**APPENDIX C**

# THE UNIVERSITY OF NORTH CAROLINA
## REQUEST FOR AUTHORIZATION TO ESTABLISH A NEW DEGREE PROGRAM

*INSTRUCTIONS: Please submit five copies of the proposal to the Senior Vice President for Academic Affairs, UNC Office of the President. Each proposal should include a 2-3 page executive summary. The signature of the Chancellor is required.*

**Constituent Institution:** Western Carolina University

Date: April 8, 2008 (revised December 15, 2011)

Discipline Specialty Title: **Engineering**

CIP Discipline Specialty Number: 14.0101 Level: B **X** M ___ 1st Prof ___ D ___

Exact Title of the Proposed Degree: **Bachelor of Science in Engineering**

Exact Degree Abbreviation (e.g., B.S., B.A., M.A., M.S., Ed.D., Ph.D.): **B.S.E.**

Does the proposed program constitute a substantive change as defined by SACS?
Yes__ No **X**

a) Is it at a more advanced level than those previously authorized? Yes___ No **X**

b) Is the proposed program in a new discipline division? Yes ___ No **X**

Proposed date to establish degree program (allow at least 3-6 months for proposal review):
*month* **August** *year* **2012**

Do you plan to offer the proposed program away from campus *during the first year of operation?*
Yes ___ No **X**

If so, complete the form to be used to request establishment of a distance education program and submit it along with this request.

# I. DESCRIPTION OF THE PROGRAM

A. Describe the proposed degree program (i.e., its nature, scope, and intended audience)

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 and Technology (ABET) currently accredits 34 BSE degree programs nationwide. Bachelor of Science in Engineering programs differ from discipline specific degree programs (*e.g.*, a BSEE) in that they provide specialization through domain concentrations built upon common mathematics/sciences components and engineering curriculum cores.

Because the proposed BSE program is based on the notion of a common core with concentrations, it is of great value to regionally-oriented universities such as WCU. It allows the institution to be nimble and responsive to changing needs of students, business, industry, and regional economic trends.

Authorization to establish the BSE is an important element of Western's ability to respond to the mandates embodied in UNC Tomorrow. Specifically, this degree responds to UNC-Tomorrow sections 4.4.1, 4.4.2, 4.4.3, 4.7.1, 4.7.3, and 5.6.1. The BSE is an integral component of its approach to enhancing the economic transformation and community development of North Carolina's regions and the state as a whole. Moreover, the degree reflects Western's focus on engagement and regional economic development

Establishing the BSE 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 minimizes unnecessary duplication and encourages sharing of expensive facilities such as the Center for Rapid Product Realization (CRPR). Students in Western's BSE degree program will have the opportunity to work with faculty and engineers on projects secured through the Center for Rapid Product Realization, using the state-of-the-art equipment and facilities of the Center. The CRPR's mission is to make use of the expertise and engineering and technology resources at Western to form effective partnerships to grow the region's economy, to assist in generating value-creating jobs, and to improve the quality of life. The Center fosters a culture of innovation and engagement in program areas related to adaptive technologies, optoelectronic systems, concept to manufacturing processes, and intelligent sensor systems. The BSE as proposed will provide Western with the ability to link a student meaningfully to the Center through the curriculum and faculty, and in doing so to provide the student with a highly relevant, rich, and valuable educational experience leading to meaningful employment.

The proposed BSE is built upon a strong "applications engineering" focus emphasizing project-based learning and collaborative/teamwork skills. It also includes content relating to engineering project management – skills training which is essential for an engineer who wishes to create his or her own business. This "engineer as an entrepreneur" content is frequently missing in traditional engineering programs. The Western BSE, with its strong link to the CRPR, will address entrepreneurship opportunities directly.

The BSE degree program as proposed will be housed in Western's Kimmel School. Existing programs in the School are Bachelor of Science degrees in engineering technology, electrical and computer engineering technology, construction management, a Bachelor of Science in Electrical Engineering (B.S.E.E.), a Master of Science in Technology, and an online Masters

in Construction Management. It is anticipated that Western will merge existing degrees/concentrations as well as develop new concentrations under the BSE. The EAC of ABET recently accredited the B.S.E.E. degree. The plan is to discontinue the BSEE degree once the BSE obtains its EAC of ABET accreditation.

The BSE curriculum will contain a liberal studies component, mathematics and sciences components, a project-based engineering core, and a project-based electrical engineering concentration. The curriculum emphasizes the application of appropriate mathematics and science. Complementing the technical aspects of the engineering program will be a curriculum emphasis on areas such as communication skills, professional and ethical responsibility, lifelong learning, and contemporary issues.

By explicitly incorporating project based learning, teamwork, project management, and engineering entrepreneurship, the program is designed to produce well-rounded engineering professionals who have the skills necessary to achieve meaningful and rewarding employment as well as to function successfully in and adapt to a rapidly transforming technology economy. Graduates of this program will have the ability to cross engineering disciplines in professional practice and to work in a variety of engineering settings. Graduates will be able to work effectively in team settings, and be able to adapt to different work environments.

Furthermore, by linking elements of the BSE curriculum to the outreach functions of the CRPR, the program addresses two of the major findings of need as stated in the UNC Tomorrow Commission Executive Summary[1]:

- UNC should be more actively engaged in enhancing the economic transformation and community development of North Carolina's regions and the state as a whole.
- UNC should become more directly engaged with and connected to the people of North Carolina, its regions, and our state as a whole.

The primary audience for the BSE will be students who enroll at Western as freshmen. However, two-year college graduates holding an Associate Degree in Science or an Associate Degree in Applied Science would also be eligible to participate in the Engineering program. Anticipating that many students with two-year college degrees may have to fulfill certain prerequisites (*e.g.*, in the mathematics and sciences) before being accepted into the program, the curriculum provides for these students to complete an engineering degree in a two plus three format.

## Concentration Archetype

Under the BSE, concentrations will be defined and eliminated in response to the changing needs of students, business, industry, and regional economic trends - permitting timely, nimble, and efficient modification of the curriculum to address institutional priorities and regional needs.

An archetype for the BSE at Western with a concentration in electrical engineering may be found below.

