A Look Back – The First Four Years of the MST/MSU Cooperative Engineering Program

Robert I. Egbert
Cooperative Engineering Program
Missouri State University

Douglas R. Carroll
Cooperative Engineering Program
Missouri University of Science & Technology

Abstract

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 of 2008. In the spring of 2012 fifteen students completed the program and became the first graduates.

In this paper, the authors take a look back at the program to identify successes and problems as well as strengths and weaknesses over these first four years. Hopefully this will be of interest to those involved in similar problems.

Overview – Major Milestones

1. August 2006 Memorandum of Understanding between Missouri S&T and MSU signed.
2. August 2008 first classes in Cooperative Engineering Program at MSU begin.
3. August 2008 Engineering 110 class, Studies and Careers in Engineering, offered for the first time.
4. August 2009 first engineering students in the Cooperative Engineering Program are admitted to Missouri S&T.
5. August 2009 first engineering courses from Missouri S&T offered on the MSU campus as part of the Cooperative Engineering Program.
6. October 2011 ABET visit to the Cooperative Engineering Facilities on the MSU campus. Accreditation through Missouri S&T expected in the summer of 2012.
7. May 2012 first graduates from Cooperative Engineering Program.

Structure of the Program

The Program is administered by a full-time Director employed by Missouri S&T but stationed on the MSU campus. The Director reports to the Associate Provost at Missouri S&T and also coordinates with the Chairs of the Department of Civil, Architectural, and Environmental Engineering and the Department of Electrical and Computer Engineering at Missouri S&T. At

MSU the program is housed in the College of Natural and Applied Science and the Program Director reports to the Dean of the College of Natural and Applied Science, who is the main point of contact between MSU and Missouri S&T.

Faculty members are hired by both MSU and Missouri S&T. All potential faculty members are interviewed by a search committee made up of both Missouri S&T and MSU faculty members. Those MSU faculty members selected for the program are granted adjunct faculty status at Missouri S&T. Teaching assignments for all faculty in the program are assigned by the Program Director in consultation with the appropriate Department Chairs at Missouri S&T. Initial appointments, salary, tenure, and promotion issues are primarily left to the institution making the appointment, although the other institution is advised of such issues.

Students are initially admitted to MSU and then after approximately three semesters apply for admission to Missouri S&T as a special student in the Cooperative Engineering Program. The registrar's offices of both institutions maintain copies of student records.

Tuition and fees are collected by MSU and then transferred to Missouri S&T for the engineering courses. Financial aid and similar functions are handled jointly.

Successes – What Worked

The academic parts of the program have worked very well. We built on the Pre-Engineering program that MSU had offered for many years. In the Pre-Engineering program, students completed approximately 2 years of coursework at MSU and then transferred to Missouri S&T to complete their engineering degree. Students take approximately half of the coursework required for the engineering degree from MSU, and the courses are transferred to Missouri S&T under a transfer agreement for the program. The MSU courses include mathematics, chemistry, physics, computer science, geology, history, economics, English, as well as the freshman engineering course.

The first step in the program is to be admitted to MSU and begin taking the freshman level courses. All of the freshman level courses are offered by MSU. After students have completed the freshman level courses in the program, they apply for admission to Missouri S&T. Students are considered to be "pre-admitted" to the program prior to being admitted to Missouri S&T. Once they are admitted to Missouri S&T, they are fully admitted to the program at both universities. In the MSU system, students are "pre-admitted" to a degree plan until they complete the general education requirements, and then they apply for formal admission to the program. At Missouri S&T students are admitted to the Freshman Engineering program until they complete the freshman level courses, and then they apply for formal admission to a degree program. The Cooperative Engineering Program process allows our students to fit into the system at both universities, and makes the academic paperwork flow smoothly.

