### The University of South Carolina Aiken Substantive Change Prospectus

#### New Academic Program – Bachelor of Science in Industrial Process Engineering Program is planned to initiate August 2015

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#### Authorized degrees and majors at the University:

Master of Education Educational Technology

Master of Science Applied Clinical Psychology

Master of Business Administration

Bachelor of Arts Biology Communications English Fine Arts History Music Education Political Science Psychology Sociology

Bachelor of Arts in Education Early Childhood Education Elementary Education Middle Level Education Secondary Education

Bachelor of Arts in Interdisciplinary Studies Interdisciplinary Studies

Bachelor of Arts in Special Education Special Education

Bachelor of Science Biology Chemistry Exercise and Sports Science Math and Computer Science Industrial Mathematics Psychology

Bachelor of Science in Business Administration

Business Administration

Bachelor of Science in Education Secondary Education

Bachelor of Science in Interdisciplinary Studies Interdisciplinary Studies

Bachelor of Science in Nursing Nursing

### Programs related to the new program:

Bachelor of Science in Industrial Mathematics Pre-Engineering Program

### Institutional Strengths in Support of the Proposed Program:

- 20 years of offering freshman and sophomore curriculum of a general engineering program
- Strong ties to the local business and industry community including Savannah River National Laboratory, Savannah River Nuclear Solutions, Savannah River Remediation, BAE Systems, Kimberly-Clark, Tognum America Inc., URS, and Bridgestone.
- Nationally recognized Veteran and Military Student Success Center
- Established experiential learning opportunities with local and global employers
- MOU with the University of Central Lancashire in England

### List of all approved off-campus sites:

The University of South Carolina Aiken is approved to offer its Bachelor of Arts in Education degree program on the University of South Carolina Salkehatchie campus and a Bachelor of Science in Business Administration on the University of South Carolina Sumter campus. Both the Sumter and Salkehatchie campuses are two-year regional branch campuses of the University of South Carolina Columbia.

University of South Carolina Salkehatchie 465 James Brandt Blvd Allendale, SC 29810

University of South Carolina Sumter 200 Miller Rd Sumter, SC 29150

### 1. ABSTRACT

The proposed change is to add a Bachelor of Science degree in Industrial Process Engineering (CIP code 14.3501) to the institution's roster of program offerings. The program builds upon more than 20 years of offering the first two years of an Engineering program, and input from an engaged local community of high tech companies who helped develop the curriculum. This undergraduate degree is designed to prepare engineering students to have the technical knowledge and skills in mathematics, science, engineering and management to analyze and solve problems in today's team oriented business environment. Students will be provided multiple opportunities to apply knowledge and skills learned in the classroom and laboratory to real world settings. The projected date of implementation is August 2015. In the initial 2015-16 academic year, the expected enrollment in the program is 90 students with growth to a projected on-going enrollment of 102 students by 2016-17. The program will occur on the University of South Carolina Aiken main campus using a traditional face-to-face instructional delivery.

### 2. BACKGROUND INFORMATION

USC Aiken was founded in 1961 as a result of the local community coming together to ask the state legislature to approve a degree granting institution to meet the needs of the area. Since it opened its doors, USC Aiken has developed into a comprehensive liberal arts institution committed to active learning through excellence in teaching, faculty and student scholarship, research, creative activities, and service. The University offers degrees in the arts and sciences and in the professional disciplines of business, education, and nursing. All courses of study are grounded in a liberal arts and sciences core curriculum. USC Aiken also encourages interdisciplinary studies and collaborative endeavors. As a community based institution, USC Aiken strives to meet the needs of the community.

Historically, there has been a significant demand for engineering degree opportunities among non-traditional students who are employed in the Central Savannah River Area. Recognizing this demand, USC Aiken has for more than twenty years offered a schedule of engineering courses which includes evening study at the freshman and sophomore levels. After completion of the courses that are available at the Aiken campus, both non-traditional and traditional students are faced with the need to continue their degree programs through daytime study at USC Columbia or some other institution that has a four year degree, a situation that usually presents the students with unsolvable logistic and financial problems. Traditional and non-traditional students who, due to financial, family, or other circumstances, are unable to relocate also find themselves with no alternative means of earning an engineering degree. We also believe that students educated in Aiken are more likely to stay in Aiken for their career in engineering.

