PROGRAM PLANNING SUMMARY

Proposing Institution: South Carolina State University

Program Title: Bachelor of Science in Industrial Engineering

Date of Submission: June 13, 2014

APPROVED: T J Elzey 6/10/14
Thomas J. Elzey, President

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2. Classification

Program Title:	Bachelor of Science in Industrial Engineering
Concentrations/Options/Tracks:	None
Designation, Type, and Level of Degree:	Bachelor of Science in Industrial Engineering Four-year undergraduate
Proposed Date of Implementation:	Fall Semester, 2015
CIP Code:	143501
Site:	South Carolina State University, Orangeburg, SC
Program Designation:	Bachelor of Science
Qualifies for Supplemental Palmetto Fellows Scholarship and LIFE Scholarship Awards:	Yes
Delivery Mode:	Traditional

3. Justification

South Carolina State University proposes to transition its Industrial Engineering Technology degree program (BSIET) to a full Bachelor of Science in Industrial Engineering (BSIE) program. There are compelling reasons for this move. The current BSIET graduates are performing exceptionally well in Industrial Engineering (IE) graduate programs (e.g. at Clemson University and at Florida International University) and are successfully performing actual IE work in industry. This clearly indicates that the current BSIET program is already producing BSIE quality graduates. State law has changed with respect to licensing BSIET graduates. In 2020, Engineering Technology graduates will be prohibited from becoming licensed as Professional Engineers (PE) in the state of South Carolina (Department of Labor, Licensing and Regulation Board of Registration for Professional Engineers and Surveyors, Chapter 49, Article 2). This means that any Engineering Technology major who graduated with a bachelor's after 2012 can never become licensed as a PE in this state with only that degree. New industries, such as Boeing, Amazon and BMW have moved into South Carolina. These industries are demanding a diverse work force. Experience has shown that industry prefers *Engineering* graduates over *Engineering Technology* graduates; and some industries will not hire Engineering Technology graduates at all, especially in South Carolina. Employed IET graduates of SC State consistently recommend a change from the BSIET program to full BSIE program. Movement to full Engineering programs has been endorsed by the Board of Registration for Professional Engineers and Surveyors and major state industries. In South Carolina, there is only one accredited BSIE program offered by Clemson University, 173 miles away. Recently, Francis Marion University (94 miles away) started offering a BSIE degree program in 2014, but it is housed within the Physics department and is not a stand-alone program.

4. Program Demand and Productivity

It is anticipated that the BSIE program will achieve an enrollment of 35 students by its fourth year. This will include new students as well as some of the students who will transfer from the current BSIET program, which enrolled 18 students in Fall 2013. Conservatively, at least 12 of those students are expected to graduate after the fourth year of the program. Fifty percent of those graduates would be those students who transferred from the BSIET program.

5. Employment Opportunities for Graduates

The Bureau of Labor Statistics Occupational Outlook Handbook points out:
"Employment of industrial engineers is projected to grow 5 percent from 2012 to 2022. . . .This occupation is versatile both in the nature of the work it does and in the industries in which its expertise can be put to use. In addition, because industrial engineers' work can help with cost control by increasing efficiency, these engineers are attractive to employers in most industries, including nonprofits. Because they are not as specialized as other engineers, industrial engineers are employed in a wide range of industries, including major manufacturing industries, hospitals, consulting and engineering services, and research and development firms." http://www.bls.gov/ooh/architecture-and-engineering/industrial-engineers.htm#tab-6

The website www.indeed.com lists 503 industrial engineer jobs currently available in South Carolina. These jobs are at some of the following companies: G. E. Healthcare, Belcan TechServices, URS Corporatio, RBC Bearings, Pioneer Metal Finishing, Bosch Rexroth Corporation. EGS Inc., aeSolutions, Composite Resources, Michelin North America, Mar Mac Protective Apparel, Boeing Industries, Eaton, Georgia IT Inc., Eaton, Ross Stores Inc., RCI, Robert Bosch LLC, and Google.

6. Curriculum

All the courses for the BSIE curriculum have been developed. The curriculum is outlined below.

South Carolina State University Industrial Engineering Program (Total Credits: 129)				
Freshman Year - First Semester			**Freshman Year -Second Semester**	
Course	Credit		Course	Credit
E 150 English Composition & Comm.	3		E 151 English Composition & Comm.	3
M 153 Calculus I	3		M 163 Calculus II	3
ENGR 150 Mech. Drawing & Basic CAD	3		S 250 Public Speaking	3
ENGR 170 Intro. to Eng. Technology	3		C 150 General Chemistry I	3
PSY 250/SOC 250 (H*)	3		C 151 General Chemistry I Lab	1
UNIV 101 Intro. to Univ. Comm.	2		H 250/H 251 World History (H*)	3
Total	**17**		**Total**	**16**
Sophomore Year - First Semester			**Sophomore Year -Second Semester**	
Course	Credit		Course	Credit
M 237 Calculus III	3		C 152 General Chemistry II (L*)	3
P 254 General Physics I w/Calculus	3		C 153 General Chemistry II Lab (L*)	1

P 251 General Physics I Lab	1		P 255 General Physics II w/Calculus	3
ARTS 250/MU 250 (H*)	3		P 253 General Physics II Lab	1
E 250/E 251 World Literature (H*)	3		IE 201 System Design	3
ETS 250 (H*)	3		IE 252 Industrial Statistics I	3
ENGR 212 Statics	3		ENGR 213 Strength of Materials	3
Total	**19**		**Total**	**17**

Junior Year - First Semester			**Junior Year - Second Semester**	
Course	**Credit**		**Course**	**Credit**
EE 230 Circuit Analysis	3		IE 355 Simulation Modeling (I*)	3
IE 368 Professional Practice in IE	1		IE 353 Intro. To Mfg. Systems Eng.	3
ENGR 255 Engineering Economic Analysis	3		IE 357 Industrial Operations Research I	3
ENGR 310 Engineering Computing (E*)	3		IE 356 Plant Layout and Material Handling	3
IE 352 Industrial Statistics II (I*)	3		EE 233 Circuits Laboratory	1
IE 354 Motion and Time Study	3		M 403 Differential Equations	3
Total	**16**		**Total**	**16**
Senior Year - First Semester			**Senior Year - Second Semester**	
Course	**Credit**		**Course**	**Credit**
IE 440 Decision Support System in IE	3		IE 460 Technical Project	3
IE 452 Statistical Quality Control	3		MGT 316 Database Management Systems	3
IE 458 Human Factors Engineering	3		ENGR 313 Dynamics	3
IE 454 Industrial Operations Research II	3		IE 456 Production and Inventory Control	3
IE 457 Facility Location	3			
IE 459 Technical Project Proposal	1			
Total	**16**		**Total**	**12**

7. Articulation and Inter-Institutional Cooperation

SC State already has articulations for transfers with Midland Technical College, Aiken Technical College, and Greenville Technical College for its BSIET program. Those course transfer agreements are still relevant.

8. Estimated Costs and Source of Financing

The existing faculty, staff, and infrastructure of the BSIET program at will be used to implement the new Industrial Engineering program. There will be no required additional costs in terms of faculty, buildings, or other resources in order to create the new BSIE program at South Carolina State University. All expenditures will constitute reallocation of E&G funds.