[1] http://www.nctomorrow.org/

**Liberal Studies, 42 hours**

Liberal Studies courses that must be taken for the concentration:
First Year Seminar: ENGR 199
C2: MATH 153
C5: PHY 230; CHEM 139

**Engineering Core (19 hours):**

ENGR 199 - Introduction to Engineering Practices and Principles I Credits: (3)
ENGR 200 - Introduction to Engineering Practices and Principles II Credits: (2)
ENGR 250 - Engineering Practices and Principles I Credits: (2)
ENGR 300 - Professional Development Credits: (1)
ENGR 350 - Introduction to Engineering Practices and Principles II Credits: (2)
ENGR 400 - Engineering Capstone I Credits: (3)
ENGR 450 - Engineering Capstone II Credits: (3)
ENGR 461 – Engineering Project Management Credits: (3)

**Mathematics and Sciences Component (32 hours):**

CHEM 139 General Chemistry, 4 hours
MATH 153 Calculus I, 4 hours
MATH 255 Calculus II, 4 hours
MATH 256 Calculus III, 4 hours
MATH 320 Ordinary Differential Equations, 3 hours
MATH 370 Probability & Statistics I, 3 hours
PHYS 230 Calculus Based Physics I, 4 hours
PHYS 310 Modern Physics, 3 hours
PHYS 322 Optics, 3 hours

**Electrical Engineering Concentration (34 hours):**

EE 200 Computer Utilization in C++, 3 hours
EE 201 Network Theory I, 3 hours
EE 202 Network Theory II, 3 hours
EE 211 Logic and Networks Laboratory, 1 hour
EE 212 Instrumentation and Networks Laboratory, 1 hour
EE 221 Logic Systems Design I, 3 hours
EE 311 Systems and Electronics Laboratory, 1 hour
EE 312 Electromagnetic and Electronic Devices Laboratory, 1 hour
EE 321 Electromagnetic Fields, 3 hours
EE 322 Electromagnetic Devices, 3 hours
EE 331 Fundamentals of Electronics & Semiconductors, 3 hours
EE 342 Solid State Electronic Devices, 3 hours
EE 351 Systems Analysis I, 3 hours
EE 411 Analog and Digital Communication, 3 hours

127 total hours for the BSE degree.

**CURRICULUM GUIDE FOR B.S. ENGINEERING DEGREE**
**(REPRESENTATIVE ELECTRICAL ENGINEERING CONCENTRATION)**

## FRESHMAN YEAR

| FALL SEMESTER | | SPRING SEMESTER | |
|---|---|---|---|
| **Course and Number** | **Hrs.** | **Course and Number** | **Hrs.** |
| ENGR 199 Eng/Proc/Prin. I | 3 | ENGR 200 Eng/Prac/Prin II | 2 |
| ENGL 101 Composition I (C1) | 3 | ENGL 102 Composition II (C1) | 3 |
| MATH 153 Calculus I (C2) | 4 | MATH 255 Calculus II | 4 |
| CHEM 139 General Chemistry (C5) | 4 | PHYS 230 Calc. Based Physics I (C5) | 4 |
| Perspective | 3 | Wellness (C4) | 3 |
| | 17 | | 16 |

## SOPHOMORE YEAR

| FALL SEMESTER | | SPRING SEMESTER | |
|---|---|---|---|
| **Course and Number** | **Hrs.** | **Course and Number** | **Hrs.** |
| EE 200 Computer Utilization in C++ | 3 | EE 202 Network Theory II | 3 |
| EE 201 Network Theory I | 3 | EE 212 Instrumentation/Networks Lab | 1 |
| EE 211 Logic & Networks Lab | 1 | ENGR 250 Engineering Design I | 2 |
| EE 221 Logic Systems Design I | 3 | MATH 320 Ord. Diff. Equations | 3 |
| MATH 256 Calculus III | 4 | CMHC 201 Intr. to Speech (C3) | 3 |
| Perspective | 3 | PHYS 310 Modern Physics | 3 |
| | 17 | | 15 |

## JUNIOR YEAR

| FALL SEMESTER | | SPRING SEMESTER | |
|---|---|---|---|
| **Course and Number** | **Hrs.** | **Course and Number** | **Hrs.** |
| EE 311 Systems & Electronics Lab | 1 | EE 312 E-M/Devices Laboratory | 1 |
| EE 321 Electromagnetic Fields | 3 | EE 322 Electromagnetic Devices | 3 |
| EE 331 Fund. Elec/Semiconductors | 3 | EE 342 Solid State Electronic Devices | 3 |
| EE 351 System Analysis I | 3 | ENGR 350 Engineering Design II | 2 |
| MATH 370 Probability & Statistics | 3 | ENGR 300 Professional Development | 1 |
| PHYS 322 Optics | 3 | ENGR 461 Eng. Project Management | 3 |
| | 16 | Perspective | 3 |
| | | | 16 |

## SENIOR YEAR

| FALL SEMESTER | | SPRING SEMESTER | |
|---|---|---|---|
| EE 411 Analog & Digital Comm. | 3 | *EE 427 Foundations Optical Imaging* | *3* |
| *EE 425 Foundations Optical Eng.* | *3* | *EE 436 Optical Fiber Communications* | *3* |
| *EE 465 Foundations Laser Electronics* | *3* | ENGR 450 Senior Design II | 2 |
| ENGR 400 Senior Design I | 2 | ENGR 412 Professional Practice | 2 |
| Perspective | 3 | Perspective | 3 |
| Perspective | 3 | | 13 |
| | 17 | | |

*Note: Courses in italics are required for an elective emphasis in Optical Engineering.*

The BSE degree program will be housed in the Kimmel School. Programs currently offered in the School include:

BS in Construction Management (Candidate for ACCE accreditation)
BS in Engineering Technology (TAC of ABET accredited)

BS in Electrical and Computer Engineering Technology (TAC of ABET accredited)
BS in Electrical Engineering (EAC of ABET accredited)
MS in Technology
MS in Construction Management (online)

B. List the educational objectives of the program.

The Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology requires engineering programs to develop Program Educational Objectives and Program Outcomes (as part of a continuous improvement process). The Objectives describe the career and professional accomplishments that the program is preparing graduates to achieve. The Outcomes represent what students are expected to know and be able to do by the time of graduation.

The Program Educational Objectives for Western's BSE graduates are:

1. Assume entry-level positions that are related to system design, development, and implementation in engineering practice.
2. Apply current engineering design tools and processes while recognizing constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
3. Function effectively on multidisciplinary engineering teams and projects by applying appropriate project management fundamentals and written and oral communications.
4. Solve broad-based, complex practical engineering problems while recognizing the impact of solutions in a global, economic, entrepreneurial, environmental, and societal context.
5. Maintain currency in global engineering and technology issues and in workplace ethics and responsibilities.
6. Pursue continuous professional development through graduate study, workshops, professional licensing, and continuing professional education.

C. Describe the relationship of the program to other programs currently offered at the proposing institution, including the common use of (1) courses, (2) faculty, (3) facilities, and (4) other resources.

Currently Western Carolina University offers all courses in the BSEE program. Western faculty presently teaching EE courses in this program meet qualifications established by EAC of ABET accreditation criteria. Western Carolina University received program accreditation from EAC of ABET for the BSEE program in August, 2011.