The Bachelor of Science in Industrial Process Engineering program would play a key role in advancing the first goal of a recently revised strategic plan. Among other worthy goals, "USCA - Forward Together" (see Appendix A for a copy of the report) envisions a new emphasis on degree programs which serve the needs of industries in our market region. As a regional, comprehensive university, part of the mission (see Appendix B) of the University of South Carolina Aiken is "to provide quality undergraduate education as well as an array of graduate programs that meet the specific needs of citizens in its region."

The proposed program has been reviewed and approved by all of the internal and external oversight committees and boards. The University of South Carolina System, within which the University of South Carolina Aiken is a senior institution, has two oversight boards that

must provide approval of academic programs: the USC Board of Trustees and the South Carolina Commission on Higher Education. Legal authority of the Board of Trustees of the University of South Carolina was established by virtue of Sections 59-117-10 et seq, Code of Laws of South Carolina (1976), as amended (Appendix C). As indicated in the USC Board of Trustees Bylaws (Appendix D), the USC System consists of a main campus in Columbia, three senior campuses (USC Aiken, USC Beaufort, and USC Upstate) and four regional campuses (USC Lancaster, USC Salkehatchie, USC Sumter and USC Union).

The South Carolina Code of Laws, Title 59, Chapter 103, Section 59-103-35 (Appendix E) stipulates that all South Carolina college and university programs require oversight approval from the South Carolina Commission on Higher Education.

Currently, USC Aiken offers a Bachelor of Science in Industrial Mathematics on its campus that is related to the proposed program. The program will reside within the Department of Mathematical Sciences. In addition to administrative support from the Dean of the College of Sciences and the Chair of the Department of Mathematical Sciences, an Engineering faculty member will serve as the program's coordinator.

### 3. ASSESSMENT OF NEED AND PROGRAM PLANNING/APPROVAL

Over the past several years Aiken County has developed into a technology center for business and government. The listing of businesses in the area that depend on technology include Savannah River National Laboratory, Savannah River Nuclear Solutions, Savannah River Remediation, Tognum America Inc., BAE Systems, South Carolina Gas and Electric; Kimberly-Clark's Consumer Health Services; Bridgestone Passenger and Truck Tire Facility; AGY Materials Corporation; Shaw Industries; Washington Safety Management Solutions Corporation; Hubbell Power Systems; and Harvey Ignition Systems Engineering Corporation. Collectively these industries employ over 16,000 individuals and each industry is driven by its technology innovations, which come from the employment of its engineering and scientific staff.

In Fall 2012, USC Aiken conducted a visioning process that involved over 700 stakeholders in the region. The purpose of the visioning process was to get input from stakeholders on what USCA does well, where it can improve, and where it should go in the future. Through the visioning process seven themes occurred: grow the university, increase program/degree offerings, increase faculty/staff salaries, market the university more widely, improve the current funding/budget situation, improve community relations/increase partnerships, and revamp the current administrative/governance structure. Within each of these themes, numerous recommendations were made. For the increase program/degree offerings theme, an undergraduate engineering program was the top recommendation for every constituent group (i.e., students; faculty; administrators; and business, industry, and community leaders).

That same semester, USC Aiken hired Carnegie Communications to do a productivity demand study and an environmental scan for a series of possible degree programs, one of which was engineering. According to the study -- which drew heavily from the Bureau of Labor Statistics Occupational Employment Statistics Classification system -- over the next 10 years, 68,000 new engineering jobs and 38,000 replacement jobs will become available. In the Central Savannah River Area, the Carnegie study indicates that there will be an estimated 333 engineering job openings (114 new, 219 replacement). Potential employers for our graduates will be URS Corporation, Savannah River Remediation, Energy Solutions, BUNTY LLC Engineered Solutions, Savannah River Nuclear Solutions, Southeastern Clay

Company, Kimberly Clark, Bridgestone Tire, AGY Materials, Shaw Industries, and Tognum America, to name a few.

