

Common Experience for Engineering/Engineering Technology Students: Strategic Advising

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Abstract – Engineering and engineering technology programs are distinct, highly structured curricula which are not very friendly toward students transferring from one curriculum to the other. Both are perceived by the general public as “engineering” and most incoming students do not understand the difference between them. Students who have a technical interest are typically advised and encouraged to enter engineering programs. Very often, engineering technology, especially at the associate degree level, is being viewed by guidance counselors as a “dead end vocational program”. There is a major mismatch between the perception of these programs and reality. A significant number of students in the engineering program discover this mismatch between their expectations and the reality that they are facing during their freshman year. Disillusion and a feeling of failure cause the student to transfer to an entirely different major. More than 50% of engineering students do not complete the engineering curriculum. On the other hand, retention in engineering technology programs is good, but few students select it as a major upon entering college. The paper describes how a common semester for engineering/engineering technology students allows the students to make a more informed decision about whether to select an engineering or engineering technology major. The paper also discusses the effects of strategic advising on recruitment and retention.

Index Terms – Engineering curriculum, Engineering technology curriculum, Retention, Strategic advising.

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3 Gray, Kenneth C. and Herr, Edwin L. (2000) *Other Ways to Win: Creating Alternatives for High School Graduates*. CA: Corwin Press, Inc., p. .

Introduction

In recent years the United States economy has been rapidly changing due to globalization and outsourcing. Engineering Technology Education (application focused approach to engineering) needs to adapt to this changing economy. Many engineering technology programs in the United States are struggling with low enrollments and difficulty in recruiting students. Therefore, many colleges and universities are eliminating their engineering technology programs because of high costs. On the other hand, high tech manufacturing in the United States relies on graduates from engineering technology programs. The reluctance of students and the lack of encouragement from their parents to enter such programs, despite the demands of the workplace and career potential, have been well documented. (1)

Tech Prep and other programs have sought to correct what has been seen by many as a simple problem of career awareness and curricular matching, but enrollments in engineering technology programs have not responded. At the same time, many undergraduates seek careers in engineering for which they are ill-prepared while others avoid programs based on STEM altogether. (2) Only 10% of high school graduates in the United State pursue engineering and engineering technology careers while 20% of German and Japanese students pursue such careers. A primary reason for this difference in career choice is the incomplete understanding by both students and their parents of career possibilities in technology-related disciplines and how those careers can be attained. (3)

Advising Issues

High school graduates usually seek baccalaureate degrees in engineering rather than in engineering technology, avoiding associate degree technology programs, and thereby not meeting national workforce needs for technicians and technologists. A common first semester or even a common freshman year between engineering and engineering technology (with some courses such as a First Year Seminar and Engineering Design and Graphics) gives

the students first hand experience in engineering and engineering technology. This common first semester allows students to make a well-informed decision in choosing either the engineering or engineering technology path. In the present situation, the transfer from engineering to engineering technology is not student friendly. A common first semester or freshman year is expected to increase retention and stabilize the enrollment in engineering-related disciplines. A common first semester can be achieved without dilution of the engineering curriculum. This concept is already being piloted at Penn State Hazleton. In the Fall 2004 semester, a majority of freshman engineering and engineering technology students were placed in the same course sequence. Through strategic advising, engineering and engineering technology students were getting a common experience during their first semester. Their decision as far as selecting engineering or engineering technology was postponed until the second semester when students have a much clearer idea of the differences between the disciplines and of the value of an associate degree.

Penn State Hazleton has introduced a common first semester for students pursuing engineering and engineering technology majors. This common first semester was accomplished without changing the requirements for neither the engineering nor the engineering technology majors. Through the advising process, students were encouraged to take classes that they would be able to apply to either the engineering or the engineering technology curriculum. Fig. 1 shows the freshman engineering and engineering technology courses blended into a common first semester.

At the end of the common first semester, students can select any of the multiple paths leading to various baccalaureate degrees, including multidisciplinary degrees. Multidisciplinary curriculums are not new, but they are seldom available at the undergraduate level. Fig. 2. The workplace increasingly needs graduates with more than one narrowly defined area of expertise that has been traditionally covered in most engineering technology programs. Career opportunities are greater for students who are prepared for interdisciplinary work. Penn State Hazleton presently offers two multidisciplinary majors. The first one combines the associate degree in Engineering Technology and the baccalaureate degree in Business Administration. This major prepares graduates for management positions in industry. The second multidisciplinary degree combines the associate degree in Engineering Technology and the baccalaureate degree in Information Science Technology. This major prepares graduates to coordinate the continuous quality improvement process in the manufacturing industry. The graduates are trained in electronic data collection and

analyzing a large amount of data electronically. Both multidisciplinary majors were created by using the strategic advising process and without changing the course requirements for the individual programs. They can both be accomplished in four years with some courses and an internship taken during the summer.