Laboratories currently used for engineering technology, electrical and computer engineering technology and the electrical engineering joint program will be used for this BSE degree program. Existing laboratories within the Kimmel School are currently equipped with all necessary and appropriate test equipment to support the BSE with the representative concentration in Electrical Engineering. The following laboratories in the Kimmel School at Western are dedicated to engineering and technology:

Analog Electronics Laboratory
Automation Systems Laboratory

Communications and Optical Research Laboratory
Digital Electronics Laboratory
Digital Communications Laboratory
Embedded Computer Engineering Sensors Laboratory
Engineering Fabrication Laboratory
Engineering Technology Graphics Design Laboratory
Laser Machining Systems Laboratory
Machining Processes Laboratory
Optical Systems Laboratory
Polymer and Composite Materials Laboratory
Rapid Prototyping and Metrology Center
Senior Projects Laboratory
Telecommunications and Networking Laboratory

Several laboratories contain per-student bench-top computer workstations, and laptop computers are available to students for software applications. All classrooms and laboratories make use of wireless communication systems.

Western has received two Small Business Administration (SBA) grants, $887,000 in March 2005, and $987,000 in October 2006. These funds were used for facilities renovation, classroom equipment, laboratory equipment, and curriculum design for engineering programs development. To date, more than $5,000,000 received through federal grants has been spent on in-place laboratory resources that will support this program.

## II. JUSTIFICATION FOR THE PROGRAM – NARRATIVE STATEMENT

A. Describe the proposed program as it relates to:
   1. the institutional mission and strategic plan
   2. student demand
   3. societal need (For graduate, first professional, and baccalaureate professional programs, cite manpower needs in North Carolina and elsewhere.)
   4. Impact on existing undergraduate and/or graduate academic programs of your institution. (e.g., Will the proposed program strengthen other programs? Will it stretch existing resources? How many of your programs at this level currently fail to meet Board of Governors' productivity criteria? Is there a danger of proliferation of low-productivity degree programs at the institutions?)

According to recent information published by the Bureau of Labor Statistics of the U.S. Department of Labor[2], 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*[3], the "highest demand [by employers for new graduates] is for engineering and accounting majors…"

The UNC system projects an additional 300,000 students in the state system in 10 years, a nearly 50% increase from the current figure[4] and regularly emphasizes a need for system components to increase the number of North Carolina students trained in the STEM (Science, Technology, Engineering and Mathematics) disciplines. These data alone demonstrate the need for an increasingly regional approach to higher professional education in the UNC system. According to the UNC Board of Governors Long-Range Plan 2004-2009[5], The Role of UNC in Economic Development,

*"There are increasing expectations from legislative and executive leadership in the State that the University of North Carolina assume a more direct, active role in economic development."*

President Erskine Bowles has committed the System to be a leader in positioning North Carolina to compete successfully in the 21st century, saying[6],

> *"Our 16 university campuses have a unique capacity and responsibility to produce graduates with the skills and abilities needed to start new businesses; to produce new ideas and technologies through the work of smart and engaged faculty; and to work in partnership with businesses, agencies and organizations to produce a better quality of life for all North Carolinians. That is what it is going to take for North Carolina to compete successfully in a knowledge-based global economy. Economic transformation is a strategic priority for UNC and for the UNC Board of Governors."*

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[2] http://www.bls.gov/oco/oco2003.htm
[3] http://www.naceweb.org
[4] http://www.newsobserver.com/579/story/554681.html
[5] http://intranet.northcarolina.edu/docs/aa/planning/longplan/LRP_2004-2009_Role_of_UNC_in_Economic_Development_(X).pdf
[6] http://www.rtrp.org/NewsReleases_detail.php?recordID=1401

In response, Western revised its Strategic Plan to reflect this vision over the document's 2006-2011 planning period; Western's Mission and Vision Statements currently read (in part):

> *"The commitment of the community to service, research, and creative activities complements the central mission and extends the benefits of its scholarship to society. As a major public resource for western North Carolina, the university promotes regional economic development through its teaching, research and service."*
>
> *"Western Carolina University will be a national model for student learning and engagement that embraces its responsibilities as an economically–engaged university. Western seeks to nurture an ever-enlarging knowledge community and economy in western North Carolina through its academic programs, public service and scholarship."*

The BSE program as proposed directly addresses these mandates. It is designed to enrich the quality and relevance of the educational experience of students while facilitating enhanced external engagement and the promotion of regional development. The program - by explicitly incorporating project based learning, teamwork, project management, and engineering entrepreneurship - is designed to produce well-rounded engineering professionals who have the skills necessary to achieve meaningful and rewarding employment as well as to function successfully in and adapt to a rapidly transforming technology economy. Graduates of this program will have the ability to cross engineering disciplines in professional practice and to work in a variety of engineering settings.

Furthermore, Western'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 BSE 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.

The project-based degree programs of two major universities, Arizona State University and Cal Poly State University, have influenced the design of Western's proposed BSE program. Arizona State University has re-designed its BSE program[7] to produce an "agile engineer" who is a lifelong learner with a comprehensive set of skills appropriate to the needs of today and tomorrow. Core values include engaged-learning, agility, and a focus on the individual.

Cal Poly State University also promotes project-based learning in the BS General Engineering degree program[8]. The program is interdisciplinary and emphasizes problem-solving and a hands-on approach to education and partnership with industry.

[7] http://ee.fulton.asu.edu/undergraduate/degree-programs
[8] http://bmegene.calpoly.edu/about/

Similarly, Western proposes the development of responsive engineering curricula and provides the University with flexibility to respond to the needs of students, business, industry, and regional economic trends in a timely fashion, significantly enhancing the University's external engagement and regional development activities. The characteristics of the BSE, *i.e.*, project based learning, teamwork, project management, and engineering entrepreneurship, will produce a well-rounded engineering professional who is equipped for success over the course of a long professional career.

**Conclusion**

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 program responds to changing regional needs as well as serves the needs of students. 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.

B. Discuss potential program duplication and program competitiveness.

1. Identify similar programs offered elsewhere in North Carolina. Indicate the location and distance from the proposing institution. Include a) public and b) private institutions of higher education.
2. Indicate how the proposed new degree program differs from other programs like it in the University. If the program duplicates other UNC programs, explain a) why is it necessary or justified, and b) why demand (if limited) might not be met through a collaborative arrangement (perhaps using distance education) with another UNC institution. If the program is a first professional or doctoral degree, compare it with other similar programs in public and private universities in North Carolina, in the region, and in the nation.

