Military on Campus: A Joint UMR-Army Program Providing Non-Traditional Master's Degrees.

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Abstract

Through efforts to bring non-traditional students into the classroom, the Environmental Engineering Program at University of Missouri-Rolla (UMR) has developed a program to offer Master's degrees to US Army Officers completing the Engineering Officer's Advanced Course (EOAC) at Fort Leonard Wood. The program was formulated in conjunction with the Army Engineering School. The goal-oriented program provides a limited amount of credit for the EOAC coursework completed by the officers, subject to evaluation by program faculty. These officers/students are allowed flexibility to develop their own plan of study that meets the UMR criteria, while still permitting them to complete their non-thesis degree in a total of nine months. While this program met some resistance when initially proposed, it has since been extremely successful, receiving broad praise from UMR and the Army. The program is now seen as a "win-win" venture as the Army students are allowed to receive a superb, flexible degree from a prominent engineering school and bring that knowledge to their profession in the military. The program added minimal additional teaching load to the Environmental Engineering Program faculty, and UMR benefits from these officer/students with their high degree of professionalism, a drive to learn, and a vast background of experiences.

The Process

The mission of the Environmental Engineering Program at UMR is: 'to train and educate future leaders in environmental engineering.' The program went through a revitalization period, hiring three new professors in a three-year period for 1993 – 1996. As part of the revitalization, the program faculty looked to expand the program to include non-traditional students and to look

beyond the conventional classroom. However with only four full-time faculty members, the options for additional teaching commitments was limited. Cooperating with Fort Leonard Wood was a distinct first step. There are other UMR departments and programs that cooperate with Ft. Wood, and historically there had been contact with the Civil Engineering Department.

Fort Leonard Wood is located approximately 20 miles from Rolla and is home to the Army Engineering School. As home of the Army Engineering School, Fort Leonard Wood conducts the Engineering Officer's Advanced Course (EOAC). The EOAC is a rigorous curriculum that prepares senior lieutenants and junior captains to lead, train, and maintain engineer units. The course continues the process of branch qualification initiated in the Engineering Officer's Base Course (EOBC) and provides a basis for continued professional development. The 18-week course is designed for active duty and selected Reserve and National Guard Officers in order to complete Military Education Level 6. The EOAC provides opportunities for students to assess their individual skills, learn from instructors and gain knowledge from each other's experiences so that they are fully prepared to command.

There was initial difficulty in arranging a program to suit the needs of both the Army Engineering School and the UMR Environmental Engineering Program, which resides in the Civil Engineering Department. The scheduling of the EOAC sessions was not conducive to the UMR academic year. Furthermore, the existing environmental engineering faculty was already taxed, so offering a number of additional courses at Ft. Wood was not a viable option. The UMR Engineering Management Department currently offers a successful M.S. program, which primarily consists of additional classes taught at Ft. Wood. The model used for the Engineering Management program, though successful, was not feasible for the Environmental Engineering Program. A new, innovative, flexible program was sought and needed to allow a cooperative program to exist to offer environmental engineering to the Ft. Wood EOAC officers.

The Program

In the fall of 1996, Drs. Craig Adams and Purush TerKonda began to work with the EOAC program directors to devise a program to meet the needs of the US Army, work with the available UMR faculty, and uphold the educational standards of UMR, a premier engineering

education institution. The non-thesis Master's Degree program requires 33 credits of graduate-level work. The requirement is met as follows, eighteen UMR credit hours earned for the listed courses based on coursework taken as part of the EOAC curriculum and at UMR during EOAC (Table 1). One key aspect of devising this curriculum was to accurately prescribe the equivalent educational value of the EOAC to the UMR programs.

Table 1. First Semester Course Curricula for the UMR/EOAC Program

Course	UMR Contact hours	EOAC Equiv. Contact hours	Cost	Credit Hours
CE/EnvE 460 Chemical Principles	45	0	#	3
CE/EnvE 461 Biological Principles	45	0	#	3
CE/EnvE 400 Special Problem	45	0	#	3
CE 345 Construction Methods	15	30	*	3
CE/EnvE 380 Water Resources	15	30	*	3
EM 308 Econ. Decision Analysis	15	30	*	3
Total	180	90		18

EnvE = Environmental Engineering, CE = Civil Engineering. Students chose either designation of these co-listed courses based on whether they seek a Civil Engineering degree with environmental emphasis or an Environmental Engineering degree

* Normal cost for one credit hour at Fort Leonard Wood.

\# Normal cost for three credit hours at the resident, on-campus rate.

