Program Planning Summary

Bachelor of Science in Industrial Engineering

to be offered by

Francis Marion University

Luther F. Carter, President

July 15, 2012

Program Planning Summary
for Bachelor of Science in Industrial Engineering
offered by Francis Marion University

I. Name of Proposed Program: Bachelor of Science in Industrial Engineering
II. Academic Unit: Francis Marion University Department of Physics and Astronomy
III. Designation, Type, and Level of Degree: New Program Planning Summary, Four-year Undergraduate Program, Bachelor of Science in Industrial Engineering
IV. Number of Credit Hours in Program: 122
V. Proposed Date of Implementation: January 2014
VI. CIP Code: 14.3501
VII. Delivery mode: Traditional
VIII. LIFE/PFS Enhancement: Yes, as a STEM program
IX. Program Description
Francis Marion University requests approval of a Bachelor of Science in Industrial Engineering degree that will be offered under a Memorandum of Agreement with Florence Darlington Technical College (FDTC). Students in the Industrial Engineering program at FMU will use laboratory facilities at the FDTC Southeastern Institute of Manufacturing and Technology (SiMT) campus. The program will incorporate quantitative systems design and management that can be applied to a broad range of industry and business enterprises.

X. Justification of Need
A well-educated workforce is necessary to attract industry to the Pee Dee region where unemployment is higher than the state average. Government officials and industry leaders have repeatedly urged FMU to offer an engineering program. There is no engineering program in the Pee Dee region and the only Bachelor of Science in Industrial Engineering program is offered by Clemson University, approximately 200 miles away.

A survey of local companies and local government agencies have produced the following data from 28 responses to date:

1. 10 of the 28 employ industrial engineers.
2. All of the 10 who employ IEs attempt to hire engineers on a regular basis, offering up to 30 positions annually.
3. Respondents noted problems in hiring and retaining IEs and other engineers because of a shortage of engineers in the region and difficulty in getting engineers to relocate to the Pee Dee area.
4. 15 of the 28 reported that they would be willing to provide internships or provide opportunities for senior design projects.
5. 11 of the 28 project an increasing demand for engineers.
6. 8 of the 28 would be willing to have employees study industrial engineering at FMU.
7. 4 of the 28 volunteered to serve on an advisory board.

The survey of employers produced the following anecdote that captures the need for industrial engineers in the Pee Dee region. The Human Resources manager of an automotive parts manufacturer with a production facility located in Mullins, SC phoned specifically to explain that he was excited to learn that FMU was considering an industrial engineering program. However, for his company, the initiative came too late. The company is closing its operations in South Carolina with one of the primary reasons being the lack of industrial engineers. The closure of the facility in Mullins will eliminate jobs in Marion County, which in May 2012 had an unemployment rate of 17.1% (the highest in the state of South Carolina).

The Bureau of Labor Statistics Occupational Outlook Handbook (accessed July 2012) states the following about industrial engineering: "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."
The proposed industrial engineering program will help meet the demand in the region and the state for workers with this degree.

XI. Anticipated Program Demand and Productivity

A graduation rate of 15 students per year is the anticipated goal of the program. The FMU Department of Physics and Astronomy has tracked a large number of students who have indicated an interest in engineering. For example, the occupational and educational interests of 300 high school students attending an advanced placement calculus practice exam at FMU were surveyed in May 2012 and 23% indicated an interest in studying engineering.

According to the Bureau of Labor and Statistics (May 2011) there are 4,780 industrial engineers in South Carolina with a mean salary $74,770, with 180 of these working in Florence and Darlington counties. Our survey results and other communications indicate that there is currently an undersupply of industrial engineers in the Pee Dee region. Despite the local shortage some major companies have recently established plants in the region but it is essential that they have an educated workforce in the future to maintain their presence. The addition of this industrial engineering program will strengthen the economic growth of the Pee Dee.

XII. Assessment of Extent to which the Proposed Program Duplicates Existing Programs in the State

As previously noted, in the state of South Carolina only one public university offers a baccalaureate degree in Industrial Engineering similar to the program proposed by Francis Marion University. This program is located at Clemson University.