Two universities in the UNC system offer the Bachelor of Science in Engineering degree: North Carolina State University (NCSU) and East Carolina University (ECU). NCSU is located in Raleigh, NC and is 280 miles from Western Carolina University; ECU is located in Greenville, NC and is 350 miles from Western Carolina University. NCSU offers a BSE with a concentration in Mechatronics on campus and in a joint program with the University of North Carolina-Asheville (UNCA). According to descriptive information on the UNCA website[9], "mechatronics engineering is a concentration of mechanical, electrical and computer engineering, focusing on the precision control of mechanical and machine systems". WCU does not contemplate ever offering a concentration in mechatronics so there will be no duplication with the UNCA/NCSU program.

East Carolina University offers a BSE with four different concentrations[10]. Systems engineering focuses on interdisciplinary tools to analyze the intricate relationships of

[9] http://www.unca.edu/ncsu_engr/index_jem.html
[10] http://www.tecs.ecu.edu/engineering/faq/#001

"systems." Engineering management provides skills in critical technology management systems such as project management, production, and logistics. Bioprocessing engineering involves engineering and operation of bioprocessing and pharmaceutical processing systems. Biomedical engineering produces interdisciplinary professionals that improve health care by contributing to the world's biological knowledge and facilitating the development of novel devices and drugs. WCU's program will reflect the demand for specific engineering skills in the Western region of the state. Concentration development and discontinuation will be based in large measure on 1) student demand, and 2) on-going surveys and focus group analyses of business and industry needs and trends. These studies will be conducted both by engineering faculty and by the staff of the Institute for the Economy and the Future at WCU.

C. Enrollment (baccalaureate programs should include only upper division majors, juniors and seniors).

Headcount enrollment - Show a five-year history of enrollments and degrees awarded in similar programs offered at other UNC institutions (using the format below for each institution with a similar program). Indicate which of the institutions you consulted regarding their experience with student demand and (in the case of professional programs) job placement. Indicate how their experiences influenced your enrollment projections.

Tables 1 and 2 below display the upper division enrollment and degrees awarded for Bachelor of Science in Engineering degree programs for NCSU and ECU.

| | CIP Code | Spr 02 | Fall 02 | Spr 03 | Fall 03 | Spr 04 | Fall 04 | Spr 05 | Fall 05 | Spr 06 | Fall 06 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NCSU | 140101 | 69 | 94 | 91 | 78 | 97 | 75 | 92 | 94 | 116 | 107 |
| ECU | 140101 | . | . | . | . | . | . | 1 | 9 | 16 | 32 |

**Table 1:** Upper Division Enrollment in BS Engineering Degree Programs

*Source:* UNC-GA ProgAssess/SDF.PR006/11JUN07

| | CIP Code | 2001-2002 | 2002 2003 | 2003-2004 | 2004-2005 | 2005-2006 |
|---|---|---|---|---|---|---|
| NCSU | 140101 | 8 | 9 | 2 | 9 | 8 |
| ECU | 140101 | . | . | . | . | . |

**Table 2:** Degrees Awarded in BS Engineering Degree Programs

*Source:* UNC-GA ProgAssess/SDF.PR006/11JUN07

The BSE at East Carolina University is a relatively new program, so Western contacted Dr. Paul Kauffmann, Chair of the Department of Engineering, to understand better the student demand and job placement history of the program. Initial enrollment in the program at ECU in Fall 2004 was 40 students with about 20-25 new students each year. The Fall 2007 class consisted of 100 freshmen. Job placement and retention information is not yet available.

Enrollment in BSE degree programs is heavily dependent on the concentration(s), or specialization(s) offered. In general, societal factors drive demand for engineering

graduates, and initial enrollment figures at ECU in the BSE program appear strong. The following tables detail predicted enrollment for the Western BSE based upon conservative estimates using historical data from other institutions, and the performance of broadly analogous programs at Western.

The chart below contains a four-year projection of student enrollment for the proposed BSE at Western. We assume all enrollments are full-time. Since the BSE with a representative EE concentration is unique in the UNC System, there is no prior information regarding student demand and program productivity for this example. 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. The steady-state headcount enrollment for this concentration after four years will be 75 full-time students.

| | Year 1 (2000-10) | Year 2 (2010-11) | Year 3 (2011-12) | Year 4 (2012-13) |
|---|---|---|---|---|
| Freshmen | 30 | 30 | 30 | 30 |
| Sophomore | | 20 | 20 | 20 |
| Junior | | | 15 | 15 |
| Senior | | | | 10 |
| **TOTALS** | 30 | 50 | 65 | 75 |

SCH production (upper division program majors, juniors and seniors *only*, for baccalaureate programs). Use the format in the chart below to project the SCH production for four years. Explain how SCH projections were derived from enrollment projections.

We have combined the enrollment projections from the table with the four-year curriculum guide to generate the SCH projections shown in the table that follows on the next page.

| | Total Credits | Year 1 Enroll | Year 1 SCH | Year 2 Enroll | Year 2 SCH | Year 3 Enroll | Year 3 SCH | Year 4 Enroll | Year 4 SCH |
|---|---|---|---|---|---|---|---|---|---|
| Freshman Year | | | | | | | | | |
| Level 1 credit | 20 | 30 | 600 | 30 | 600 | 30 | 600 | 30 | 600 |
| Level 2 credit | 0 | 30 | 0 | 30 | 0 | 30 | 0 | 30 | 0 |
| Level 3 credit | 8 | 30 | 240 | 30 | 240 | 30 | 240 | 30 | 240 |
| Level 4 credit | 5 | 30 | 150 | 30 | 150 | 30 | 150 | 30 | 150 |
| | | | | | | | | | |
| Sophomore Year | | | | | | | | | |
| Level 1 credit | 13 | | | 20 | 260 | 20 | 260 | 20 | 260 |
| Level 2 credit | 0 | | | 20 | 0 | 20 | 0 | 20 | 0 |
| Level 3 credit | 3 | | | 20 | 60 | 20 | 60 | 20 | 60 |
| Level 4 credit | 16 | | | 20 | 320 | 20 | 320 | 20 | 320 |
| | | | | | | | | | |
| Junior Year | | | | | | | | | |
| Level 1 credit | 6 | | | | | 15 | 90 | 15 | 90 |
| Level 2 credit | 0 | | | | | 15 | 0 | 15 | 0 |
| Level 3 credit | 3 | | | | | 15 | 45 | 15 | 45 |
| Level 4 credit | 23 | | | | | 15 | 345 | 15 | 345 |
| | | | | | | | | | |
| Senior Year | | | | | | | | | |
| Level 1 credit | 9 | | | | | | | 10 | 90 |
| Level 2 credit | 0 | | | | | | | 10 | 0 |
| Level 3 credit | 0 | | | | | | | 10 | 0 |
| Level 4 credit | 21 | | | | | | | 10 | 210 |
| | | | | | | | | | |
| Total Credits | 127 | | 990 | | 1630 | | 2110 | | 2410 |

**Table 3.** SCH projections

## III. PROGRAM REQUIREMENTS AND CURRICULUM

A. Program Planning.

1. List the names of institutions with similar offerings regarded as high quality programs by the developers of the proposed program.

a. Department of Engineering
Arizona State University at the Polytechnic Campus
Building #20, Room 110
7001 Williams Field Road
Mesa, AZ 85212-0180
Tel: 480-727-2727

The BSE degree program is a new initiative at the Polytechnic campus. The curriculum is project-based with a focus on realistic engineering problems.

b. College of Engineering
Michigan Technological University
1400 Townsend Drive
Houghton, Michigan 49931-1295
Tel: 906-487-2005

This BSE degree program allows students to pursue an "innovative and individualized path" to career objectives based on a solid engineering fundamentals core.

c. Department of Engineering
University of Tennessee at Martin
101 Johnson EPS Building
Martin, TN 38238
Tel: 731-881-7571

The BSE degree program rests on a broad engineering foundation and incorporates engineering design with hands-on engineering applications.