Conclusion

Already during the first year of piloting the project showed that a common first semester increases retention and stabilizes the enrollment of the engineering technology related disciplines. Also, a common first semester was achieved without diluting the engineering curriculum. No changes were made in the curricular requirements for the engineering or engineering technology programs. A common first semester was accomplished by strategic advising initiatives. This common first semester can be extended to a common freshman year, but this would require minor curricular changes in the engineering and engineering technology curricula. A few courses would need to be created that could be shared by the engineering and engineering technology programs while satisfying the mathematics requirements for each.

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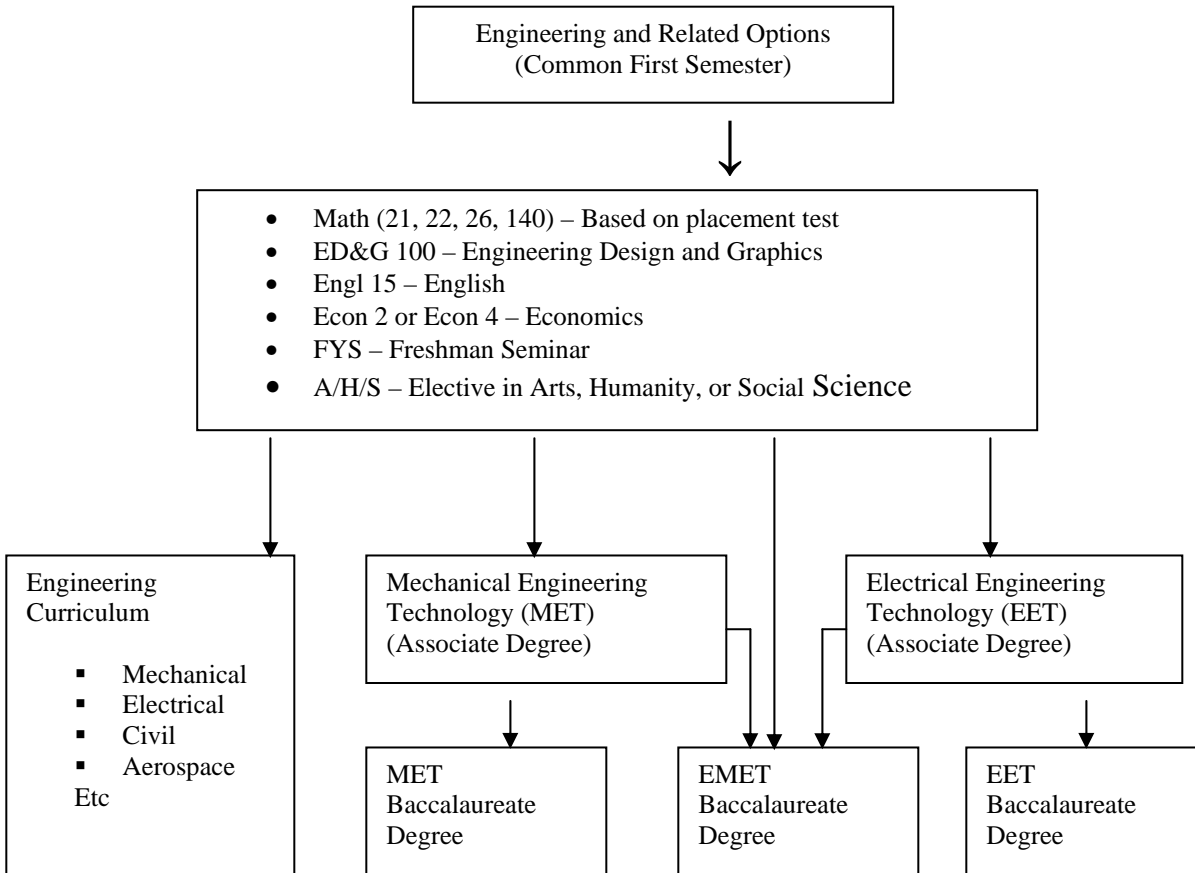


