BRACE for Change! EOP in the Civil Engineering Curriculum

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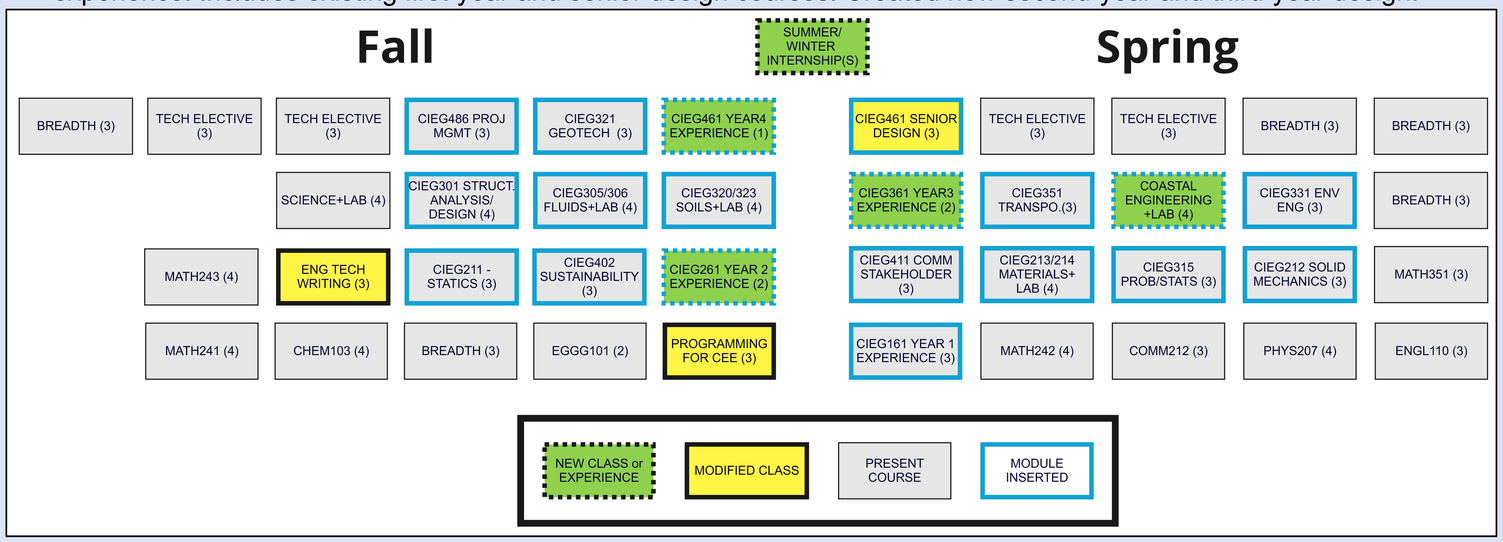
Motivation

Introducing concepts of sustainability, climate change, and life cycle thinking have become imperative across all engineering disciplines.

- Theme of sustainability is an integral part of the NAE's 14 Grand Challenges for Engineering.
- ABET Student Outcomes: Consideration of environmental factors in engineering design, addressing issues of sustainability.
- Students are deeply interested in sustainability topics and making a difference.
- Urgent need for our civil engineering graduates to know how to work in changing environments shaped by climate change and build vital infrastructure that is sustainable and resilient.
- Our enrollment numbers match a nationwide decline. We want to **increase recruitment of a diverse student body**, **foster industry connections** for faculty and students, and **engage students** excited about their role in designing infrastructure for a sustainable future.

Curriculum Map

- **Module Inserted:** Identified 13 existing courses as targets for incorporating sustainability-related modules. 8 courses launched with these modules.
- **New Class:** Identified the primary focus and implementation plan for each Design Spine course—yearly project-based experience. Includes existing first-year and senior design courses. Created new second-year and third-year design.



Project Objectives

BRACE FOR CHANGE

Building Resilience through Applied Civil | Coastal | Collaborative Engineering.

Curriculum transformation that infuses sustainability-focused learning outcomes from the **Engineering for One Planet (EOP) framework** throughout the **civil engineering undergraduate curriculum**.

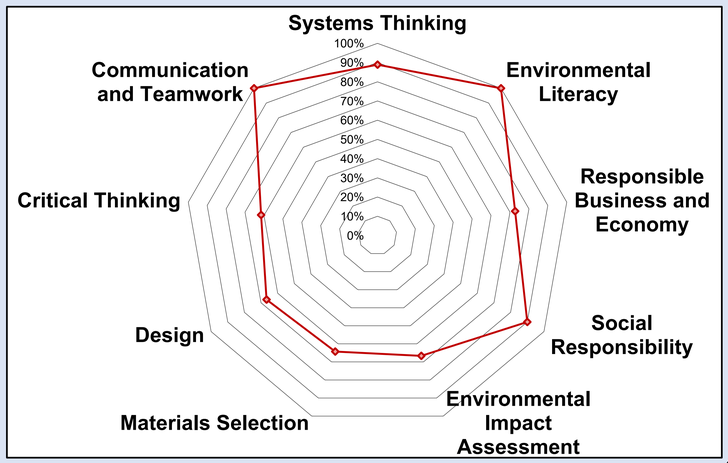
- Create **sustainability-related modules** within core courses taken by all civil engineering students

- Develop a **Design Spine** of new yearly project-based experience courses.

EOP Curriculum Evaluation

Status of EOP Implementation in the civil engineering curriculum at UD through the changes so far:

- Mapped coverage w.r.t. the nine EOP pillars using the EOP Teaching Evaluation Tool.
- Identified strengths & weaknesses in the curriculum as a whole.



Future Work

- File for curriculum change approval to add the new Design Spine courses.
- Build resilience into the curriculum! Ensure that critical student learning outcomes are revisited in multiple courses.

References

The Lemelson Foundation (2022). The Engineering for One Planet Framework: Essential Sustainability-focused Learning Outcomes for Engineering Education (2022). Accessed: Dec. 15, 2024 [Online]. Available: https://engineeringforoneplanet.org/wp-content/uploads/EOP_Framework.pdf

Teaching Evaluation Tool. Created by Arizona State University for the Lemelson Foundation. Accessed: Dec 15, 2024 [Online]. Available: Google Sheets

Acknowledgements

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