

GRANT PROGRAM AIMS TO GROW SUSTAINABLE ENGINEERING

More than 1,500 engineering students have benefited.

Future engineers must be able to solve problems while ensuring environmental and social sustainability. And higher education programs need to prepare engineering students to innovate and solve global problems threatening the planet. With these goals in mind, ASEE partnered with The Lemelson Foundation and its Engineering for One Planet (EOP) initiative to incentivize engineering course modifications through the EOP Mini-Grant Program (EOP-MGP). Now in its second year, the program supports faculty in pioneering new teaching and learning approaches that infuse sustainability across engineering curricula. EOP-MGP is helping to grow the number of engineering professionals equipped to incorporate environmental sustainability into their work—and prevent the engineering solutions implemented today from becoming the sustainability problems of tomorrow.

The mini-grant program's year-one cohort yielded helpful insights and lessons learned. Some teams focused on their engineering departments; others facilitated cross-department partnerships. Thirty-four engineering courses were either modified or offered as completely new courses. Below are three examples of grantees' varied work.

A unique integration of Bradley University's colleges of engineering and business, which share not only a building but also a dean, has created an uncommon opportunity for cross-discipline collaboration. EOP team lead Tyler Smith, assistant professor of business law at the university, developed learning management system modules that engineering professors implemented in their classes. According to Smith, these modules "provide legal, business, and ethical insights into engineering problems." Topics such as environmental literacy and business and social responsibility offer a "fundamental understanding of the role law plays in helping or hindering the advancement of solutions to environmental issues." Future plans include creating new EOP course modules that offer students the opportunity to consider engineering problems from a business perspective.

At the University of Puerto Rico, Mayagüez, the mini grant is aiding development of a BS degree program in Sustainability Engineering as well as a minor. The latter is expected to launch by fall 2023, and the former by fall 2025. Chris Papadopoulos, a professor in the Department of Engineering Sciences and Materials, explains that the project "involves creation of new courses and curricula; stakeholder building; fundraising; and research on sustainability mindsets. Recruitment of women, workforce development, and the development of a Community of Practice [with faculty across departments] are all featured elements."

The new course Creating a Sustainable World, required for the sustainability engineering minor, is also now a general education elective positioned to introduce sustainability to all students, not just those in engineering. The class offers a comprehensive overview of sustainability and addresses key drivers of climate change and implications of earth science systems on engineering designs.

Kennesaw State University was already promoting clean commuting, recycling, and composting campus-wide. However, engineering instructors lacked resources to meaningfully integrate environmental sustainability into the curriculum. The mini-grant program enabled the incorporation of such concepts into three sections of the Introduction to Civil Engineering course, says Team Lead Roneisha Worthy, impacting more than 200 students.

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Worthy, an associate professor of civil engineering and assistant chair of the Civil and Environmental Engineering Department, explains that students could choose from three projects: building structures out of recycled materials, redesigning an abandoned greenhouse on campus and making it accessible for students with disabilities, or designing a rain capture system to collect water for a community garden in partnership with an off-campus conservation organization.

The effects of the Engineering for One Planet Mini-Grant Program are expected to be far reaching. Forty-eight faculty members used the foundation's EOP Framework—which identifies engineering student learning outcomes related to social and environmental impact considerations—to inform either their course design or their teaching practices. And the engineering sustainability courses have already directly touched 1,615 students.

Go to <https://eop-mgp.asee.org> for more information. Institutions awarded in Cohort II will be announced soon. Watch for the Cohort III opportunity to be posted near the end of 2023.



Mini-Grant Program