A job search conducted on November 8, 2013 through Careerbuilder.com indicates more engineering related job openings as predicted by the Bureau of Labor Statistics. A search on that website yielded the following results:

Job Prompt	CSRA	South Carolina	Georgia	North Carolina
Industrial Engineer	8	181	270	171
Process Engineer	39	415	879	466
Mechanical Engineer	19	211	269	173

A search on the Accreditation Board for Engineering and Technology (ABET) program listing site indicates that there are 97 institutions within the United States that offer Industrial Engineering at the undergraduate level. Clemson is the only institution in South Carolina that is listed. There are two institutions in North Carolina (North Carolina Agricultural and Technical State University and North Carolina State University in Raleigh) and one institution in Georgia (Georgia Institute of Technology). A search of the Southern Regional Education Board's Academic Common Market yielded no results for industrial engineering.

Apart from Clemson's ABET accredited Industrial Engineering program, Francis Marion University was approved for an Industrial Engineering program this past year. Of the two programs, Francis Marion's program is of similar size and scope to what is being proposed by the University of South Carolina Aiken. Because of the geographic distance between our campuses and the emphasis of regional recruitment, we don't believe we will be in direct competition.

In keeping with its history as a community focused institution, an engineering advisory group made up of engineer leaders in businesses such as Savannah River National Laboratory, Savannah River Nuclear Solutions, Savannah River Remediation, BAE Systems, Kimberly-Clark, Tognum America Inc., URS, and Bridgestone was formed in Fall of 2012. The charge assigned to this group was to help develop a program whose graduates they would want to hire for their businesses. This group aided in the development of the proposed baccalaureate industrial process engineering program in the 2012-13 academic year. The result was the development of the Industrial Process Engineering Program with a mission to prepare engineering students who have the technical knowledge and skills in mathematics, science, engineering and management to analyze and solve problems in today's team oriented business environment. Through a rigorous curriculum students will be provided multiple opportunities to apply knowledge and skills learned in the classroom and laboratory in real world settings.

This same committee also suggested the name of the degree. They felt it was important for the title to describe not only the course topics but the career destinations of our graduates. The industrial process engineers will be prepared to oversee, develop, enhance, and design processes found in industry relating to people, products, economics, and knowledge. The title for the degree indicates learning to achieve knowledge in the processes of industry from multiple viewpoints: mechanical, manufacturing, and business.

Based on indications of student interest and enrollment in our current pre-engineering program that averages 100 students each year, a conservative estimate of the number of students to be enrolled in the program are given in Table A.

Table A - PROJECTED TOTAL ENROLLMENT									
	FA	LL	SPR	ING	SUMMER				
YEAR	Headcount	Credit Hours	Headcount	Credit Hours	Headcount	Credit Hours			
2015-16	90	1575	90	1525	0	0			
2016-17	102	1755	102	1705	0	0			
2017-18	102	1755	102	1705	0	0			
2018-19	102	1755	102	1705	0	0			
2019-20	102	1755	102	1705	0	0			

Based on surveying our students, we are making an assumption that approximately 60% of the sophomores will continue with us for their junior year; then most of those will succeed and continue to the senior year.

Year 1 - 50 freshman, 25 sophomores, 15 juniors

(assumes 15 current sophomores in pre-engineering stay with the program)

Year 2 – 50 freshman, 25 sophomores, 15 juniors, 12 seniors

Year 3 – 50 freshman, 25 sophomores, 15 juniors, 12 seniors

Year 4 - 50 freshman, 25 sophomores, 15 juniors, 12 seniors

Year 5 - 50 freshman, 25 sophomores, 15 juniors, 12 seniors

We do not expect many, if any, transfers from other programs on campus. Similarly, we do not expect an influx of many transfer students into the program; principally because there are only two other programs in Industrial Engineering in the State.

The proposed program has been reviewed and approved by all of the internal and external oversight committees and boards:

USCA Chancellor's Cabinet: *approved September 25, 2013* USCA Department of Mathematical Sciences: *approved January 13, 2014* USCA Academic Council: *approved March 4, 2014* USCA University Planning Committee: *approved March 17, 2014* USCA Courses and Curricula Committee: *approved March 17, 2014* USCA Faculty Assembly: *approved April 2, 2014* USCA Chancellor: *approved April 2, 2014* USC System Provost: *approved February 27, 2014* USC System President: *approved March 3, 2014* USC System Academic Affairs and Faculty Liaison Committee: *approved March 28, 2014*  USC System Board of Trustees: *approved April 25, 2014* South Carolina Commission on Higher Education (SC-CHE): *approved February 5, 2015* 

Copy of minutes and letters showing consideration and approval by the Chancellor's cabinet, Faculty Assembly, the USC System Board of Trustees and SC-CHE are provided in Appendix H.