2. List other institutions visited or consulted in developing this proposal. Also discuss or append any consultants' reports, committee findings, and simulations (cost, enrollment shift, induced course load matrix, etc.) generated in planning the proposed program.

Western Carolina University reviewed the curricula of the 34 ABET-accredited BSE programs to determine those programs that offered a project-based engineering education and the nature of the current curricula. The three programs indicated above provide the most appropriate model for WCU's BSE program in reference to project-based learning.

B. Admission. List the following:

1. Admissions requirements for proposed program (indicate minimum requirements and general requirements).

Applicants to the Bachelor of Science in Engineering degree program will meet the general admission requirements of Western Carolina University. The University is open

to all qualified students without regard to race, sex, color, national origin, religion, age, sexual orientation, or disability.

**First-Year Students:** Admission to Western Carolina University and placement into courses and programs are based upon a variety of factors including courses taken in high school, rank in class, SAT or ACT scores, and high school grade point average. Applicants must be graduates of accredited high schools. Graduates of unaccredited high schools may satisfy entrance requirements by examination. The university reserves the right to require any conditions deemed necessary. Applications also are considered for admission from prospective students who have achieved high school graduation equivalency by means of tests of General Education Development (GED).

*Engineering Program Admission:* Freshmen and transfer students accepted into the University with the request to be in the engineering program will have their academic records further evaluated by the department. Based upon an overall evaluation of high school records and test scores, with particular emphasis on advanced courses in math and science and test scores, freshmen may be admitted to one of two tracks:

> FENG – Students with acceptable records will be accepted directly to the Freshman Engineering sequence.
>
> PENG – Students needing additional course work before being accepted into the Freshman Engineering sequence will be advised as pre-engineers.

Admission to the engineering program requires completion of all freshman year engineering program requirements with grades of C or better. Students from the FENG track must also have a minimum cumulative GPA of 2.00 for all courses taken. Students from the PENG track must have a minimum cumulative GPA of 2.50 for all courses taken.

In addition to the University requirements for continued enrollment, students in the engineering program must maintain a cumulative GPA of 2.0 for all courses in the engineering concentration.

2. Documents to be submitted for admission (listing or sample).

**University Entrance Examinations:** Freshman applicants must take the Scholastic Aptitude Test (SAT) or the American College Test (ACT). The achievement test in subject-matter fields is not required. For the SAT, application forms and information concerning the test fee, dates, and centers may be obtained from the College Board, P.O. Box 592, Princeton, New Jersey 08541. Information and application for the ACT may be obtained from The American College Test National Office, P.O. Box 168, Iowa City, Iowa 52243, and from high school guidance counselors. Students who elect to take only the ACT must take The Writing Test. Applicants must request that their scores be sent to the Office of Admissions, Western Carolina University, Cullowhee, North Carolina 28723. College code for the SAT is 5897 and ACT code is 3172.

**Secondary School Preparation:** The quality and content of the applicant's high school program are important. A good background in English, mathematics, foreign language, social studies, and natural sciences is recommended. Students with inadequate

preparation in English and mathematics, if admitted, will be required to complete additional work in these areas.

To be considered for any category of admission, students must have graduated from high school and successfully completed the following fifteen units of college preparatory courses in high school:

- 4 units of English
- 4 units of Math including 2 units of algebra, 1 unit of geometry or advanced math, 1 unit of math beyond algebra II
- 3 units of Science including 1 unit of a life or biological science, 1 unit of a physical science, 1 unit of an additional lab science
- 2 units of Social Studies including 1 unit in U.S. history
- 2 units of one language other than English

C. Degree requirements. List the following:
1. Total hours required. Major. Minor.
2. Proportion of courses open only to graduate students to be required in program (graduate programs only).
3. Grades required.
4. Amount of transfer credit accepted.
5. Other requirements (e.g., residence, comprehensive exams, thesis, dissertation, clinical or field experience, "second major", etc.).
6. Language and/or research requirements.
7. Any time limits for completion.

1. Coursework required for the BSE degree program totals 127 hours, consisting of a 42 hour Liberal Studies component, a 19 hour engineering core, a 32 hour Mathematics/Sciences component, and for the representative Electrical Engineering concentration component, 34 hours.

2. None of the courses in the BSE are cross-listed as graduate offerings.

3. Admission to the engineering program requires completion of all freshman year engineering program requirements with grades of C or better. Students from the FENG track must also have a minimum cumulative GPA of 2.00 for all courses taken. Students from the PENG track must have a minimum cumulative GPA of 2.50 for all courses taken.

   In addition to the University requirements for continued enrollment, students in the engineering program must maintain a cumulative GPA of 2.0 for all courses in the engineering concentration.

4. The amount of transfer credit awarded to transfer students in Engineering will be determined by the department. The amount of transfer credit is limited by the residency requirement that a minimum of 25 percent of semester hours applied toward a bachelor's degree must be earned through regular enrollment in Western Carolina University junior-senior level courses, including a minimum of twelve hours in junior-senior courses in the major field.

5. A minimum of 25 percent of semester hours applied toward a bachelor's degree must be earned through regular enrollment in Western Carolina University junior-senior level courses, including a minimum of twelve hours in junior-senior courses in the major field.

6. There are no specific foreign language requirements for the degree. Students are required to participate in project-based applied research projects that are embedded in the project-based learning curriculum. In addition, students are also encouraged to participate in faculty-led undergraduate research.

7. There is no time limit on the course work accepted for undergraduate transfer credit. However, students who plan to schedule courses with stated prerequisites should consider auditing the prerequisite courses if no work has been attempted in the field within the past five years.

D. List existing courses by title and number and indicate (*) those that are required. Include an explanation of numbering system. List (under a heading marked "new") and describe new courses proposed.

