

What to Teach in a Freshman Engineering Course? Experiences in the First Year of the Missouri S&T/MSU Cooperative Engineering Program

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Abstract

The curriculum in most engineering programs includes some type of freshman level course designed to introduce new engineering students to the various career fields in engineering and to make the new students aware of some of the university resources available to help them make a successful transition to university life. Some programs expand the freshman engineering course to include topics such as teamwork, professionalism and ethics, and fundamentals of the engineering design process.

This paper describes the development of an appropriate introductory engineering course for students on the Missouri State University (MSU) campus who are participating in the cooperative engineering program operated by Missouri University of Science & Technology (Missouri S&T) in cooperation with MSU.

Introduction

On August 21, 2006, the Governor of the state of Missouri, along with the Curators of the University of Missouri, the Chancellor of Missouri University of Science and Technology (Missouri S&T), and the President of Missouri State University (MSU) signed a Memorandum of Understanding that allowed Missouri S&T to offer bachelor's degrees in Civil and Electrical Engineering on the MSU campus. The first classes in the new cooperative program were held on the MSU campus in the fall semester of 2008.

Typical freshman classes for engineering majors in disciplines such as Chemistry, Mathematics, Physics, etc., were already in place on the MSU campus. What was needed was a freshman engineering class similar to the one offered at Missouri S&T in their Freshman Engineering Program. The Missouri S&T course, FE 10, entitled, "Studies and Careers in Engineering," is a one credit hour lecture course that covers the various fields of engineering and career opportunities in those fields. The class also introduces some campus resources available for assisting student success.

MSU already had a freshman course in the Interdisciplinary Studies Program (IDS) known as IDS 110, Introduction to University Life. This course introduces students to the purposes and processes of higher education and is designed to facilitate a successful university experience for students.

Development of Engineering 110

The challenge at MSU was to develop a freshman engineering course that effectively introduced students to the various fields of engineering and the career opportunities in those fields as is done in FE 10 at Missouri S&T, while also preparing students for life on the MSU campus as is done in IDS 110 at MSU.

Due to their generally large freshman engineering class, Missouri S&T must offer a number of sections of FE 10, taught by several different instructors, so coordination among different sections is an issue. At MSU, only one section of EGR 110 has been offered each semester and this will likely remain the case for some time to come.

The first EGR 110 class was held on the MSU campus in the fall semester of 2008. A total of 33 students enrolled. The course was modeled after the FE 10 class at Missouri S&T and the grading scheme was the same as that used in FE 10. In cases where FE 10 students were required to attend Career Fairs and similar events on the Missouri S&T campus, students enrolled in EGR 110 were required to attend similar events on the MSU campus. We also arranged for a number of engineering practitioners in the Springfield, MO area to come and speak to the class. A copy of the syllabus for EGR 110 from the fall 2009 semester is shown in Table 1, below.

Table 1. Syllabus for EGR 110 Fall 2008**EGR110 Study and Careers in Engineering Agenda Fall 2008**

Week	Tentative Schedule of Topics	Assignments & Activities
Aug. 28	Introduction, Expectations	Read Syllabus and Grading Policy
Sept. 4	Critical Issues for Student Success – 1	Assignment: Goals Essay
Sept. 11	Critical Issues for Student Success – 2	Goals Essay Due Visit Advisor to Get Acquainted
Sept. 18	Fields of Engineering	Assignment: Visit the Fall Career Fest 2008, Sept. 24 (10am-2pm) Visit Advisor to Get Acquainted
Sept. 25	Career Interest Presentation: Career Center Services & Resume Writing	Fall Career Fest Assignment Due Guest Speaker: Jack Hunter
Oct. 2	Public Affairs Theme: Sustainability	Assignment: Sustainability Essay
Oct. 9	Ethics and Professionalism	Sustainability Essay Due
Oct. 16	Fall Break – No Class	
Oct. 23	Communication Skills and Working as a Team	Guest Speaker: Jerry Lynn Kyle
Oct. 30	Research, Design Teams and Global Studies Opportunities	2 Guest Speakers: Dr. Carroll, Engineering Dept. Head, and Representative of Study Away Program.
Nov. 6	Service Learning Opportunities	Guest Speaker: Elizabeth Burton
Nov. 13	Missouri State University Resources	Library tour and information
Nov. 20	Writing Center Presentation	Guest Speaker: Michael Frizell
Nov. 27	Thanksgiving – No Class	
Dec. 4	Engineering Career Topic	Guest Speaker: Engineering Advisory Board Member Assignment 1: Career Choice Essay Assignment 2: Visit the Writing Center
Dec. 11	Summer Co-op Job Strategies	Career Choice Essay Due
Dec. 18	Final Exam Week – No Class	Study for your finals in other classes.

Student Input

At the end of the fall 2008 semester the students enrolled in EGR 110 were asked to complete a survey about the EGR 110 class. The results of this survey revealed a number of interesting facts.

One important fact discovered was, that due to the cooperative engineering program just starting, a number of the students in EGR 110 had already taken the IDS 110 course at MSU. Thus, these students felt that much of the material in EGR 110 on study habits and campus resources was redundant. This led to a change in MSU policy that made EGR 110 a substitute for IDS 110 for all students in the cooperative engineering program. In addition, it was decided that students who took EGR 110 while enrolled in the cooperative engineering program and later changed to another major at MSU would not be required to take IDS 110.

The Career Center on the MSU campus developed a special EGR 110 presentation focused on careers in engineering. This class session was highly rated by the students.

The most popular topics in EGR 110, however, were the presentations given by practicing engineers describing the work they did on a daily basis. Many students expressed the point that these presentations gave them the best perspective on the work that engineers actually do.

EGR 110 in Spring 2009

EGR 110 was offered again the spring 2009 semester and there were 22 students enrolled. All but one of the students enrolled had already taken the IDS 110 class, so minimal class time was spent on study habits and campus resources. Instead the additional class periods were used to invite more guest lecturers from the local engineering community.

The end of semester survey of students in this class revealed that these students, like those in the previous semester, rated the presentations by practicing engineers as best of all the material covered in the course. On this survey students were also asked to make suggestions about other topics to be covered in the course.

A number of the students suggested some form of hands on laboratory exercise as part of the course. Others suggested a tour of some type of engineering facility.

EGR 110 in the Future

EGR 110 will again be offered at MSU in the 2009 fall semester. Plans are to put some of the study habits and campus resources back into the course since students will no longer be taking *both* EGR 110 *and* IDS 110. We will continue to use practicing engineers as guest lecturers. We also plan to add some simple laboratory exercises and/or demonstrations to the course.

In addition, the administration at Missouri S&T has invited students in the cooperative engineering program, to take a one day trip to the Missouri S&T campus in Rolla to see some of

the laboratory facilities and talk to the faculty there about some of the engineering programs not offered on the MSU campus. This is planned to be included as another part of EGR 110.

Conclusions

EGR 110, Studies and Careers in Engineering, will continue to evolve on the MSU campus as the cooperative Missouri S&T/MSU engineering program progresses. Hopefully it will remain a course that provides a good introduction to the engineering profession as well as an introduction to life on the MSU campus.

Biographical Information

Dr. Robert I. Egbert received B.S., M.S., and Ph.D., degrees in electrical engineering from the University of Missouri – Rolla (now Missouri University of Science & Technology). He was a member of the faculty at Wichita State University for 20 years and has recently accepted a faculty position in the new cooperative engineering program between Missouri S & T and Missouri State University.