SUMMER STUDY IN ENGINEERING PROGRAM
FOR WOMEN HIGH SCHOOL STUDENTS

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Brief History of the Women Study in Engineering Program

From 1975 until 1983, the College of Engineering conducted a special six week summer program for women high school students. The primary purpose of the program was to increase the awareness of the career and educational opportunities for women in engineering. Specifically, the aims of the program were: (1) to encourage more women to consider studying the field of engineering; (2) to provide an opportunity for talented women students to experience college level study earlier; (3) to provide a basis for evaluating and perhaps changing their planned senior year in high school and (4) to provide an experience from which these women students could help their peers as well as themselves in making the choice to study engineering. The program was offered each summer to approximately 25–30 women who had completed their junior year of high school. This program took place during the regularly scheduled six-week summer session.

The program was funded by corporate sponsors such as Bechtel Power Corporation, Bethlehem Steel, C&P Telephone Company, Corning Glass Works, General Electric Foundation, Mobil Oil Company, Baltimore Gas & Electric Company, IBM, Alcoa, Western Electric, and Westinghouse. These funds were used for scholarship support for the students and administrative costs.

As the enrollment of women students rose in the College of Engineering and nationwide from 6% in 1976 to 16% in 1982, these corporate sponsors decided to no longer fund women's programs. Instead, they concentrated recruitment efforts and funds for minority students. This resulted in a lack of funds for the women's program. As a result, the College of Engineering in 1984 decided to conduct a special summer program without scholarship monies for high school men and women students who paid the costs themselves. Each year, the program has had fewer women students attending and in 1989 there was only one woman student who participated.

The percentage of women in the College of Engineering has been at a stable level since 1984 at approximately 17%. Between 1983 and 1986 female enrollment declined nationally by more than 7,000 students, slipping from 17% of the total in 1983 to about 15% in 1986. We are beginning to see such a decline in the College of Engineering at the University of Maryland. It is, therefore, important to institute programs geared to the recruitment of women students. These efforts
were effective in the 1970s and early 1980s and we believe that they will be effective again. At Purdue University, for example, the enrollment of women in engineering is in excess of 20%. Purdue has had base funding and programs for the recruitment of women in engineering since the early 1970s.

Summer Study in Engineering Program for Women, 1989

The College of Engineering is grateful to the College Park campus administration for providing the funding which permitted the College to reinstate the Summer Study in Engineering Program for Women in the summer of 1989. The College enrolled 22 high school women who had completed their junior year of high school to study engineering. The women came from all over the state of Maryland, Virginia, and two black women came from Florida. The class was composed of more than a third minority women.

The students were regularly admitted students to the second summer session. Some chose to live on campus and some commuted. They registered for two engineering courses, ENES 101 and ENES 121. Both classes were taught by women faculty. ENES 121 was taught by Dr. Hasna Khan, an Assistant Professor of Mechanical Engineering and Ms. Pourreza-Djoureshi, a doctoral student in Mechanical Engineering. Another class of high school students (both men and one woman student) who paid their own way was enrolled for summer engineering study and often the two classes merged for special presentations and field trips.

The ENES 101 course is the standard first year course taught to all engineering students. It covers introductory material about all the areas of engineering, Graphics, and Quick Basic. The other course ENES 121 provided students with more sophisticated engineering study including problems in fluid mechanics (as an example of a generic engineering problem), field trips to campus laboratories and invited lecturers.

The students were asked to evaluate the materials covered in the courses, the instructors, and their overall experience at College Park. As in the past there were some students who complained that the material was too difficult for them. This is not surprising since the program is demanding. On the other hand, many students welcomed the challenge and approximately half of the students said that they were sure that they were going to pursue engineering study in college. Only four students said that they would not be studying engineering in college; the others were uncertain. A real value of this program is that it provides reality testing and the opportunity to succeed in a very demanding manner.

Some of the women have contacted the College about their college plans and have been very enthusiastic about last summer at College Park. There were also some constructive criticisms which will be incorporated for the 1990 program. The women said that they would have preferred more field trips, perhaps off campus, some additional hands-on activities, and some planned social activities. The full cost of the program for the summer of 1989 was $21,000.

