all CEE students
 - 10% Transfer students
 - 5% upper-level students
- Enrollment is ~2-300 each Fall semester
- 3 Instructors and TA staff scaled to enrollment
- 2-2hr meetings (4 credit)
 - ***Previously 1 credit seminar***



Course Outcomes

1. Describe the roll and responsibilities of civil and environmental engineers
2. Demonstrate an ability to manage and complete multiple assignments by specified deadlines
3. 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.
4. Demonstrate an ability to communicate with a range of audiences through written, verbal, and graphic communications.
5. Demonstrate and ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics

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Theoretical Underpinnings

- Project-based learning
 - Challenging questions/problem
 - Sustained inquiry
 - Authenticity
 - Student choice
 - Reflection
 - Critique and revision
- Entrepreneurial Mindset Learning
 - Curiosity
 - Connections
 - Creating value



Semester Project

- Identify a problem on campus or choose an issue from a provided list
 - 75% of selected projects are self-identified
 - Any area within CEE(+) is allowed
- Identify solution(s)
- Develop a feasibility study for their proposal
- Communicate their study
 - 3 Iterations of a written report
 - Oral presentation to alumni and university officials



Scaffolded Activities

Case Studies

- An area of CEE presents an application of their discipline
- Reading and reflection

Sections of a report

- Emphasize technical communication
- Revision of writing

Journaling

- Ideation and reflection on project ideas

Skill Development

- Computation
- Peer review
- Teamwork
- Entrepreneurial Mindset

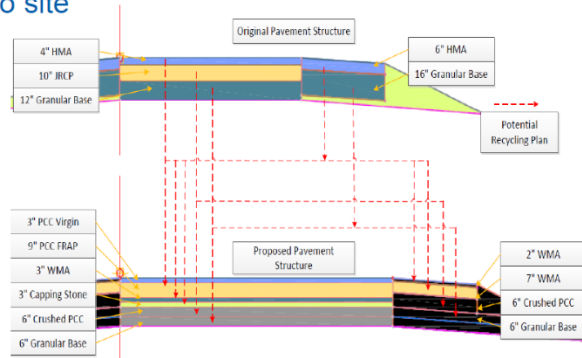
Semester project

Recycle 100% of Existing Roadway

- Benefits:
 - Less money towards virgin materials
 - Already close to site
- How can we recycle 100% of the existing roadway?

Issues

- Structural capacity
- Where/how do we process material?
- Processing costs



FOR ADVANCING CONCRETE



Sources of Project Support

- External Mentoring
 - External faculty
 - University personnel
- ***Near-Peer Mentoring***
 - 4th year students
 - 5 scheduled sessions



Institute for Sustainability, Energy, and Environment (ISEE)



Facilities & Services



iCAP Portal

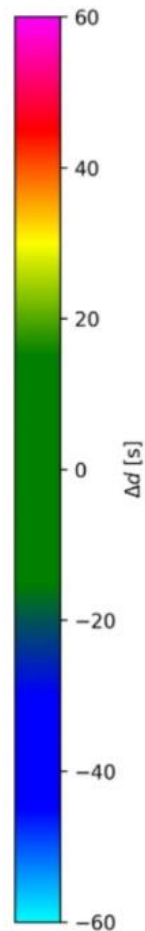
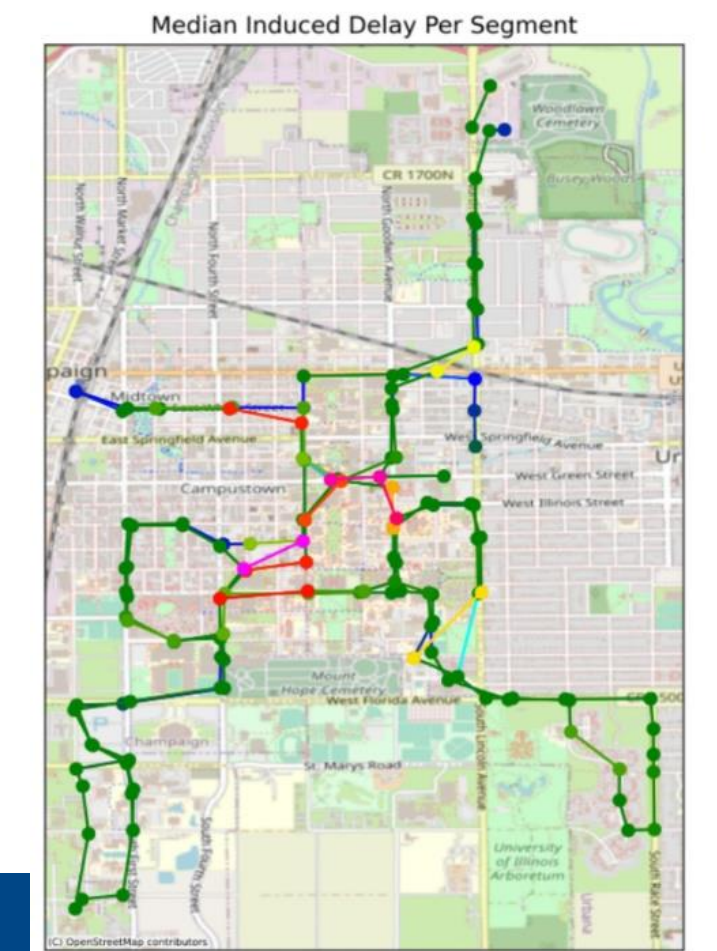
Illinois Climate Action Plan (iCAP)

