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ENGINEERING'S SOFT SIDE

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Lauren Cooper isn't the kind of engineering student who views the world in terms of steel and cable, equations and oil wells.

She sees Third World villages that need clean water, American Indian reservations without enough housing and South American communities with no electricity.

Cooper is one of about 20 students at the Colorado School of Mines enrolled in a new humanitarian engineering minor, thought to be the first undergraduate program of its kind at an engineering college in the United States.

The program and a similar graduate one at the University of Colorado at Boulder are at the forefront of a push to teach the softer side of engineering.

"We are creating a new breed of engineers who can change the planet," said Bernard Amadei, director of the Engineering for Developing Communities program at CU-Boulder. "This kind of engineering is more compassionate. You need to bring your heart into the picture."

Mines' humanitarian engineering minor, in its third year, has created a burst of humanitarianism, from student clubs to senior design projects that send students to improve living conditions in Honduras, Africa and Ecuador, said David Munoz, interim director of the engineering division.

Mines won a \$1.1 million grant in 2003 from the Hewlett Foundation to start the program, and grant money has funded student trips across the globe.

In Colinas de Suiza, Honduras, students are designing a wastewater system that prevents pollution of an aquifer and allows villagers to use a urine mixture as fertilizer in vegetable gardens. Another group of students is helping the Gulkana Village in Alaska design a recreational-vehicle park so the native people can cash in on tourism.

At first, some faculty members complained that the new minor implied that the rest of engineering wasn't humanitarian. Munoz said that while most engineers are working to

"improve man's situation on the planet," not all engineering is humanitarian.

"What about weaponry?" he said. "It may be necessary, but it's not humanitarian. It's caused us to ask some interesting questions."

Cooper, one of a handful of students accompanying Munoz to Honduras in October, said the difference is that a humanitarian engineer "has a philosophy of helping underserved communities."

"A humanitarian engineer also has an ethical sense, a broader cultural sense, and has a sensitivity of what constitutes appropriate technology," said Cooper, a senior mechanical engineering major.

Tibor Rozgonyi, head of the mining engineering department, said the new minor is a good supplement to the core mining curriculum. For decades, mining engineers have worked around the globe, fostering economic and social development, he said.

"But unfortunately, when money shows up, it drags with it some kind of negative aspect," said Rozgonyi, a native of Hungary.

Mines' program requires 28 credit hours in subjects ranging from ethics and water politics to writing proposals for nonprofit groups. The program isn't likely to become a major, because it isn't considered a core curriculum like mining, mechanical, petroleum or geological engineering, Munoz said.

The American Society for Engineering Education in Washington, D.C., isn't aware of any other humanitarian engineering program in this country, said Bob Black, deputy executive director.

The program is a result of a national push by accreditation agencies in the past few years to look at the softer side of engineering, he said. The objective is to introduce foreign languages, communication skills and cultural perspective to the stereotypically conservative, numbers-oriented, male engineering student, Black said.

The change already is drawing more women into the field.

Most of the Mines' humanitarian engineering minors are women, Munoz said. And in Boulder, almost half of the 25 graduate students in the Engineering for Developing Communities program are women, compared with about 20 percent of students in CU's engineering school, Amadei said.

The CU graduate program, which began in spring 2004, integrates languages, archaeology and sociology - disciplines not normally studied by "traditional engineers," he said.

The humanitarian engineering program has drawn mainstream Mines students not

minoring in humanitarian engineering into altruistic projects.

Five seniors, all electrical and mechanical engineers, will fly to Ecuador and take a two-hour canoe ride down the Amazon River over Thanksgiving to reach a village without electricity. The students - none of whom is a humanitarian engineering minor - will install small solar panels on roofs that villagers can use to recharge batteries for flashlights made of PVC pipe.

Rafael Ribeiro, a senior from Brazil, said the project will help villagers economically by allowing them to work on crafts after dark. A mechanical engineering major, Ribeiro doesn't plan to make a career out of humanitarian engineering back in Brazil.

"But there are a lot of these things that I can take back to South America," he said.

Munoz, whose father is Honduran, said traveling to developing countries is an invaluable experience for students.

He recalls a student complaining on the way to Honduras that lugging bags of donated clothes had nothing to do with her project. After she saw impoverished villagers gathered in a schoolhouse, eager to meet the American students, she didn't say another word about the clothes.

"It changes the students," said Julie VanLaanen, the instructor leading the Ecuador trip. "They don't come back the same."

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