Attempts to Secure Funding

This program offers the University an effective way to recruit women into science and engineering study. In an attempt to
institutionalize the program, the College has made significant efforts to secure funding. A proposal was submitted under the NSF Young Scholars Program - FY1990, and the College is awaiting the announcement of successful proposals. The College submitted a joint proposal with Prince Georges Community College to the Department of Education but this was not funded. In addition, the College is preparing two other proposals to NSF: one under the Model Projects for Women Program; and the other under the Engineering Coalitions Program.

The Program

The College of Engineering will conduct the Summer Study in Engineering Program for women for the Summer of 1990. The College will provide an academic experience for 25-30 women through two different courses. One course will provide an introduction to engineering science and engineering design, acquainting students with key concepts of applying mathematics and science to engineering problems. Studies will include engineering drawing as a form for engineering design and product development and the use of the computer in engineering analysis and design. These skills will provide students with the basic languages of the engineer. Computer languages will be taught to allow students to solve simple engineering problems. In addition, engineering senior faculty will be guest lecturers and will present engineering design problems and engineering design failures. This first course, ENES 101, is the first basic engineering course required of all students in the College of Engineering.

The second course (ENES 121 - The World of Engineering) is a laboratory course and will introduce students to laboratory experiments in engineering. The students will take field trips on campus to engineering facilities and to such other facilities as the Calvert Cliffs Nuclear Power Plant and the National Institute for Science and Technology (NIST). Students will have hands-on laboratory experiences and will also engage in a design project competition.

Women in engineering and science today will also be a focus in ENES 121. The students will have an opportunity to interact with women engineering faculty, practicing women engineers, and with women undergraduate and graduate students. The students will share both academic and planned social events. The students will earn six college credits for their summer study; ENES 101 is a required engineering course, ENES 121 is an elective.

Evaluation

In previous years, when the special women's programs were offered, the programs were evaluated by both the teaching faculty and by the students. A questionnaire was given to the students. In general, the most beneficial aspects mentioned were working with the computer, living on campus, the design projects, and learning about engineering. We propose to continue these evaluation procedures.

In 1980, a follow-up study was designed to track the students who had participated in all of the women's summer programs. Ninety eight questionnaires were sent to students who participated in the summer women's programs (1975-1979). Seventy-five responses or 77% were received completed. The data indicated a 65% engineering enrollment with a 91% enrollment in technically related fields. A significant number of respondents felt that their summer experience at the University of Maryland greatly improved their skills with regard to

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college and program selection, and that the program gave them the confidence to apply to technical programs, and the information necessary for choosing an appropriate academic setting and major. Finally, many students did in fact adjust their senior year schedule to include the mathematics and science courses recommended for engineering and other technical or scientific college majors.

We will continue to mail out follow-up questionnaires for the women in the program to determine if these findings will hold true for these additional groups of students.

Funding

The College of Engineering receives funds for the summer program from the campus that have been designated to implement the recommendations of the Greer Report. The Greer Report was the result of a campus study which examined the underrepresentation of women in the sciences and engineering, and made recommendations for improving the campus environment for women in these fields. In the meantime, we will continue in our efforts to secure outside funding.

Summary

The College of Engineering is looking forward to being able to again offer the Summer Study in Engineering Program for Women. This program, in the past, was very effective in recruiting women students to the field of engineering. We feel certain that with adequate funding for 1990 and for future years, we can provide one of the most beneficial and effective programs the College of Engineering has ever been able to offer women students. Please note the kind words contained in an unsolicited letter from a parent of a former student.

"I would like to take this opportunity to commend you for offering such a valuable experience to high school students who are considering careers in engineering. I have personal knowledge based on my own daughter that can verify the importance of testing out an engineering program's curriculum before entering college. Jennifer, like many students, was interested in math and science, but uncertain about her capacity to handle the rigorous engineering curriculum; she also wasn't sure how much she would enjoy the subject matter. She was fortunate to be accepted into Maryland's summer program for women and minorities. She quickly discovered that she could indeed do well in the courses and really enjoyed both the classes and the opportunity to live in the dorms with other high school students. That experience definitely convinced her that engineering was the right choice for her. Now, seven years later, Jennifer is a very successful electrical engineer at the MITRE Corporation in Virginia."

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