University of Illinois Urbana-Champaign



Peer mentoring session

Campus bus priority signaling

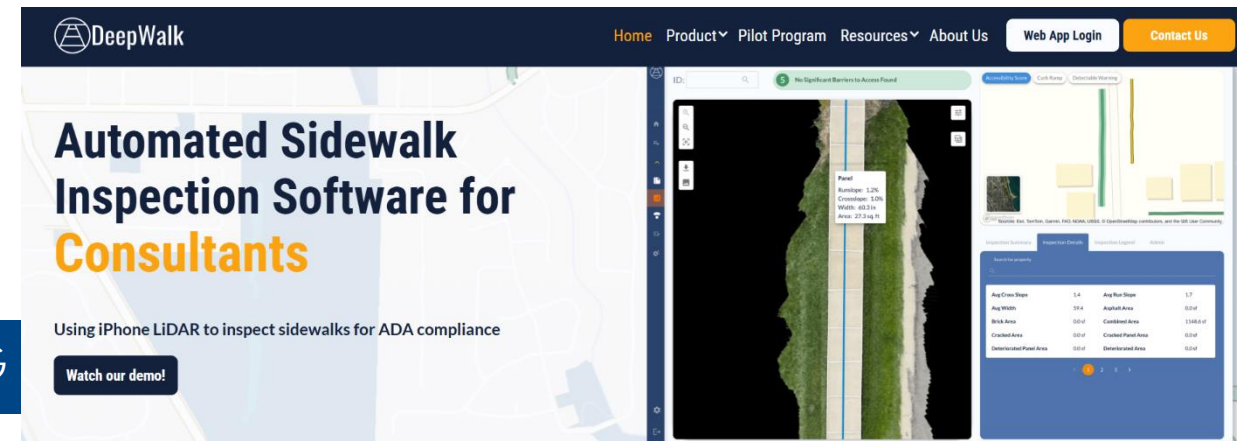


Waste food to energy



Solar Powered Embedded pavement lighting

Deepwalk: scanning technology for ADA compliance



OR ADVANCING

Student Reflections

I enjoyed this project, in part, mostly because of the team I worked with but also the project itself.

I can confidently say I feel more comfortable and prepared with engineering writing in my future schooling and career and completing my degree at the University of Illinois.

During the project, we developed practical skills during the project that helped us assess a range of sources to determine the feasibility of our idea.

I began to learn that engineering is most successful through collaboration with others.

As our project progressed and its needs changed over time, our group was able to work together and adapt to shifting circumstances despite the setbacks we encountered along the way.

As a group we have learned how to set realistic goals, accomplishing and communicating through deadlines, research, technical skills used by civil engineers, and how to work on writing professional papers

Don't be afraid to ask questions and seek help when needed, whether from professors, peers, or mentors.

Lessons Learned

- Emphasize that writing is a process
- Advising projects early is critical for developing the proper scope
- Peer mentoring has many positive outcomes especially in a large class
- *Sadly, heated sidewalks are not feasible*
- **Acknowledgements**
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