### 4. DESCRIPTION OF THE CHANGE

The Industrial Process Engineering program has a structured curriculum that will provide an opportunity for local high school students and technical college students to participate in a local 4-year engineering program; address a need as identified by local businesses and industries; and aid the economic development of the CSRA by providing a program that can help attract and retain industries and engineers. The program's educational objectives are to:

- 1. Provide students with the technical knowledge and skills in mathematics, science, and engineering to analyze and solve problems;
- 2. Provide engineering students with a strong liberal arts background;
- 3. Provide students with practical experience and organizational skills, enabling them to interact and communicate both orally and in writing to others; and
- 4. Provide students with the skills to work effectively in cross-functional team environments.

With respect to student learning outcomes, upon completion of the program, students will:

- 1. Be able to apply knowledge of mathematics, science, and engineering;
- 2. Be able to design and conduct experiments, as well as to analyze and interpret data;
- 3. Be able to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability;
- 4. Be able to function on multidisciplinary teams;
- 5. Be able to identify, formulate, and solve engineering problems;
- 6. Demonstrate an understanding of professional and ethical responsibility;
- 7. Be able to communicate effectively;
- 8. Understand the impact of engineering solutions in a global, economic, environmental, and societal context;
- 9. Recognize the need for engaging in life-long learning;
- 10. Demonstrate a knowledge of contemporary issues; and
- 11. Be able to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Students will achieve these outcomes and educational objectives through a 129 credit hour, 4 year program; 53 of the credit hours will be in fulfilment of the general education core that covers knowledge of human cultures and the physical and natural world, intellectual and practical skills, personal and social responsibility, and integrative learning; 68 credit hours will fulfil major requirements; and 6 hours will be completed in major electives. The program aligns with the general educational objectives of all undergraduate programs at the university.

The curriculum of the program will be as follows:

1.	General Education A. Knowled	n Requirements53 lge of Human Cultures and the Physical & Natural
	world	
	1.	Natural Sciences16
		(CHEM 111, CHEM 112, PHYS 211, and PHYS 212)
	2.	History of Civilization
		(HIST 101 of HIST 102)
	0	Social & Behavioral Sciences 6
	3.	Students should take a hours of ECON and an and a hours
		Students should take 3 hours of ECON 221 of 223, and 3 hours
		from one of the following areas: Anthropology, Geography,
		Political Science, Psychology, or Sociology.
	4.	Humanities9
		Students should take 3 hours of PHIL 325: Engineering Ethics and
		6 hours from any approved course in the areas of: History; Art
		History: Humanities: Honors: Music: Theatre: Religion: or
		Dhilosophy
		r mosopny.
	<b>B</b> Intellect	ual & Dractical Chille 19
	D. Intenect	Cuitical La suring
	1.	
		Freshmen must take AFCI 101 Critical Inquiry in their first
		semester of enrollment at USC Aiken.
	2.	English 101 & 1026
		Students should take English in their first semester of enrollment
		at USC Aiken (unless they have received credit for ENGL 101 and
		102 through concurrent enrollment AP etc.) Students must
		complete English 101 and English 102 with a grade of C or better
		in order to fulfill general education requirements and before
		in order to fulfill general education requirements and before
		taking Writing Intensive courses.
	0	Ovel Communication
	3.	
		COMM 201 OF COMM 241
		Math / Statistics / Lagia
	4.	Matil/ Statistics/Logic
		(MATH 141, MATH 142)
	_	Satisfactory completion of Whiting Dusficionar Dequinement
	5.	Satisfactory completion of writing Proficiency Requirement
	6.	Satisfactory completion of 3 course designated as Writing
	0.	Intensive at least one of which is in the student's major
		inclusive, at least one of which is in the student's major
	C Democrat	& Social Desponsibility
	U. rersonal	American Delitical Institutions
	1.	American Political Institutions
		(POLI 201, HIST 201, OF HIST 202)
	2.	Inter-Curricular Enrichment Program (ICE)
		Two approved events in each semester of enrollment.
		2

**D. Integrative Learning......o** While there are no specific course requirements in this category, students are strongly encouraged to include one or more integrative learning experiences in their academic programs, such as linked courses, study abroad internship, service learning, faculty-mentored research, capstone. Each summer, students in the Industrial Process Engineering program will be encouraged to participate in a summer internship opportunity.

