

Incorporating Engineering for One Planet (EOP) into the Civil Engineering Undergraduate Curriculum at the University of Kentucky

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Introduction and Overview

- Recently, University of Kentucky Civil Engineering (CE) created a required undergraduate course (**CE 218: Sustainable Engineering**) to explicitly focus on sustainability.
- Building on this, we believe training sustainability-minded students will be most successful if topics are integrated throughout the full undergraduate curriculum.
- To this end, we **revised CE 218 to introduce the EOP framework** and **piloted integrating EOP outcomes in CE 303 (Introduction to Construction Engineering)** with the goal of using CE 303 as a model for other courses.

The specific objectives of this EOP mini grant project were to:

1. revise materials for CE 218 (Sustainable Engineering) to introduce EOP
2. revise materials for CE 303 (Construction Engineering) to integrate EOP outcomes
3. map EOP outcomes to existing required undergraduate courses
4. engage CE faculty by introducing the EOP framework and providing opportunities for implementation
5. develop a guidance document for faculty interested in integrating EOP in courses

Current and Future Integration of EOP Learning Outcomes

EOP core learning outcomes were incorporated (✓) into CE 218 and CE 303 in Fall 2024.

Core #	1	2	3	4	5	6
CE 218	✓	✓	✓	✓	✓	✓
CE 303	✓	✓	✓	✓	✓	✓
Future	✓	✓	✓	✓	✓	✓

EOP outcomes were also mapped to other CE courses for possible integration in the future (see future plans at right)

Core #	1	2	3	4	5	6
CE 218	✓	✓	✓	✓	✓	✓
CE 303	✓	✓	✓	✓	✓	✓
Future	✓	✓	✓	✓	✓	✓

Core #	1	2	3	4	5
CE 218	✓	✓	✓	✓	✓
CE 303	✓	✓	✓	✓	✓
Future	✓	✓	✓	✓	✓

Core #	1	2	3
CE 218	✓	✓	✓
CE 303	✓	✓	✓
Future	✓	✓	✓

Core #	1	2	3	4	5
CE 218	✓	✓	✓	✓	✓
CE 303	✓	✓	✓	✓	✓
Future	✓	✓	✓	✓	✓

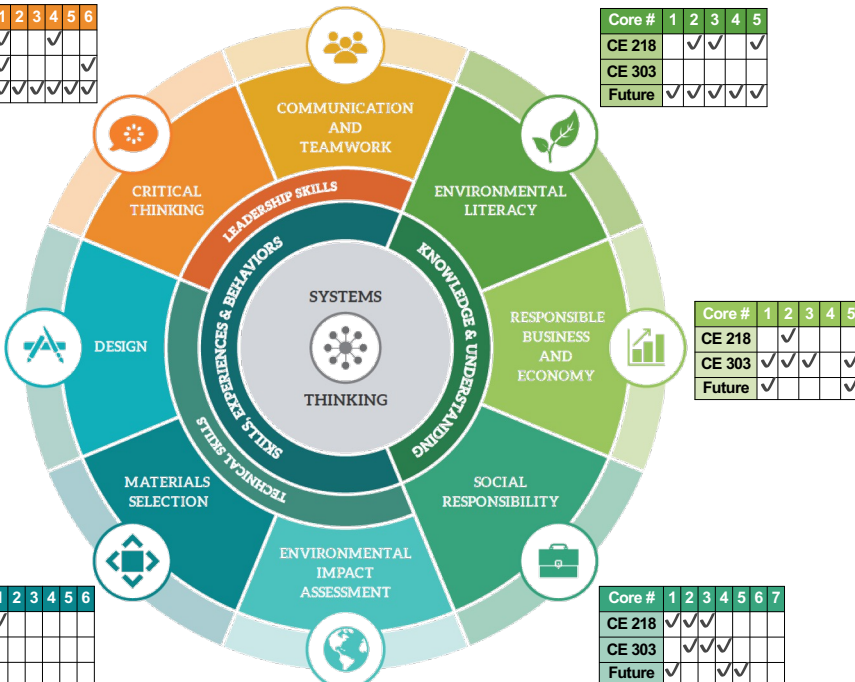
Core #	1	2	3	4	5	6
CE 218	✓	✓	✓	✓	✓	✓
CE 303	✓	✓	✓	✓	✓	✓
Future	✓	✓	✓	✓	✓	✓

Core #	1	2	3	4	5	6	7
CE 218	✓	✓	✓	✓	✓	✓	✓
CE 303	✓	✓	✓	✓	✓	✓	✓
Future	✓	✓	✓	✓	✓	✓	✓

Systems Thinking (center)

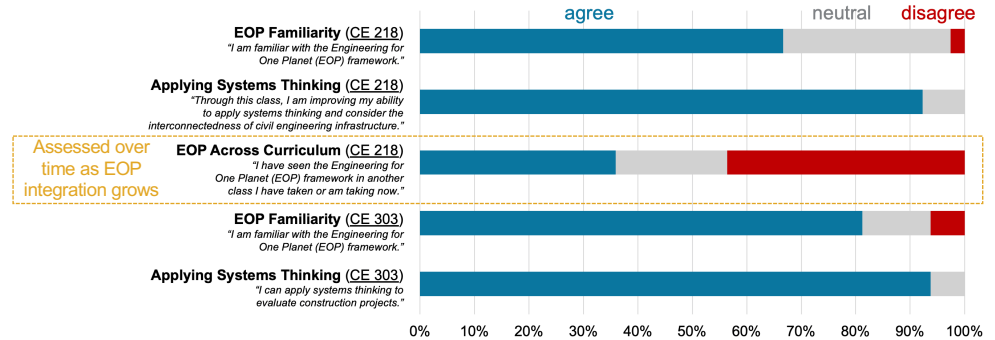
Core #	1	2	3	4	5
CE 218	✓	✓	✓	✓	✓
CE 303	✓	✓	✓	✓	✓
Future	✓	✓	✓	✓	✓

Core #	1	2	3	4
CE 218	✓	✓	✓	✓
CE 303	✓	✓	✓	✓
Future	✓	✓	✓	✓



Assessment

The integration of EOP was assessed through **midsemester course feedback** conducted by the **Center for the Enhancement of Learning and Teaching (CELT)** at the University of Kentucky.



Future Plans

We aim to **collaborate with instructors** to continue to **grow EOP integration** throughout the undergraduate civil engineering curriculum.

Timeframe	Implementation	Courses
Fall 2024	implemented through this mini grant	CE 218: Sustainable Engineering CE 303: Introduction to Construction Engineering
Spring/Fall 2025	possible learning outcomes identified	CE 331: Transportation Engineering CE 351: Introduction to Environmental Engineering CE 429: Civil Engineering Systems Design CE 461G: Water Resources Engineering
Beyond	possible growth to full undergraduate curriculum	CE 341: Fluid Mechanics CE 381: Civil Engineering Materials CE 471G: Soil Mechanics CE 482: Structural Analysis and Design

Acknowledgements and References

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IRB Statement: The Institutional Review Board (IRB) at UK determined that the assessment portion of this project was considered a quality improvement assessment activity and did not require IRB review.

Reference (for EOP framework): The Lemelson Foundation (2022). The Engineering for One Planet Framework: Essential Sustainability-focused Learning Outcomes for Engineering Education (2022). Cynthia Anderson and Cindy Cooper (Eds). The Lemelson Foundation, Portland, Oregon, USA. 28 pages.