XIII. Relationship of the Proposed Program to Existing Programs at the Proposing Institution

In cooperation with South Carolina's Technical Colleges, FMU offers Bachelor of Science degrees in Civil and Electronic Engineering Technology.

The proposed industrial engineering degree program will be housed within the Department of Physics and Astronomy and will incorporate courses from Physics, Mathematics, and Business. Thus it will draw on existing resources and expertise at FMU while adding new faculty and new courses for the industrial engineering curriculum. A highly-qualified program consultant is advising FMU about courses, faculty, and accreditation requirements.

XIV. Relationship of the Proposed Program to Other Institutions via Inter-institutional Cooperation

The proposed program will be offered in cooperation with Florence-Darlington Technical College. Laboratory experiences in materials and manufacturing processes will take place at the Southern Institute for Manufacturing Technology (SiMT) facility at FDTC. The faculty and administration at FDTC fully support the proposed industrial engineering program and a Memorandum of Agreement between FMU and FDTC will be signed and included as part of the program approval process.

XV. Curriculum

The proposed program will require a minimum of 122 hours at Francis Marion University, which will include the Engineering curriculum as well as the University's General Education requirements. The table below summarizes these hours with new engineering courses in bold:

Freshman

Fall semester	*Hours*	*Spring semester*	*Hours*
Calculus I, Math 201	*3*	*Calculus II, Math 202*	*3*
Technical Physics, Phys 200	*4*	*Technical Physics, Phys 201*	*4*
General Chemistry, Chem 101	*4*	*Composition III, Eng 200*	*3*
Composition II, Eng 112	*3*	***Introduction to IE ENGR 101***	*3*
		Engineering Graphics (CAD) ENGR 201	*3*
Total semester hours	*14*	*Total semester hours*	*16*

Sophomore

Fall semester	*Hours*	*Spring semester*	*Hours*
Calculus III, Math 203	*3*	*Linear Algebra, Math 304*	*3*
Technical Physics, Phys 202	*4*	*Multivariate Calculus, Math 306*	*3*
Literature (any)	*3*	*Intro to Microeconomics Econ 203*	*3*
Computational Methods, Phys 220	*3*	***Engr. Science-Materials ENGR 220***	*3*
Mechanics, ENGR 301	*3*	***Production & Operations Man., ENGR 355***	*3*
Total semester hours	*16*	*Total semester hours*	*15*

Junior

Fall semester	*Hours*	*Spring semester*	*Hours*
Intro to Macroeconomics Econ 204	*3*	*Speech, Spco 101*	*3*
History (any)	*3*	*Art/Music/Theatre Appreciation 101*	*3*
Electronics, ENGR 310	*4*	*Biology (any)*	*4*
Workplace Data A&A ENGR 320	*3*	***Engineering Economy ENGR 330***	*3*
Manufacturing Processes ENGR 350	*4*	***Operations Research ENGR 373***	*3*
Total semester hours	*17*	*Total semester hours*	*16*

Senior

Fall semester	*Hours*	*Spring semester*	*Hours*
Political Science, Pol 101	*3*	*Humanities Elective*	*3*
Business Writing, Eng 305	*3*	***Quality Control, ENGR 356***	*3*
Human Factors Engr., ENGR 420	*3*	***Facility Design, ENGR 470***	*3*
Supply Chain Design, ENGR 467	*3*	***Senior Design, ENGR 480***	*4*
Production planning, ENGR 468	*3*		
Total semester hours	*15*	*Total semester hours*	*13*
		TOTAL PROGRAM	*122*

XVI. Total New Costs Associated with Implementing the New Program

A. Personnel Budget: 2 new tenure track faculty with terminal degrees in engineering: $210,000 including fringe benefits.

B. Equipment and materials: Initial software and laboratory equipment is anticipated to cost $50,000. The annual operating budget to cover other costs is projected at $60,000 per year.

C. Facilities: No additional facilities required as the engineering labs will use existing laboratory space in the SiMT facility and existing labs and classrooms at FMU.

D. Revenue: FMU will provide initial startup support for the program and subsequently after 3 years the program will be sustained by tuition.