ENCP 101 Introduction to Engineering I (3) ENCP 102 Introduction to Engineering II (3) MATH 241 Calculus III (4) MATH 242 Calculus IV (Differential Equations) (4) ENCP 200 Statics (3) ELCT 221 Electrical Circuits (3) ENGR 260 Mechanics of Solids (3) ENGR 290 Thermodynamics (3) ENCP 310 Dynamics (3) ENGR 316 Control Systems (3) EMCH 327 Design of Mechanical Elements (3)\*new course ENGR 334: Quality Planning and Control (3) EMCH 360: Fluid Mechanics (3) ENGR 361: Instrumentation, Measurements, & Statistics (3) EMCH 371 Engineering Materials (3)\*new course BADM 371: Principles of Management and Leadership (3) ENGR 380: Intro to Systems Engineering (3) ENGR 421: Engineering Economics (3) BADM 494: Project Management (3) ENGR 498: Capstone Design I (3) ENGR 499: Capstone Design II (3) STAT 509: Statistics (3) EMCH 354 Heat Transfer (3)

EMCH 354 Heat Transfer (3) EMCH 377 Manufacturing Processes (3) ENGR 454 Unit Operations (3) ENGR 477 Advanced Manufacturing (3) MGMT 475 Production/Operations Management (3) STAT 510 Statistical Quality Assurance (3)

A student can complete this program of study in 4 years. An example of a student's schedule of classes as they proceed through the program of study is shown below:

Year 1 (35 Credit Hours)										
	Spring									
Gen Ed Requirement B	ENGL 101	3	Gen Ed Requirement B	ENGL 102	3					
Gen Ed Requirement B	MATH 141: Calculus I	4	Gen Ed Requirement B	MATH 142: Calculus II	4					

# USC Aiken Substantive Change Prospectus: Industrial Process Engineering Program

Major Requirement	nt ENCP 101: Introduction to Engineering I		Major Requirement	ENCP 102: Intro to Engineering II	3					
Gen Ed Requirement A	CHEM 111	4	Gen Ed Requirement A	CHEM 112	4					
Gen Ed Requirement A	nt Humanities		Gen Ed Requirement A	ECON 221/222: Micro or Macro Economics	3					
Gen Ed Requirement B	AFCI 101	1								
Total Semester Cred	it Hours	18	Total Semester Credi	t Hours	17					
	Year 1 Summ	ner Ir	Internship Opportunity							
	Year	2 (34	Credit Hours)							
	Fall		F	Spring	1					
Gen Ed Requirement A	PHYS 211	4	Gen Ed Requirement A	PHYS 212	4					
Major Requirement	MATH 241: Calculus III	4	Major Requirement	MATH 242: Calculus IV (Differential Equations)	4					
Major Requirement	ENCP 200: Statics	3	Major Requirement	ENGR 290: Thermodynamics	3					
Major Requirement	ajor Requirement EMCH 371: Engineering Materials		Major Requirement	ENGR 260: Mechanics of Solids	3					
Gen Ed Requirement B	Gen Ed Requirement B COMM 201 or 241		Gen Ed Requirement A	Humanities	3					
Total Semester Credit H	Hours	17	Total Semester Credit H	lours	17					
	Year 2 Summ	ner Ir	nternship Opportunit	-V						
		-		. y						
	Year	3 (30	) Credit Hours)	- 7						
	Year Fall	3 (30	) Credit Hours)	Spring						
Major Requirement	Year Fall BADM 371: Principles of Management and Leadership	3 (30	Ocredit Hours)	Spring ENCP 310: Dynamics	3					
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# All 15 courses are new. The course descriptions are:

# **ENCP 101 – Introduction to Engineering I**

Engineering problem solving using computers and other engineering tools. This course introduces the engineering profession, professional concepts, ethics, and responsibility; reviews the number system and unit conversions; and introduces computer programs. It also prepares students for success through the integration of the following important skills: technical problem solving and engineering design, ethical decision-making, teamwork, and communicating to diverse audiences.

# ENCP 102 – Introduction to Engineering II

Principles and practice of visualization and graphical representation using modern computeraided design software.

