

Developing a Plan for Recruiting and Retaining Women and Minorities in Engineering Technology at Western Kentucky University

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I. Introduction

The underrepresentation of females and minorities in the areas of science, engineering, and technology is recognized as a serious issue facing academia and industry¹. Researchers now understand that the experience of young women in science and math classes is much different than that of young men². Recently, the Department of Engineering Technology at Western Kentucky University (WKU) has begun to focus on the need for recruiting and retaining more women and minorities into its programs. Traditionally, the percentage of women and minorities in the Department of Engineering Technology at WKU has been extremely low. The Women Embracing Engineering (WEE) and Minorities in Engineering (MIE) programs are currently being organized to address the issues of low enrollment and retention. The initiation of these programs is being planned for August 2000.

The WEE and MIE programs are expected to have a wide range of impact on the young women and minority students of south central Kentucky. Often capable young women and minority students do not pursue careers in science, engineering, and technology for reasons such as lack of encouragement, lack of information, lack of opportunity, and lack of role models. By providing all of these, this program will stimulate the interest of underrepresented groups in these areas. In addition, these projects will lay the groundwork for continuing the recruitment and offering opportunities to women and minorities engineering.

The goals of the WEE and MIE programs are as follows:

- ◆ Identify and encourage women and minorities to pursue ET degrees at WKU;
- ◆ Expose the field of engineering to K-12 students through appropriate female and minority role models;
- ◆ Provide female and minority students opportunities to experience engineering prior to entering college; and
- ◆ Mentor female and minority students throughout their academic career at WKU.

These goals will be reached through the following objectives:

- ◆ Develop a scholarship program through grant money to aid gifted female and minority students in the pursuit of an engineering technology degree;
- ◆ Establish a summer engineering camp for female and minority middle and high school students;
- ◆ Provide engineering opportunities throughout the year for K-12 students such as engineering workshops and various competitions; and
- ◆ Implement a mentoring program for female and minority students involving faculty members and industry leaders.

In south central Kentucky, women and minorities are an untapped resource for the engineering technology programs that will provide many bright and talented students. Through the development of the WEE and MIE programs, women and minorities will be encouraged and offered opportunities to explore the profession of engineering.

II. Scholarship Program

The region of south central Kentucky needs to increase the number of students enrolling in math, computer science, and engineering. However, the financial condition of many families constrains the ability to support their children in search of a college education. By developing a scholarship program that can aid the students financially and support the students by mentoring, the number of students from underrepresented groups studying engineering technology at WKU can increase.

A direct link exists between education level and the degree of poverty. In Kentucky, college enrollment is one-fifth the national average³. Kentucky is ranked 45th in the number of college graduates and ranked lowest in the number of Black college graduates. Only 11.1% of the adults in Kentucky have completed four or more years of college. In 1994, 10,983 students enrolled in Kentucky state universities for the first time and 502 (4.6%) of these students enrolled in engineering. This average is below the national average of 6.1%. There is a clear need for increasing the support of engineering education in the state of Kentucky and particularly the region served by WKU. During fall 1998, 8,874 female and 6,008 male students attended WKU⁴. However, the majority of female students chose fields of study which have been traditionally dominated by women such as elementary education and nursing. A significantly smaller percentage chose to major in engineering technology. A clear need for encouraging women and minorities in computer science, engineering, and mathematics exists at WKU.

The goals of the WEE and MIE programs are to increase the number of women and minorities studying computer science, engineering, and mathematics at WKU and to also increase the retention of these students in their respective disciplines. This will be achieved by several objectives:

- ◆ Developing a recruiting strategy;
- ◆ Creating a brochure and CD-ROM;
- ◆ Traveling to high schools and middle schools to engage young women and minority students in discussions about engineering careers;

- ◆ Developing a web page dedicated to increasing the engineering opportunities for young women and minority students in south central Kentucky; and
- ◆ Offering scholarships to talented women and minorities.

III. Summer Camp

A second opportunity which will be available to female and minority students is a summer Engineering Camp. For one week in the summer, students finishing grades 7-10 will live on campus and participate in a variety of engineering activities. The camp will be composed of demonstrations, projects, and field trips pertaining to environmental studies, electrical engineering, civil engineering, and mechanical engineering. The students will also engage in a design competition during the camp. A sample schedule of the activities is listed in Table 1, Appendix A.

IV. K-12 Engineering Opportunities

Another objective of the WEE and MIE programs is to offer engineering opportunities to students in middle schools and high schools. One way this will be achieved is by presenting Engineering Saturdays every fall and spring. Elementary, middle, and high school students will be invited to campus to participate in a day focused on engineering including projects, guest speakers, and demonstrations. The guest speaker at each Engineering Saturday will be a female or minority engineer working in industry. The engineering demonstrations will focus on various aspects of engineering followed by the students completing a small project during each activity. The purpose of these events is to continue the enthusiasm of the WME program throughout the year and to offer as many opportunities as possible for students.

V. Mentoring Program

A mentoring program will be established to provide the students with opportunities to meet and network with industrial leaders and faculty members. Each semester, the female and minority students will be invited to meet with the mentors in a workshop environment to discuss topics of interest. The mentors will be encouraged to invite their mentees to their workplace and to become involved in the students' academic career.

The WEE and MIE programs will build upon the WKU support structure by adding a mentoring program with faculty members and industrial leaders from various engineering disciplines. Each student will be assigned a faculty mentor who will serve as his/her advisor during the duration of the student's academic career. The students will receive application-oriented experiences throughout their education by participating in the mentoring program and through the curriculum of the different programs.

VI. Conclusion

This paper presents a comprehensive approach to the recruitment of women and minorities into science and engineering. The intent is to lay a foundation for continued recruitment of women and minorities into the engineering technology programs. Students in grades 7-10 are at a

critical stage in their academic development. Through this program, students will be reached before they choose their high school curriculum and thus encouraged to take the appropriate math and science courses prerequisite to success in the pursuit of science, engineering, or technology careers.

VII. Appendix A

Table 1: Engineering Camp Schedule

	Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.
7:30		Breakfast	Breakfast	Breakfast	Breakfast	Breakfast
8:30		Orientation	Orientation	Orientation	Orientation	Orientation
8:45		Session 1	Session 3	Session 7	Session 9	Group Project
10:25		Break	Break	Break	Break	
10:35		Session 2	Session 4	Session 8	Session 10	
12:15		Lunch	Lunch	Lunch	Lunch	Luncheon with Guest Speaker
1:30		Industry Trip 1	Session 5	Industry Trip 2	Session 11	Competition
3:10	Arrival		Break		Break	Competition
3:20			Session 6		Session 12	Depart 4:00
5:00			Classes end		Classes end	
5:30	Supper	Supper	Supper	Supper	Picnic	
7:00	Icebreaker	Movie	WKU Fitness Center	Bowling	Group games	
10:00	Lights out	Lights out	Lights out	Lights out	Lights out	

**Each session represents a civil engineering, electrical engineering, mechanical engineering, or environmental studies activity.

Bibliography

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