Once students are formally admitted to the program (civil or electrical engineering) they enroll for their engineering classes through Missouri S&T and their non-engineering classes through MSU. Sections of the Missouri S&T engineering classes are set up that meet on the MSU campus. Most of the sophomore and junior level engineering courses are taught live by faculty

in Springfield, though there are a few taught as distance education. Most of the senior elective engineering courses are taught as distance education by faculty in Rolla or St. Louis, though there are a few senior elective classes taught live by faculty in Springfield.

The distance classes used for senior electives are graduate level classes that are used by Missouri S&T for their on-line graduate programs in civil and electrical engineering. One of the efficiencies was to use the Missouri S&T distance courses that would be offered whether the Cooperative Engineering Program existed or not. We are adding students to existing classes. It also gives the students in Springfield choices in what to take for their senior electives, and adds to the quality of the program.

Another success has been the integration and cooperation of the faculty in the program. Approximately half the engineering faculty work for Missouri S&T and half for MSU. Faculty teach courses based on their areas of expertise, rather than the university that they work for. The faculty in Springfield participate in the faculty meetings at Missouri S&T via teleconference. Faculty work together in developing curriculum and course outlines and the common final exams.

Problems – What Didn't

Most of the problems have been in the administrative areas of admissions, financial aid, registration and billing. All universities have automated systems for dealing with these processes. The systems are programmed according to the policies of the university, and no two universities have the same policies. The result is that agreements had to be worked out between the two universities as to how to handle admissions, financial aid, registration and billing. It is not feasible to program the agreements into the university systems, or to get the two university systems to talk to each other. These processes are handled manually.

As we worked through the administrative problems, the goal was to find solutions that caused minimal disruption of the automated systems (PeopleSoft at Missouri S&T and Banner at MSU). We work within the systems as much as possible because the system is essential in working the students through to graduation. At MSU students apply for admission using the standard process that all students use. They indicate their major as civil or electrical engineering, and by keying on the major code we can pull MSU records for the students in the cooperative engineering program. This works well for getting student information on the MSU side. For Missouri S&T we require that students fill out a paper application, and we stamp it indicating that they are in the cooperative engineering program. Missouri S&T gives the students a different campus code, indicating that they are on the MSU campus, and we can pull records by keying on the campus code. This allows us to get student information on the Missouri S&T side.

For registration, students register for the MSU classes using the standard MSU registration system. Students register for the Missouri S&T engineering classes using the standard Missouri S&T registration system. We had an issue where students in Rolla were accidentally registering for classes that were taught in Springfield, so the Missouri S&T registrar had to work out a system where the classes taught in Springfield are hidden from the students in Rolla, but available to the Students in Springfield.

Financial aid has been and continues to be a difficult problem to solve. Different universities have different financial aid packages, and so part of the negotiation is to decide what the financial aid will be for students in a cooperative program and who will pay for the financial aid. In our case, students will receive their first two years of university funded scholarships from MSU, based on the MSU scholarship criteria. The second two years of university funded scholarships are transfer scholarships from Missouri S&T, based on the Missouri S&T transfer scholarship criteria. Students who transfer into the program from a community college receive the Missouri S&T transfer scholarships, but do not (in most cases) receive scholarships from MSU.

External scholarships, loans, grants, GI funding, etc. are all administered by the MSU financial aid department. Most of the financial aid requires that students enroll for a minimum number of credits each semester and complete a minimum number of credits toward the degree each year. To satisfy the enrollment requirements during the semester, students enrolled in Missouri S&T courses are put in placeholder courses at MSU. Enrolling them in the placeholder courses allows the Banner system to tell the financial aid office that the students meet the enrollment requirements. At the end of the semester, Missouri S&T sends transcripts to MSU and the courses are transferred in. Grades for the placeholder courses are NV (No Value) because they are not real courses. The transfer credits at the end of the semester allow the Banner system to tell the financial aid office that the students have completed the required number of credits per year. Enrolling students in the placeholder courses, getting the transcripts sent and transferred, and getting the grades in order are manual processes on a fairly large scale. Human error sometimes causes students to get notifications that they are losing their financial aid or will need to begin paying back their loans. The students notify us when they have problems and we get the problems fixed.