# ENCP 200 – Statics (pre: MATH 141)

Introduction to the principles of mechanics; equilibrium of particles and rigid bodies; distributed forces, centroids, and centers of gravity; moments of inertia of areas; analysis of simple structures and machines; and friction.

# ENCP 260 – Introduction to the Mechanics of Solids (pre: MATH 241, ENCP 200 with a C or better)

developments for stresses. Tension, torsion, axial load, and pressure. Deformations of elastic relationships between stress and strain.

# **ENCP 290 – Thermodynamic Fundamentals**

Definitions, work, heat, and energy. First law analyses of systems and control volumes. Second law analysis and design.

# EMCH 371 – Engineering Materials\* (pre: ENCP 260)

Structures and properties of engineering metals, ceramics, and polymers; atomic bonding, crystalline structures and microstructures; mechanical behavior and deformation mechanisms; processes for controlling structures and properties; corrosion.

# ELCT 221 – Circuits (pre: MATH 142)

Linear circuit analysis and design.

# EMCH 327 – Design of Mechanical Elements\* (pre: ENCP 260)

Design against static failure and fatigue failure of structural members and machine parts: design and selection of components including fasteners, welds, shafts, springs, gears, bearings, and chain drives.

# ENCP 310(210) – Dynamics (pre: ENCP 200 with a C or better)

Kinematics of particles and rigid bodies. Kinetics of particles with emphasis on Newton's second law: energy and momentum methods for the solution of problems. Applications of plane motion of rigid bodies.

# ENGR 334 – Quality Planning and Control\* (pre: STAT 509)

Introduction to quality management philosophies, tools, and approaches. Six Sigma philosophy, roadmap, tools, and techniques of planning and executing quality improvement programs and the LEAN continuous improvement approach that focuses on reducing waste. Application of Design for Six Sigma approach to design or improve products and processes.

# EMCH 360 - Fluid Mechanics\* (pre: MATH 241, ENCP 200 with a C or better)

Mechanical engineering applications of fluid statics and dynamics. Conservation of mass, momentum, and energy. Similitude and dimensional analysis, open channel flow, lift and drag. Introduction to turbulent flow.

# ENGR 361 – Instrumentation, Measurements, & Statistics\* (pre: STAT 509, PHYS 212, ELCT 221; co: ENCP 260, ENCP 290)

Principles of measurement, analysis of data, experimental planning. Correlations of experimental data, experimental variance, and uncertainty analysis. Lab and lecture.

# BADM 371 - Principles of Management and Leadership (pre: Junior standing)

This course focuses on the basic principles of management used by all types of organizations. It serves to provide a foundation of knowledge concerning the theoretical framework of management as well as integrating the practical concerns of reality. Contemporary issue topics and exercises are used to help students synthesize course materials and apply the management concepts and theories. Emphasis and understanding of leadership principles are an integral part of the course.

# ENGR 380 – Introduction to Systems Engineering\* (pre: MATH 242, STAT 509, ENGR 334)

An integrated introduction to systems methodology, design, and management. An overview of systems engineering as a professional and intellectual discipline, and its relation to other disciplines, such as operations research, management science, and economics. An introduction to selected techniques in systems and decision sciences, including mathematical modeling, decision analysis, risk analysis, and simulation modeling. Overview of contemporary topics relevant to systems engineering such as reengineering and total quality management. Elements of systems management, including decision styles, human information processing, organizational decision processes, and information system design for planning and decision support.

# ENGR 316 - Control Systems (pre: MATH 242, ENGR 330, ELCT 221)

An introduction to closed-loop control systems; development of concepts, including transfer function, feedback, frequency response, and system stability by examples taken from mechanical engineering practice; control system design methods. Also an introduction to programmable logic controllers (PLCs). *[EMCH 516 Control Theory]* 

# PHIL 325 - Engineering Ethics\*

An investigation of ethical issues in engineering and engineering-related technology. Topics include whistleblowing, employee/employer relations, environmental issues, issues related to advances in information technology, and privacy. Engineering ethics involves two related skills: the ability to analyze complex socio-political problems concerning the design, manufacturing, and use of technologies and their technological systems and the ability to communicate reasonably and persuasively about such analyses. In this course we develop both sets of skills

through lectures, discussions, written and oral assignments, focusing on the examination of several case studies concerning real technologies in society.

