

Request for Authorization to Establish a Bachelor of Science in Engineering at Western Carolina University

Western Carolina University requests authorization to establish a B.S. in Engineering degree program (CIP 14.0101).

Program Description

Western Carolina University requests Authorization to Establish a Bachelor of Science in Engineering (BSE) degree. The Engineering Accreditation Commission of the Accreditation Board for Engineering (EAC of ABET) currently accredits 34 BSE degree programs nationwide. Bachelor of Science in Engineering programs differ from discipline specific degree programs (e.g., BS in Electrical Engineering) in that they provide specialization through domain concentrations built upon common math/sciences components and engineering curriculum cores. Establishing the BSE program would create a process of efficient and agile modification of the curriculum as needed to address institutional priorities and regional needs. Also, by creating a common core curriculum, the BSE would minimize unnecessary duplication and encourage sharing of expensive facilities such as the Center for Rapid Product Realization (CRPR). The proposed BSE is built upon a strong “applications engineering” focus emphasizing project-based learning and collaborative/teamwork skills. The proposed 127 semester credit hour curriculum is comprised of 42 hours of liberal studies, 19 hours of an engineering core, a 32 hour math/sciences component, and an electrical engineering concentration of 34 hours.

Western Carolina University currently offers a B.S. in Electrical Engineering degree program in conjunction with UNCC. Since Fall 2011, WCU has been offering all of the coursework for this program, and the EAC of ABET recently accredited WCU’s B.S.E.E. program. WCU’s plan is to discontinue the BSEE degree and end the joint agreement with UNCC once the BSE obtains EAC of ABET accreditation.

Relevance to Institutional Mission and Strategic Plan

Western Carolina University’s Strategic Plan describes strategic directions and goals for the University to respond to regional needs and opportunities that are directly addressed by the proposed B.S. in Engineering program:

- Develop and support academic programs that respond to changing economic opportunities, technologies, and demographic trends.
- Develop programs that involve the students, faculty and the community in promoting regional development.

Highlights from UNC-GA Data Template

Two UNC institutions offer the BSE degree program (ECU and NCSU). Also, NCSU offers the BSE with a concentration in Mechatronics on campus and in a joint program with UNC Asheville. In the past three years, Western Carolina University has established one baccalaureate and one doctoral program, and has discontinued twelve baccalaureate and four master’s programs.

Outcome of Consultation with Disciplinary Panel

The panel included faculty members from ECU, NCA&T, and UNCC in addition to the WCU faculty presenters. Discussion was held on the overall curriculum of the program and in particular on the relationship of the Core and Concentration components. There was consensus on the desirability of offering this program at WCU.

Student Demand

The chart below contains WCU's four-year projection of student enrollment for the proposed BSE. Since the BSE with an Electrical Engineering concentration is unique within UNC, there is no prior information regarding student demand for this program. First year projected enrollment is based on assuming 10 graduates over a four year period with a four year success rate of 35%, which is typical in Engineering programs nation-wide.

	Year 1 (2012-13)	Year 2 (2013-14)	Year 3 (2014-15)	Year 4 (2015-16)
Freshmen	30	30	30	30
Sophomore		20	20	20
Junior			15	15
Senior				10
TOTALS	30	50	65	75

WCU thus projects enrollment of the program in its fourth year will be 25 full-time upper division students.

Opportunities for Graduates of the Program

The proposal states that, according to information published by the Bureau of Labor Statistics of the U.S. Department of Labor, the size of the civilian work force will increase from 2004-14 by 14.7 million, or 10%, to 162.1 million. Bureau of Labor Statistics data also reveal the importance of providing engineering and related occupational training: "Employment in professional, scientific, and technical services will grow by 28.4 percent and add 1.9 million new jobs by 2014". According to the National Association of Colleges and Employers (NACE) in their *Jobs Outlook 2008*, the "highest demand [by employers for new graduates] is for engineering and accounting majors..."

Resource Implications

Resource needs: Because the proposed program is based on the existing curricula in the B.S.E.E. program that Western has been offering on campus, no additional faculty positions, courses, library resources, equipment, or physical facilities are needed to implement this new program.

Resources allocated: The BSE degree program, as proposed, will be housed in WCU's Kimmel School, which will absorb responsibilities for administering the program.

Estimated cost to the State: Based on the University funding formula, in the fourth year, WCU would generate additional state appropriations of approximately \$130,000 if fully funded by the General Assembly.

Recommendation

It is recommended that the Board of Governors approve Western Carolina University's request to establish a B.S. in Engineering degree program (CIP 14.0101).

General Information Template for Academic Program Review

Degree Area and Level:

B.S. in Engineering (CIP 14.0101) at Western Carolina University

Addressing UNC Tomorrow:

This proposed program would address several Recommendations within the UNC Tomorrow Report including the components to enhance Our Communities and Their Economic Transformation (Recommendation 4.4) and Our University's Outreach and Engagement (Recommendation 4.7).