In order to accommodate the time requirements of the EOAC students the CE/EnvE 460 and 461 courses are each held in the evening as a three-hour, once per week session. The evening offerings allow the EOAC students to complete their full day of instruction at Ft. Wood and then travel to UMR for the classes. Three courses are given partial credit in conjunction with the EOAC curriculum. The EOAC curriculum was reviewed and subject matter that was equivalent to selected UMR courses was tabulated. There was sufficient educational value in numerous areas to offer credit towards the UMR classes CE 345 Construction Methods, CE/EnvE 380 Water Resources, and EM 308 Economic Decision Analysis, which is taught through the Engineering Management Department. To ensure that there is adequate educational value in the EOAC curriculum, there is also a course component that is taught by UMR faculty. For each class, there are 15 hours of contact time of instruction by the UMR faculty, with

assessment of the students' knowledge over the entire class material. This was viewed as an essential aspect to ensure that the academic standards of the UMR degree programs are being met. The CE/EnvE 400 Special Problem class is difficult to complete in one semester, especially given the time requirements put on the officers. Generally the officers and supervising faculty member identify a research area in the fall semester, begin the background work, and then complete the project during the spring semester. To accomplish this the instructor must issue an incomplete after the completion of the first semester. This incomplete is then changed to a representative grade during the spring semester.

In the spring semester of the program, the officers take five courses on the UMR campus, the same courses that are available to any other UMR student. Two of these classes are required as part of the MS program, CE/EnvE 462 and 463. Two other courses are selected from the civil and environmental engineering graduate class offerings. The remaining required course must be a 300 (graduate) level engineering course form outside the Civil Department. This course is selected and approved by the individual student and advisor. An overview of the second semester of coursework is listed below in Table 2.

Table 2. Second Semester Course Curricula for the UMR/EOAC Program

Course	UMR Contact hours	EOAC Equiv. Contact hours	Cost	Credit Hours
CE/EnvE 462 Physiochem. Operations	45	0	#	3
CE/EnvE 463 Biological Operations	45	0	#	3
Approved EnvE or CE Elective	45	0	#	3
Approved EnvE or CE Elective	45	0	#	3
Approved Out of Dept. Elective	45	0	#	3
Total	225	0		15

* Normal cost for one credit hour at Fort Leonard Wood.

\# Normal cost for three credit hours at the resident, on-campus rate.

The three open courses, which are selected by each individual, and the CE/EnvE 400 Special Problem course offers a degree of flexibility in the program. The officers are able to look at all of the course offerings on the UMR campus, providing they meet the requirements of

the curriculum. By opening-up the entire campus of opportunities and formulating a unique topic for their CE/EnvE 400 Special Problem coursework, the program participants get a distinctive educational experience. Such an experience is not possible if the program were to be offered at Ft. Wood, existing of a set, predetermined course plan.

A few aspects of the program require some special attention, including administrative aspects of the program, and registration for the program and graduate school. Students are encouraged to apply for the UMR program, and request inclusion in EOAC 4, which is the EOAC session that coincides with the program outlined above. Many students follow this plan and are accepted into the graduate school well in advance of arriving at Ft. Wood. There are other students that are not aware of the UMR program prior to arriving at Ft. Wood for EOAC 4. To assist these officers, the Civil Engineering Academic Assistant, a faculty member, and the Environmental Research Center Secretary travel to Ft. Wood when the officers are registering for their program and aid in getting the officer's applications arranged on location. The officers can then be registered almost immediately. The CE Academic Assistant is also crucial for the program, ensuring that all requirements for graduation are met in a timely fashion. This is not a simple task when considering that the officers are in class nine hours a day at Ft. Wood and not on the UMR campus to complete paper work and other tasks.

The Result

The program has earned high praise from UMR and the Army. The program meets the needs and requirements of all parties involved. The program has the most profound impact on the Army officers taking part in the program. In a limited period of time the officers receive a superb education, which aids in their military advancement and heightens their technical skills. Captain Preston Funkhouser was in the first class to go through the course (UMR M.S. Graduate May, 1998). His comments on the program follow:

> *"My graduate studies at UM, Rolla helped me to re-affirm my long-term goal of being a civil engineer. The program offered many insights into the civil and environmental engineering fields that broadened my career horizon. The program also offered me the opportunity to prepare myself to pass the Civil Engineering Professional Engineer Exam. The courses at UMR help to ingrain in the engineer's*

mind the problem-solving skills necessary to tackle the many challenges of the profession."

Currently Captain Funkhouser is stationed at Bamberg, Germany. He serves as logistics officer for the 82nd Engineer Battalion and recently passed his Professional Engineer Exam.

Summary

Overall the program has been a great success, experiencing only minimal problems over the first two years. One such problem was the limitation on the numbers of credit hours a graduate student can be enrolled in at one time. The total load for a graduate student is limited to 15 hours. To accommodate this limitation, the CE/EnvE 380 Water Resources course was moved to a special session before the beginning of classes in August.

The benefits to the officers include receiving a superb degree from a top engineering school and the ability to customize the curriculum to a degree. The officers also greatly appreciate the time on a university campus. UMR benefits from these students with a high degree of professionalism, a drive to learn, and a vast background of experiences. The College of Engineering and Civil Engineering Department have noted the success of this program. There are plans underway in hopes to create a program for a general Civil Engineering M.S. in the next two years. The Civil Department is using the model generated by the Environmental Engineering Program. This is not the only model that exists for offering graduate education to non-traditional students. It is a unique program combining minimal special offerings, a large degree of traditional university-based classes, and non-traditional classroom aspects (the EOAC Curriculum).

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