### ENGR 421 – Engineering Economics & Finance\* (pre: ECON 221 or 222)

Decision making with respect to capital goods, with emphasis on such decision making in governmental activities and public utilities. Intended primarily for engineering students, the course emphasizes the types of investment decisions that engineers are often called upon to make.

# BADM 494 Project Management (pre: BADM 371)

A study of general principles of project management which includes concepts related to management of technology, people, stakeholders and other diverse elements necessary to successfully complete the project. The student will explore both technical and managerial challenges involved in managing projects.

### ENGR 498 - Capstone Design I\*

An integral part of the education provided to undergraduates in engineering is a senior twosemester course sequence in "capstone" design.

# ENGR 499 – Capstone Design II\*

An integral part of the education provided to undergraduates in engineering is a senior twosemester course sequence in "capstone" design.

The design projects are selected from problems submitted by the students, faculty and local industry. Industry projects are given preference since these projects are best suited for meeting the course objectives.

### Technical Electives

# EMCH 354 – Heat Transfer\* (pre: MATH 242, ENCP 290, EMCH 360,)

One- and two-dimensional steady and unsteady conduction; free and forced convection; boiling and condensation; heat exchangers.

### ENGR 454 – Unit Operations\* (pre: EMCH 354, EMCH 360, ENCP 290)

This course presents the standard unit operations in chemical and metallurgical systems and discusses the principles governing fluid flow, heat transfer, mass transfer, thermodynamic and mechanical processes. The design and operation of the devices for these unit operations is emphasized and the course will discuss the application to such areas as fluid transportation, evaporation, distillation, refrigeration and solids.

### EMCH 377 – Manufacturing Processes (pre: EMCH 371)

Basic principles of metal processing; applied mechanics of metal cutting and forming; cost analysis of manufacturing operations.

# ENGR 477 – Advanced Manufacturing (co: ENGR 334)

In-depth study of the planning and method of selection and sequencing of various chip generating and assembly processes in order to produce a product with the highest usable quality

at the lowest cost. Workplace design, assembly, and inspection features and positioning devices analyzed. Advanced techniques involving robotics and computers used in developing manufacturing processes.

# STAT 510 – Statistical Quality Assurance (pre: STAT 509 with C or better)

Basic graphical techniques and control charts. Experimentation in quality assurance. Sampling issues. Other topics include process capability studies, error analysis, estimation and reliability.

# MGMT 475 Production/Operations Management (pre: BADM 296 and BADM 371)

A study of the strategic, operating, and control decisions involved in manufacturing and service organizations. Topics include forecasting, process development, production technology, resource allocation, facility planning, facility layout, planning systems, inventory systems, resource requirements planning systems, shop floor planning, scheduling operations, just-in-time manufacturing, materials management, productivity control, quality management, quality control, project management, and maintenance management.

The credit value of each course is determined by the amount of formal instructional time per week for one semester. At least 700 minutes of instruction (and at least twice that for laboratory time) is expected per credit hour at the University of South Carolina Aiken. The semester hour credit for each course is included in each course description and will be published in the USC Aiken Undergraduate and Graduate Programs Bulletin. This policy, rooted in the Carnegie Unit, is standard within the USC system and is the norm at institutions on the semester system throughout the United States. Seminar courses, distance education courses, internet courses, internships, field classes, and other courses which do not share the traditional lecture/laboratory format require the same number of contact or instructional hours required for traditional lecture/laboratory classes.

The relationship between the program's student learning outcomes and the courses that make up the curriculum is shown in the following curriculum map.

BS in Industrial Engineering Curriculum Map																			
							СС	UR	SES										
Outcomes	ENCP 101	ENCP 102	ENCP 200	ELCT 221	ENCP 260	ENCP 290	ENCP 310	ENGR 316	EMCH 327	ENGR 334	EMCH 360	ENGR 361	BADM 371		ENGR 380	PHIL 325	EMCH 371	ENGR 421	BADM 494
Students will be able to apply knowledge of mathematics, science, and engineering.	I R	I R P	I R P	I R P	I R	I R	I R P	I R P	I R P	I R P	I R	I R P	Ρ	М	М				
Students will be able to design and conduct experiments, as well as to analyze and interpret data.			I R	I R		I R P M			н К Р				Ρ	М	М				
Students will be able to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.	I R P	I R P	l R P		I R P		l R P	l R P				l R P	Ρ	М	М				
Students will be able to function on multidisciplinary teams.			I R	I R P		I R P			I R P	I R P	I R P		Ρ	М	М				
Students will be able to identify, formulate, and solve engineering problems.	I R		I R	I R		I R		I R P		I R P	I R P M		Ρ	М	М				

