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Cal Poly Receives \$1 Million Grant to Redesign Engineering Education to Retain Women, Minorities

SAN LUIS OBISPO -- Cal Poly's Materials Engineering Department has received a \$1 million grant from the National Science Foundation to redesign its materials engineering education program.

"The 're-engineering' of the Materials Engineering degree curriculum is intended to attract and retain more women and minorities while preparing all students to solve increasingly complex global problems," according to Materials Engineering Department Chair and Professor Linda Vanasupa.

The Materials Engineering Department and its Industrial Advisory Board have been exploring new teaching methods and curriculum since 2002. Since then, the department has assembled a team of more than 25 professors and experts from various colleges and departments at Cal Poly and other universities, agencies and companies across the nation. The team reviewed education research findings and "best practices" from university education programs around the country before incorporating its findings into a plan for changing materials engineering education at Cal Poly.

The cross-campus group named the coursework overhaul plan "TriAD: Triple Bottom Line Awareness in Design."

"The proposed changes represent an urgency to create a more diverse population of engineers that are more representative of society as a whole and to instill in students a new way of thinking about balancing economics, the environment, and society's needs -- what we're calling the 'triple bottom line,'" said Professor Vanasupa.

"One of our basic premises is that young people, especially women and students from underrepresented groups, will be motivated to study and apply their creative energies to benefit society if they are aware of society's needs and know they can make a difference," she stressed.

The \$1 million, 3-year grant from the NSF will pay for faculty time to develop, implement and test the effectiveness of the new curriculum and laboratory exercises. Although the Materials Engineering faculty have piloted many of the course changes already, the grant funding will enable professors to launch a cohesive, team-taught, project-based learning approach for the students' junior year, Vanasupa said.

"The college of engineering is greatly encouraged by this exceptional level of support from NSF, given the strong national competition for such awards. We anticipate many positive outcomes from this project -- outcomes that will benefit not just Cal Poly, but also other universities nationwide," said Unny Menon, associate dean.

The proposed curricular revision will change roughly 80 percent of the materials engineering courses at Cal Poly. Changes include:

- Linking students in peer groups for learning and support during freshmen and sophomore years -- when students are most likely to drop out of engineering
- Increasing interaction between students and faculty, with faculty taking on more "coaching" roles with students
- Encouraging student appreciation for communications, math and science skills and "deeper learning" in undergraduate courses in those areas
- Providing more "real world" engineering applications and learning experiences
- Including a "service learning" requirement for undergraduate materials engineering students.

The redesigned materials engineering curriculum will also emphasize ethical, environmental, health and safety, sustainability, social, political and manufacturing issues.

As part of the change, some newly admitted materials engineering students will complete pre-college, web-based tutorials

before coming to campus. The department will monitor whether the tutorials increase student success.

The service learning component of the curriculum is key, Vanasupa said, because it gives students a chance to see how their engineering skills and problem-solving abilities can help people in need.

So far, Hewlett-Packard, Microsoft, National Instruments, Texas Instruments and the Semiconductor Industry Association have contacted the National Science Foundation to express interest in the service-learning portion of the new curriculum.

For more details on the Materials Engineering Department or the launch of its new curriculum, visit www.mate.calpoly.edu.

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