Developing a Micro-Credential in Sustainable Leadership via GenEds

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INTRODUCTION

Maritime College is part of the State University of New York system (SUNY). SUNY mandated a change in General Education (GenEd) courses that required Maritime College to rework the GenEd curriculum.

Using this mandate as an opportunity to grow, Engineering reached out to the Humanities and Science Departments to develop an optional set of courses that would provide students with backgrounds in sustainability in the lower division.

The goal of these efforts were to allow subject matter experts to teach non-engineering topics in a way that could be directly tied to how engineers use them.

A capstone course would then allow students to apply and share that background while mentoring design teams of younger students

BACKGROUND

This effort targeted the GenEd courses to address these issues and attempt to take advantage of some unique campus opportunities:

- There was a need to develop more diverse GenEd offerings
- LAS faculty wanted to offer GenEd courses in their areas of interest
- Engineering wanted to demonstrate support for sustainable efforts

Faculty in different corners of campus have endeavored to bring sustainability into their domains thru individual efforts. These are not coordinated or shared across campus. It is hoped this effort could spearhead that

METHODS

Micro-Credential Sequence

- DEISJ – Environmental Literature
- HUMN – Ethical Choices in Engineering
- HIST – History of the Environmental Movement
- SOC. SCI – Economics of Sustainability
- ENGR – Capstone in Engineering Leadership

Environmental Literature

- Co-taught by Humanities and Science professors
- Analyze environmental issues and how they have uneven effects on poorer and racialized communities

Ethical Choices in Engineering

- Introduction to philosophical lenses and their application to real-world scenarios
- Case-study evaluations of engineering choices where solutions are ambiguous

History of the Environmental Movement

- Review of environmentalism in the United States
- Detailed focus on legislative issues and regulations that inform and dictate engineering practice

Economics of Sustainability

- Discussion of short- and long-term effects and costs of actions within the context of sustainability
- Examining business case of sustainability

Capstone in Engineering Leadership

- Introduction to guiding engineering design teams
- Application of skills thru mentoring first-year or pre-college engineering design teams
- Leading design teams in incorporating sustainable concepts into their work.

PROGRESS AND FUTURE PLANS

Current Offerings

- Environmental Literature
  - Course is **fully enrolled** for Spring 2025 (24 students)
  - Enrollment roughly reflective of student body
    - Engineering: 30.4% class (34.3% overall body)
    - Overrepresentation of Marine Environmental Science majors

Future Offerings

- Ethical Choices in Engineering and History of the Environmental Movement.
  - Course descriptions and outlines developed.
  - Planned to pass thru Curriculum Committee Spring 2025
- Economics of Sustainability
  - Course description complete and outline in development.
  - Planned to pass thru Curriculum Committee Spring 2025
- Capstone in Engineering Leadership
  - Discussions beginning on select trial offering as Special Topics in Fall 2025

Scaling-Up

- Submitted Office of Naval Research (ONR) grant for trial offering of Capstone course with local maritime CTE/vocational high school
- Marine Environmental Science program expressing interested in offering parallel micro-credential

Aspirational Goals

- Alternative tracks for other micro-credentials
  - Social Responsibility
  - Maritime Industry
  - New York City (local focus)

EVALUATION

Potential Impacts

- Broader understanding of sustainable concepts both in their work and, potentially, in society
- Content in GenEd courses is directly applicable and endorsed by their majors
- Increased connections between cohorts

Current Faculty Impact

- Increased communication and collaboration between departments
- Opportunity to “double-dip” course development by creating upper-division alternatives

Personal Impact

- Significantly more desire to foster interdisciplinary relationships
- Welcome reception within LAS programs
- Repeated phrase: “This is worth doing”

Evaluation Plan

- Qualitative self-assessment in GenEd courses
- Enrollment numbers in courses and micro-credential
- Quantitative performance of design teams before and after implementation of mentors
- Potential for improvement in ABET student learning outcomes in design, ethics, and teamwork

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