Figure I. COMMON FIRST SEMESTER FOR ENGINEERING AND ENGINEERING TECHNOLOGY STUDENTS

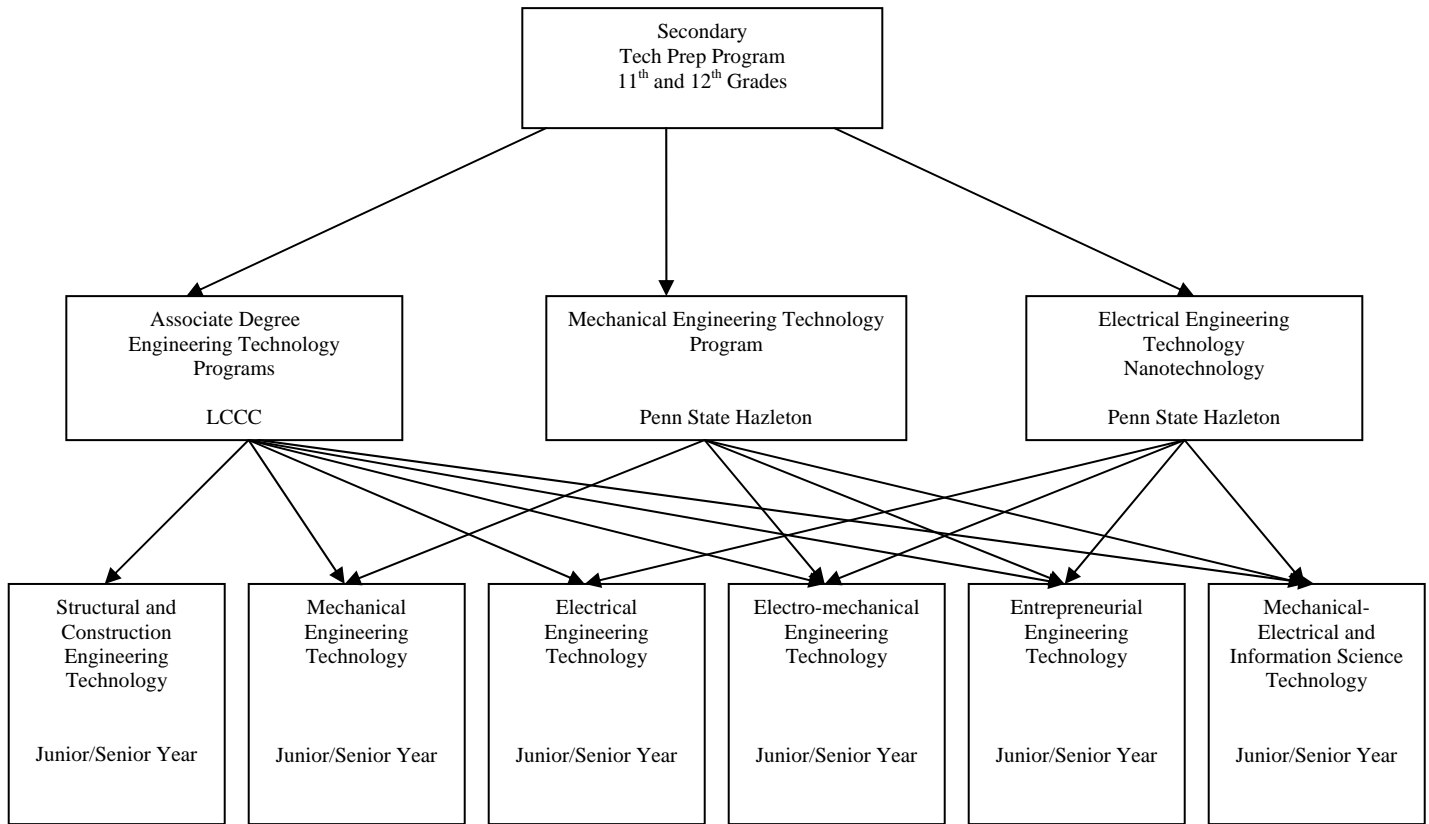


FIG. II. 2+2+2 EDUCATIONAL OPPORTUNITIES TO BE DEVELOPED