MSU bills the students for all of the tuition and fees. MSU courses are billed at the MSU rate, and the Missouri S&T courses are billed at the Missouri S&T rate. In billing for the Missouri S&T courses, MSU keys on the placeholder courses in the Banner system, and bills at the Missouri S&T rate for those courses. Refund of fees for courses dropped early in the semester are based on the MSU refund schedule, regardless of which university is offering the course. The bills are developed manually, and there are human errors. During the semester, both universities develop proposed bills and check each other's work. Once everyone is in agreement, Missouri S&T sends a bill to MSU and MSU pays the bill. Since MSU hires faculty who teach in the cooperative engineering program, an agreement was worked out to share the tuition for engineering courses taught by MSU engineering faculty. MSU send Missouri S&T a bill for their share of the tuition and fees, and Missouri S&T pays that bill.

Strengths

The biggest strength of the Program is that it works. Two different institutions have been able to successfully operate a Cooperative Engineering Program that has now graduated its first class. Virtually all of the first year graduates were able to obtain jobs or secure admission to graduate engineering programs at other institutions. This suggests that the program has been successful. In surveys, students in the Program have indicated that they have generally been pleased with the Program.

Weaknesses

As has been mentioned above, many of the weaknesses in the Program have been in the administrative side. Students in the Program generally seem pleased with their education.

One problem that has been observed by both faculty and administration in the Program is that students in the Program do not feel strongly "connected" to either institution. Although they are on the MSU campus they don't really interact with a lot of MSU students outside of the program. It came as a surprise to faculty and administrators in the Program that none of the spring 2012 graduates recognized the Dean of the MSU College of Natural and Applied Science. Similarly, faculty and administrators at Missouri S&T have expressed feelings that students in the Program do not feel a strong attachment to Missouri S&T as well.

Plans to correct this include having the MSU Dean speak to the EGR 110 class at MSU as well as encouraging faculty from Missouri S&T who are teaching classes via distance to come to Springfield once or twice during the semester and teach back to Rolla. We also hope to get students in the Program more involved in activities at Rolla.

Plans for the Future

Future plans include moving the Program from Kemper Hall on the MSU campus into a new facility made from a building in the downtown area of the MSU campus. This is an older building that was vacant and was purchased by the university. Several other university facilities will also be relocating to the facility but the Cooperative Engineering Program will have approximately 16 thousand square feet of space that will be on parts of the two floors in the facility. The first floor will include classrooms and laboratory space for both the Civil and Electrical Engineering programs, including some high bay areas for the Civil Engineering Labs. The Electrical Engineering Power Lab that is currently in Kemper Hall room 213A will be relocated to the first floor of the new building. Another general Electrical Engineering Lab that will be approximately twice the size of the power lab will also be located on the first floor. Faculty and staff offices as well as a conference room, break room and storage room will be on the second floor.

Plans are currently to move into the facility next summer and begin holding classes in the facility in the fall of 2013. Figure 1 shows a rendering of the front entrance of the building. Figure 2 shows the office complex and other rooms to be located on the second floor in the building. Figure 3 shows the laboratories and other rooms located on the first floor of the building. The plan will provide the office and laboratory space, classrooms, computer laboratory and distance education rooms that are necessary for the Cooperative Engineering program.

Conclusions

Missouri University of Science and Technology and Missouri State University have demonstrated that a successful Cooperative Engineering Program can be developed between two different institutions. Through careful early planning many pitfalls can be avoided and with active participation between both institutions problems encountered in the ongoing operation of the Program can be resolved.

Figure 1. Rendering of the Front Entrance.