Role of Program in Relation to State and Regional Needs:

According to the proposal, "WCU is committed to regional stewardship and engagement. A core component of the stewardship model requires WCU to assist the region in developing a strong, diverse, sustainable, and vibrant economy. The BSE is a core component of the curriculum required to respond to changing regional needs. WCU already has invested millions of dollars in creating the Kimmel School for the specific purpose of developing outreach-based curricula. The BSE will be a very significant component of the School's curricula and it is critical to WCU supporting the region's business and industry."

US Labor Department Analysis:

- *Summary* – Overall engineering employment is expected to grow by 11 percent over the 2006-16 decade, about as fast as the average for all occupations. Engineers have traditionally been concentrated in slower growing or declining manufacturing industries, in which they will continue to be needed to design, build, test, and improve manufactured products. However, increasing employment of engineers in faster growing service industries should generate most of the employment growth. Job outlook varies by engineering specialty.

Source: http://www.occsupplydemand.org/OSD_UnitOfAnalysis.aspx?CLUSCODE=024A-05&ST=NC&PathNo=1

Availability of Program Statewide (Enrollment and Degrees Awarded in Last 3 Years):

- *Public universities* – NCA&T received approval in January 2006 to offer the BS in Interdisciplinary General Engineering. There is not any enrollment or graduation data available for this degree program.

Upper Division Enrollment			Academic Year						
			Fall 07	Spr 08	Fall 08	Spr 09	Fall 09	Spr 10	Fall 10
ECU	Engineering, General	BS	49	60	61	68	89	99	104
NCSU	Engineering, General	BS	153	185	170	228	15	14	7
UNCA	Engineering, General	BS	N/A	N/A	10	9	17	20	17

Number of Degrees Awarded			Academic Year		
			2007-2008	2008-2009	2009-2010
ECU	Engineering, General	BS	22	19	13
NCSU	Engineering, General	BS	8	6	10
UNCA	Engineering, General	BS	N/A	3	5

- *Private universities* – N/A

APPENDIX E

Available in Online or Distance Format from UNC institutions: According to the Distance Education Inventory, NCSU is approved to offer the BS in Engineering in Craven County.

Available from Academic Common Market: North Carolina does not participate in the ACM at the undergraduate level.

WCU Campus enrollment and degrees awarded in similar programs at the Bachelors level:
(Based on two CIP digits –14 CIP is the summary group for Engineering under which Engineering is listed as a program.)

Upper Division Enrollment			Academic Year					
			Fall 07	Spr 08	Fall 08	Spr 09	Fall 09	Spr 10
WCU	Electrical and Electronics Engineering	BSEE	22	26	21	22	14	19

Number of Degrees Awarded			Academic Year		
			2007-2008	2008-2009	2009-2010
WCU	Electrical and Electronics Engineering	BSEE	3	10	8

Campus Average of enrollment and degrees awarded per degree program in this area at the Bachelors level over the last 3 Academic Years, Fall 2007-Fall 2010:

(Based on two CIP digits –14 CIP is the summary group for Engineering under which Engineering is listed as a program.)

Campus Average			
	Number of Active Programs	Upper Division Enrollment per Semester	Degrees Awarded per Year
ECU	1	76	18
NCA&T	10	56	16
NCSU	15	209	70
UNCA	1	15	4
UNCC	5	160	59
WCU	1	21	7
Campus Average:		90	29

WCU Campus Degree Programs added in the past three years:

- Bachelor
 - BA International Studies (04/09/2010)
- Master
 - N/A
- Doctoral
 - DPT Doctor of Physical Therapy (04/09/2010)

APPENDIX E

WCU Campus Degree Programs discontinued in the past three years:

- *Bachelor*
 - BS Education in French, Secondary Education (03/20/2009)
 - BS Education in German, Secondary Education (03/20/2009)
 - BS Electrical and Computer Engineering technology (03/20/2009)
 - BS Telecommunications Engineering Technology (03/20/2009)
 - BS Industrial Distribution (03/20/2009)
 - BS Engineering Technologies Manufacturing (03/20/2009)
 - BS Industrial Chemistry (03/20/2009)
 - BS Social Science (03/20/2009)
 - BA Social Sciences (03/20/2009)
 - BS International Business (03/20/2009)
 - BS Clinical Laboratory Sciences (02/11/2011)
 - BA Chemistry (08/12/2011)
- *Master*
 - Master of Education in English, 2-Yr College Teaching (03/20/2009)
 - Master of Education in Mathematics, 2-Yr College Teaching (03/20/2009)
 - Master of Education in Physical Education, 2-Yr College Teaching (03/20/2009)
 - Master of Education in Biology, 2-Yr College Teaching (03/20/2009)
- *Doctoral*
 - N/A