Agenda Item 2.e

New Program Proposal
Bachelor of Science
Engineering Science
USC-Columbia

Summary

USC-Columbia requests approval to offer a new program leading to the Bachelor of Science degree in Engineering Science to be implemented in Fall 2009. The proposed program is to be offered through traditional instruction methods on the USC-Columbia campus.

The Program Planning Summary was submitted to the Commission in February 2008 and reviewed and voted upon favorably without substantive comment by the Advisory Committee on Academic Programs (ACAP) on March 20, 2008. The USC Board of Trustees approved the proposal on December 15, 2008. The full proposal was received by the Commission on January 26, 2009.

According to the proposal, the purpose of the program is to provide an undergraduate education that will provide "non-discipline-specific" engineering training for students engaged in interdisciplinary studies within the various engineering fields, as well as provide a grounding in engineering science for graduate students in professional fields such as law, business, medicine, or education.

The USC College of Engineering and Computing currently offers undergraduate engineering degrees in six specific fields: Biomedical Engineering, Chemical Engineering, Civil Engineering, Computing Engineering, Electrical Engineering, and Mechanical Engineering. The proposed program will combine elements of all these programs and provide a solid technical engineering foundation.

Presently, no South Carolina public institution of higher education offers a general engineering undergraduate degree. The proposal indicates that Bob Jones University offers an Engineering Science program which is not accredited by ABET (formerly known as the Accreditation Board for Engineering and Technology). The proposal indicates that ABET identifies five general engineering undergraduate programs in the Southeast and 66 general engineering programs nationwide, including ten Engineering Science B.S. programs.

While the program proposal does not indicate any specific types of student demand for this program, the proposal does indicate that a number of prospective engineering employers have shared with USC faculty and administration the need for engineering graduates with training in the liberal arts, foreign language, and project

management. The U.S. Bureau of Labor Statistics projects more than one-half million new and net replacement engineering positions by 2016, with total national engineering positions increasing to nearly 1.7 million. The proposal does not provide employment data for new engineering background positions in the professional fields of law (patent attorneys), business (project management), medicine (STEM discipline research), or education.

The proposed program will consist of 129 credit hours of course work, including a core engineering course requirement (33 credit hours); technical engineering coursework in at least two (of six) discipline-specific engineering fields (30 credit hours, consisting of two, five-course sequences); a general education track consisting of liberal arts courses (18 credit hours) and mathematics/science courses (33 credit hours) from multiple departments and programs, including history, fine arts, social science, mathematics, statistics, chemistry, biology and physical science; and an elective track (15 credit hours). In the senior year, the student must complete a full-year capstone project, a requirement for all degree programs in the College of Engineering & Computing. No new courses will be added to USC's course catalog to support the program.

The proposal states that admissions and transfer criteria will be the same as for all other USC College of Engineering and Computing undergraduate programs. The proposal also states that current articulation agreements for engineering programs with South Carolina's two-year institutions will apply.

If the program proposal is approved, USC indicates that it will seek ABET accreditation under the program requirements for "Engineering, General Engineering, Engineering Physics, Engineering Science and similarly named programs." The proposed curriculum has been developed in keeping with ABET accreditation requirements. The College of Engineering will seek ABET review and assessment at the earliest possible time, which is after the first class of students graduates.

The proposal anticipates there will be 55 new students (56.1 FTE) in the program's first year, increasing to 96 students (97.3 FTE) in the second year, and further increasing to 145 students (148 FTE) by the fifth year of the program. If enrollment and program completion projections are met, the proposed program will meet the Commission's productivity standards.

The program proposal notes that "no new faculty will be hired specifically for this program." However, the Dean of the College of Engineering and Computing will appoint one existing faculty member to be program director and five teaching faculty members (one from Computer Science or Computer Engineering; one from Mechanical Engineering; one from Civil Engineering; one from Electrical Engineering; and one from Chemical Engineering) to administer the program and teach the core engineering courses

related to the program. The proposal anticipates that the program director will spend approximately one-third of his or her work time conducting administrative work for the program, and that a total of two staff members will spend one-third of their work time to support the program.

The proposal states that no new costs, including additional physical space, equipment or library resources, are required for the successful implementation and administration of the new program. Additional sections of engineering courses currently offered will be added to accommodate increased student numbers; current faculty will be asked to add to current course loads in order to accommodate the increase. The program will draw upon current engineering resources and materials available on the USC-Columbia campus.

Below are the estimated Mission Resource Requirement (MRR) costs to the state and new costs not funded by the MRR associated with the implementation of the proposed program during its first five years. Also shown are the estimated revenues projected under the MRR and the Resource Allocation Plan as well as student tuition.

Estimated Program Costs and Revenue

	Estimated Program Costs		Estimated Program Revenue				
	(A) MRR Cost	(B) Other Costs*	(C) Actual State Funding	(D) Tuition	(E) Additional Revenue	(F) Total Revenue (C+D+E)	(G) Total Revenue - Total Costs (F-(A+B))
Year 1	$705,000	$0	N/A	$588,151	$0	$588,151	-$116,850
Year 2	$1,221,610	$0	$406,979	$1,016,638	$0	$1,423,617	$202,007
Year 3	$1,590,856	$0	$704,230	$1,324,313	$0	$2,028,543	$437,687
Year 4	$1,858,789	$0	$917,137	$1,548,621	$0	$2,465,758	$606,968
Year 5	$1,858,789	$0	$1,071,904	$1,548,621	$0	$2,620,525	$761,735

*Includes costs of an extraordinary nature not otherwise included in the MRR cost calculation (e.g., costs for a new building required to support a program).

These data demonstrate that if USC-Columbia can meet the projected student enrollments and contain costs as shown in the proposal, the proposed program will be able to cover costs with revenues it generates beginning in the second year of implementation.

In summary, USC-Columbia is proposing a program leading to the Bachelor of Science degree in Engineering Science. Designed to be broadly based and interdisciplinary within the various engineering fields, the program will draw heavily

from current resources and materials in the College of Engineering and Computing. The proposed program is intended to provide general undergraduate engineering training, especially for students planning to seek training in other professional areas such as law, medicine, and business.

Recommendation

The staff recommends that the Committee on Academic Affairs and Licensing commend favorably to the Commission approval of the program leading to a Bachelor of Science degree in Engineering Science at USC-Columbia, to be implemented in Fall 2009, provided that no "unique cost" or other special state funding be required or requested.