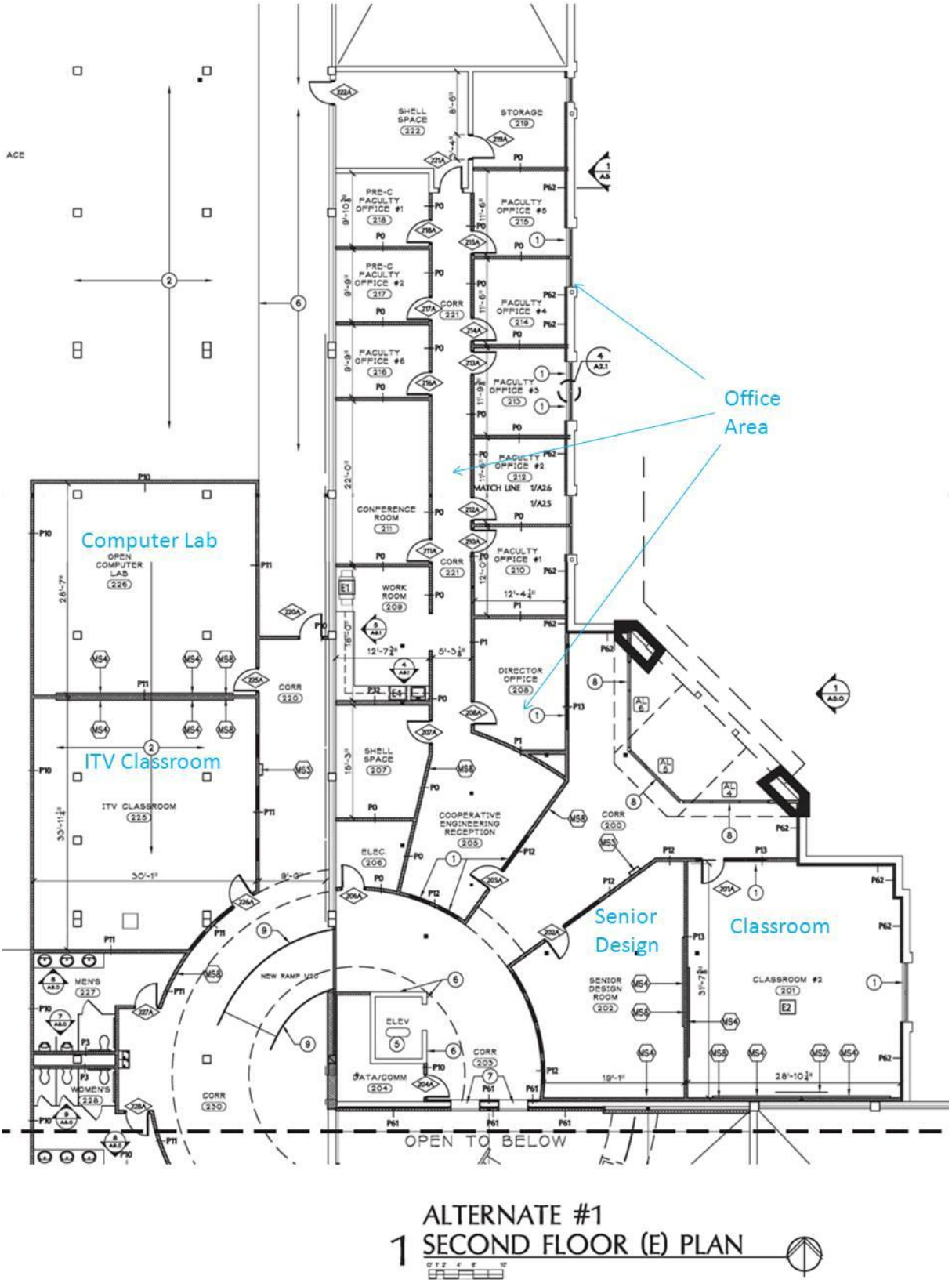

Figure 2. Office Complex and Second Floor Rooms.