The course numbering system is quite traditional. For example, a 1xx is a freshman course, a 2xx is a sophomore course, and so on. There is no particular significance to the last two digits.

All courses listed below are required for engineering and for mathematics and sciences. No new courses are proposed for the representative concentration in Electrical Engineering.

**Engineering Core**

*ENGR 199 - Introduction to Engineering Practices and Principles I Credits: (3)
*ENGR 200 - Introduction to Engineering Practices and Principles II Credits: (2)
*ENGR 250 - Engineering Practices and Principles I Credits: (2)
*ENGR 300 - Professional Development Credits: (1)
*ENGR 350 - Introduction to Engineering Practices and Principles II Credits: (2)
*ENGR 400 - Engineering Capstone I Credits: (3)
*ENGR 450 - Engineering Capstone II Credits: (3)
*ENGR 461 – Engineering Project Management Credits: (3)

**Mathematics/Sciences Component**

*CHEM 139 General Chemistry, 4 hours
*MATH 153 Calculus I, 4 hours
*MATH 255 Calculus II, 4 hours
*MATH 256 Calculus III, 4 hours
*MATH 320 Ordinary Differential Equations, 3 hours
*MATH 370 Probability & Statistics I, 3 hours
*PHYS 230 Calculus Based Physics I, 4 hours
*PHYS 310 Modern Physics, 3 hours
*PHYS 322 Optics, 3 hours

**Electrical Engineering Concentration**

*EE 200 Computer Utilization in C++, 3 hours
*EE 201 Network Theory I, 3 hours
*EE 202 Network Theory II, 3 hours
*EE 211 Logic and Networks Laboratory, 1 hour
*EE 212 Instrumentation and Networks Laboratory, 1 hour
*EE 221 Logic Systems Design I, 3 hours
*EE 311 Systems and Electronics Laboratory, 1 hour
*EE 312 Electromagnetic and Electronic Devices Laboratory, 1 hour
*EE 321 Electromagnetic Fields, 3 hours
*EE 322 Electromagnetic Devices, 3 hours
*EE 331 Fundamentals of Electronics & Semiconductors, 3 hours
*EE 342 Solid State Electronic Devices, 3 hours
*EE 351 Systems Analysis I, 3 hours
*EE 411 Analog and Digital Communication, 3 hours

## FACULTY

A. List the names of persons now on the faculty who will be directly involved in the proposed program. Provide complete information on each faculty member's education, teaching experience, research experience, publications, and experience in directing student research, including the number of theses and dissertations directed for graduate programs. The official roster forms approved by SACS can be submitted rather that an actual faculty vita.

Dr. James Zhang, Interim Dean of The Kimmel School and Dr. Robert Adams, Associate Professor, are the two tenured Electrical Engineering faculty in the Department of Engineering and Technology. New Electrical Engineering faculty hired in August 2007 are Dr. Yeqin Huang, and Dr. Weiguo Yang. Faculty qualifications for these faculty are shown in the tables below.

### Faculty Qualifications

| Name/Department | Teaching Experience: Courses Taught | Academic Degrees | Other Qualifications |
|---|---|---|---|

| Name/Department | Teaching Experience: Courses Taught | Academic Degrees | Other Qualifications |
|---|---|---|---|
| Dr. James Zhang.<br>Interim Dean of The Kimmel School and Associate Professor<br>Dept. of Engineering & Technology | Western Carolina University- 8/2003 to present.<br>Hunan University- 1986 to 1990<br>.....<br>EET 331 Digital Integrated Circuits<br>TEL 495 Telecommunications Seminar<br>ET 190 Engineering Systems<br>TEL 312 Electronics Communications Fundamentals<br>TEL 444 Wireless Communications<br>ET 570 Telecommunications & Networking<br>ECET 479 Senior Projects<br>ENGR 199 Principles/Practices of Engineering<br>ET 603 Research Methods & Design of Experiments<br>EE 201 Network Theory I<br>EE 411 Analog & Digital Communication | Ph.D. 2002 Purdue University<br>MSE 1993 Purdue University<br>MA 1993 Indiana University<br>BSEE 1986 Hunan University, China | 1. Senior Member, IEEE since 2004<br>2. Reviewer for 11 publications<br>3. Fifteen refereed publications<br>4. Eighteen peer reviewed conference presentations<br>5. Advisor for three graduate student conference presentations<br>6. Five patents granted 2004-06; three pending patents<br>7. Participation in six funded proposals; approximately $450,000<br>8. Six unfunded proposals<br>9. Demonstrated teaching excellence<br>10. Coordinator of M.S. in Technology degree program |
| Dr. Robert Adams<br><br>Associate Professor<br>Dept. of Engineering & Technology | Western Carolina University – 8/2003 to present.<br><br>ENGR 199 Intro. To Engineering Practices & Principles<br>EE 212 Logic & Networks Lab<br>EE 311 Systems & Electronics Lab<br>EE 321 Electromagnetic Fields<br>EE 351 System Analysis I<br>EE 401 Senior Design I<br>EE 402 Senior Design II | Ph.D. 1979 University of Alabama<br>M.S. 1991 Johns Hopkins University<br>B.S. 1983 Clarkson University | 1. Senior Member, IEEE.<br>2. ASEE Member.<br>3. Eleven journal articles over past 6 years.<br>4. Knowledgeable in 6 programming languages.<br>5. IEEE Chapter Student Advisor.<br>6. Nine years of industrial professional practice. |

| Name/Department | Teaching Experience: Courses Taught | Academic Degrees | Other Qualifications |
|---|---|---|---|
| Dr. Weiguo (Bill) Yang<br>Assistant Professor<br>Dept. of Engineering & Technology | Western Carolina University- 8/2007 to present.<br>.....<br>EE 311 System & Electronics Lab<br>EE 465 Foundations of Laser Electronics<br>EE 401 Senior Project Proposal<br>EE 342 Solid State Electronic Devices<br>EE427 Foundations of Optical Imaging<br>EE402 Senior Project | Ph. D. 1999 Princeton University<br>M. A. 1997 Princeton University<br>M. S. 1995 University of Science and Technology of China, China<br>B. S. 1992 University of Science and Technology of China, China | 1. Senior Member, IEEE, since 2005<br>2. Member, Optical Society of America since 1998<br>3. Twenty-five refereed publications<br>4. Twenty-seven peer reviewed conferences presentations<br>5. Four U.S. patents and one Europe patent awarded, four U.S. patents pending<br>6. Seven years industrial research experience<br>7. Participation in two funded proposals; approximately $15 million. |
| Dr. Yeqin Huang<br>Assistant Professor<br><br>Dept. of Engineering & Technology | Western Carolina University, 8/2007-present.<br><br>Tulane University, 8/2003-6/2007<br>.....<br>(at WCU)<br>EE 321 Electromagnetic Fields<br>EE 322 Electromagnetic Waves<br>EE 211 Logic & Network Lab<br>EE 212 Instrument & Networks Lab<br>EE 436 Optical Fiber Communications<br>ENGR 199 Intro Eng Pract & Prin<br><br>(at Tulane)<br>ELEN 417/617 MEMS & RF Engineering<br>ELEN 201 Electric Circuits I<br>ELEN 202 Electric Circuits II<br>ELEN418/618 Antennas for Wireless Communications | Ph.D. 2003 University of Nebraska<br><br>M. Sc. 1985 Peking Univ., China<br><br>B.Sc. 1982 Peking Univ., China | 1. Senior Member, IEEE since 1999<br><br>2. Member, ASEE since 2003<br><br>3. Received two patents<br><br>4. Reviewer for IEEE AP, IEEE AP-Letter, J. of EM Waves and Applications |

B. Estimate the need for new faculty for the proposed program over the first four years. If the teaching responsibilities for the proposed program will be absorbed in part or in whole by the present faculty, explain how this will be done without weakening existing programs.

Because project based Electrical Engineering is the focus of the BSE degree, there is no need for new faculty for the BSE program. The BSEE that currently exists has the resources/courses needed for the proposed BSE. The BSEE will eventually be eliminated (once successful accreditation of the proposed BSE program is obtained).

C. If the employment of new faculty requires additional funds, please explain the source of funding.

As the program grows and generates more enrollment and SCHs, resources will be allocated as needed.

D. Explain how the program will affect faculty activity, including course load, public service activity, and scholarly research.

The new program will not affect the faculty activity, course loads, public service activity, and scholarly research. All of the electrical engineering courses in BSE currently exist and are taught regularly.

## V. LIBRARY

A. Provide a statement as to the adequacy of present library holdings for the proposed program.

Western Carolina University increased its library holdings in relevant areas when the BSEE was established, allocating more than $20,000 to increase the collections for engineering and optical science. In addition, new searchable databases were added to support the engineering and technology programs.

B. State how the library will be improved to meet new program requirements for the next five years. The explanation should discuss the need for books, periodicals, reference material, primary source material, etc. What additional library support must be added to areas supporting the proposed program?

The Department of Engineering and Technology currently receives approximately $10,000 each year to increase library holdings. The faculty and staff propose new books for each program area. This is adequate to maintain library support.

C. Discuss the use of other institutional libraries.

ABC Express is a document delivery service operated by the libraries of Appalachian State University, UNC-Asheville, and Western Carolina University. This service allows the delivery of a book, journal, or other library material within one to four days. Inter-library Loan is a service to obtain library materials that are not owned by Hunter Library at Western Carolina University or available from the network libraries at UNC-Asheville and Appalachian State University.

Western also has access to a wide variety of databases including LexisNexis Academic. This database contains journals and other publications of the Institute of Electrical and Electronics Engineers (IEEE) and the Institute of Electrical Engineers (IEE). Topics include electrical engineering, computer engineering, biometrics, homeland security, and telecommunications.

Other databases available include the ACM Digital Library which provides access to the full text of all articles published in the Association for Computing Machinery (ACM) journals, magazines, and conference proceedings.

## VI. FACILITIES AND EQUIPMENT

A. Describe facilities available for the proposed program.

Laboratories currently used for engineering technology, electrical and computer engineering technology and the electrical engineering joint program will be used for this BSE degree program. Existing laboratories within the Kimmel School are currently equipped with all necessary and appropriate test equipment to support the BSE with the representative concentration in Electrical Engineering. The following laboratories in the Kimmel School at Western are dedicated to engineering and technology:

Analog Electronics Laboratory
Automation Systems Laboratory
Communications and Optical Research Laboratory
Digital Electronics Laboratory
Digital Communications Laboratory
Embedded Computer Engineering Sensors Laboratory
Engineering Fabrication Laboratory
Engineering Technology Graphics Design Laboratory
Laser Machining Systems Laboratory
Machining Processes Laboratory
Optical Systems Laboratory
Polymer and Composite Materials Laboratory
Rapid Prototyping and Metrology Center
Senior Projects Laboratory
Telecommunications and Networking Laboratory

Several laboratories contain per-student bench-top computer workstations, and laptop computers are available to students for software applications. All classrooms and laboratories make use of wireless communication systems.

B. Describe the effect of this new program on existing facilities and indicate whether they will be adequate, both at the commencement of the program and during the next decade.

The current facilities are adequate for the BSE with the Electrical Engineering concentration over the next decade. To date, more than $5,000,000 received through federal grants has been spent on in-place laboratory resources that will support the BSE program.

C. Discuss any information technology services needed and/or available.

Currently we have more than 10 of the most predominant engineering software packages for students' use. Wired and wireless connections are available for students' access in the engineering building and classrooms. We also have the Virtual Computing Lab (VCL) that provides students access to engineering software applications from anywhere. All incoming students to Western Carolina University must have an appropriate, networkable computer. All engineering students must have a laptop that meets minimum requirements. We also have a dedicated IT specialist who provides IT services to the faculty and students. No additional information technology services are needed.

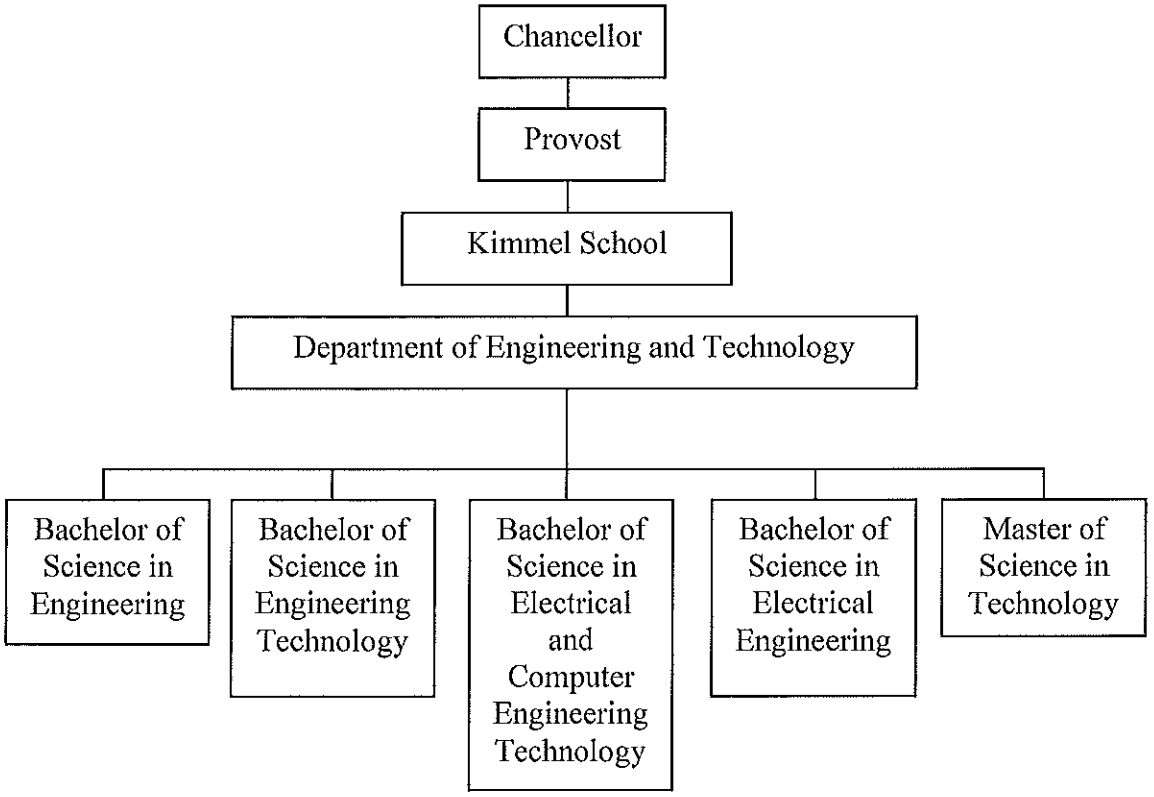
D. Discuss sources of financial support for any new facilities and equipment.

No new facilities are needed for this program.

## VII. ADMINISTRATION

Describe how the proposed program will be administered, giving the responsibilities for each department, division, school, or college. Explain any inter-departmental or inter-unit administrative plans. Include an organizational chart showing the "location" of the proposed new program.

The BSE program will be located in the Department of Engineering and Technology. The Department Head will supervise ongoing aspects of the program. This Department Head reports to the Dean of the Kimmel School of Construction Management and Technology who reports to the Provost for Western Carolina University.




## VIII. ACCREDITATION

Indicate the names of all accrediting agencies normally concerned with programs similar to the one proposed. Describe plans to request professional accreditation. If the proposed new degree program is at a more advanced level than those previously authorized or if it is in a new discipline division, was SACS notified of a potential "substantive change" during the planning process? If so, describe the response from SACS and the steps that have been taken to date with reference to the applicable procedure.

The appropriate accrediting body is the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology. The existing BSEE program received

accreditation from EAC of ABET in August 2011. The appropriate time frame for an accreditation visit for the BSE is Fall 2016.

The BSE is at the same level of the BSEE program in terms accreditation.

SACS has been informally informed of this program initiative. No concerns were brought to our attention.

## IX. SUPPORTING FIELDS

Are other subject-matter fields at the proposing institution necessary or valuable in support of the proposed program? Is there needed improvement or expansion of these fields? To what extent will such improvement or expansion be necessary for the proposed program?

The subject matter fields of mathematics and sciences are particularly crucial to this program. These fields have adequate resources to support this degree program.

## X. ADDITIONAL INFORMATION

Include any additional information deemed pertinent to the review of this new degree program proposal.

No additional information is necessary to review this degree program.

If approval for this proposal to establish is granted prior to January 31, 2012, Western is prepared to offer the degree to incoming students beginning in Fall 2012.

## XI. BUDGET

As previously expressed in this document, faculty resources, existing facilities, and library resources are adequate for the BSE degree program. Consequently, no additional resources are being requested for the program.

## XII. EVALUATION PLANS

All new degree program proposals must include an evaluation plan which includes:
(a) the criteria to be used to evaluate the quality and effectiveness of the program, (b) measures to be used to evaluate the program), (c) expected levels of productivity of the proposed program for the first four years of operation (number of graduates), (d) the names, addresses, e-mail addresses, and telephone numbers of at least three persons (six reviewers are needed for graduate programs) qualified to review this proposal and to evaluate the program once operational, and (e) the plan and schedule to evaluate the proposed new degree program prior to the completion of its fifth year of operation once fully established.

### PROGRAM EVALUATION FORMAT

A. Criteria to be used to evaluate the proposed program:

EAC of ABET program criteria will be used to evaluate the proposed BSE program including assessing student outcomes. The assessment plan for the BSEE, which resulted in successful accreditation, will be used as the framework for the proposed BSE program.

B. Measures to be used to evaluate the program:

Western Carolina University requires all academic programs to conduct annual program assessments. In addition, the university also conducts program reviews every five years. This program review process is in conjunction with the accreditation process involving external evaluators.

EAC of ABET requires evaluation of program outcomes and program educational objectives. Assessment data will be gathered for both outcomes and objectives and further evaluated to determine the level of attainment of outcomes and objectives. A self-study will be generated during the year prior to an ABET visit. The self-study will include the data generated from the assessment process. An EAC of ABET team will visit the campus, use the self-study, and meet with various constituents on campus. The ABET team will report the findings based on the accreditation criteria.

C. Projected productivity levels (number of graduates):

| Year 1 | Year 2 | Year 3 | Year 4 |
|---|---|---|---|
| 0 | 0 | 0 | 10 |

D. Recommended consultant/reviewers: Names, titles, addresses, e-mail addresses, and telephone numbers. May not be employees of the University of North Carolina.

Dr. Rich Helgeson, Chair
Department of Engineering
University of Tennessee at Martin
101 Johnson EPS Building
Martin, TN 38238
Tel: 731-881-7571
Email: helgeson@utm.edu

Amy Monte
College of Engineering
Michigan Technological University
1400 Townsend Drive
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Tel: 906-487-2005
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Dr. Massood Towhidnejad
Professor & Department Chair
Computer & Software Engineering
Embry-Riddle Aeronautical University
600 South Clyde Morris Blvd.
Daytona Beach, FL 32114
Tel: 386-226-6891
Email: towhid@erau.edu

E. Plan for evaluation prior to fifth operational year.

A program assessment plan as required by EAC of ABET will be in place prior to enrollment of the freshman class. Assessment activities will be ongoing prior to the fifth

operational year based on WCU's program assessment process (see B above). Complete program evaluation will occur during the fifth year with graduates in the field, in accordance with ABET's criteria.

## XIII. REPORTING REQUIREMENTS

Institutions will be expected to report on program productivity after one year and three years of operation. This information will be solicited as a part of the biennial long-range planning revision.

Proposed date of initiation of proposed degree program: Fall 2012[11]

This proposal to establish a new degree program has been reviewed and approved by the appropriate campus committees and authorities.

**Chancellor:** David O. Belcher

[11] If approval for this proposal to establish is granted prior to January 31, 2012, Western is prepared to offer the degree to incoming students in Fall 2012.