Students will have an understanding of professional and ethical responsibility.				I R P M		I R P			I R P	I R P M		Ρ	М	М		
Students will be able to communicate effectively.		I						I R P				Ρ	м	М		
Students will understand the impact of engineering solutions in a global, economic, environmental, and societal context.								I R P			I R P	Ρ	М	М		
Students will recognize the need for and demonstrate an ability to engage in life-long learning.																
Students will have a knowledge of contemporary issues.																
Students will be able to use the techniques, skills, and modern engineering tools necessary for engineering practice.																
Students will be able to use contemporary computation techniques and tools.																
Students will be able to apply statistical methods to analyze and interpret data.																
Legend: Learning outcome is	Legend: Learning outcome is…I – Introduced, R – Reinforced, P – Practiced, M – Mastered															

Admission requirements to the engineering program will be the same as those of entering freshman at USC Aiken. High school course selection, standardized test scores, and an Admissions Index are all used to determine admissibility. Students must have taken the following in high school: English (4 units), mathematics (4 units), laboratory science (3 units), social science (3 units), foreign language (2 units), academic electives (4 units), and physical education or ROTC (1 unit).

Engineering majors must have a grade of "C" or better in all mathematics, science, and engineering courses. If a student fails to receive a "C" or better, they must repeat the courses until they receive a "C" or better.

For students who wish to transfer into the program, up to six semester hours of credit with grades of B or better (or equivalent grades if a different system is used) from another AACSB-accredited institution may be transferred for use with the restriction that the credit must have been earned at an institution holding AACSB accreditation at the time the course work was completed. All transfer credit must be approved by the Dean of the School of Business Administration.

To ensure the quality of the program and services, administrative oversight will fall within the responsibilities of the Dean of the College of Sciences and the Chair of the Department of Mathematical Sciences. With the department, and Engineering faculty member, Dr. Bethany Fralick, will serve as the program's Coordinator (see Appendix I for Dr. Fralick's *curriculum vitae*).

### 5. FACULTY

To provide the Industrial Engineering program, USCA will need to add two full-time, tenure-track faculty with terminal degrees in Industrial Process Engineering. A roster of faculty who will be teaching the new major's classes is provided on pages 14-17.

# Faculty Roster Form Qualifications of Full-Time and Part-Time

Institution:	University of South Carolina Aiken
College or School:	College of Sciences
Department:	Department of Mathematical Sciences

To be hired Fall 2015									
Courses	Relevant Degrees	Degree Details/Other Qualifications							
ECON 601: Economics for Decision Making (G) BADM 605: Quantitative Tools for Business Analysis (G)	will require a Ph.D. in Industrial Process Engineering	Looking for someone with research interests in applied economics, and/or statistical and quantitative analysis							
To be hired Fall 2016									
Courses	Relevant Degrees	Degree Details/Other Qualifications							
BADM 649: Program and Project Management I (G) BADM 650: Program and Project Management II (G) MGMT 617: Supply Chain Management (G) MGMT 629: Information Systems Strategy (G)	will require a Ph.D. in Industrial Process Engineering	Looking for someone with research interests in the areas of Information Technology and systems, operations and supply chain management, and/or project management							
FRALICK, BETHANY (F)									
Courses	Relevant Degrees	Degree Details/Other Qualifications							
	1								
	T								

The School of Business Administration currently has 16 full time permanent faculty consisting of 12 tenured or tenure-track faculty who hold terminal degrees in their discipline and 4 instructors who have a minimum of a master's degree in their discipline. A full-time faculty member at USCA is on a nine-month contract and carries a teaching load of 12 undergraduate hours or 9 graduate hours per Fall and Spring semesters. In addition, 9 qualified adjuncts and faculty within the USC System who are located on the USC Sumter campus teach undergraduate courses for the School of Business Administration. Summer teaching assignments provide additional remuneration to faculty at a rate of 2.5% of the 9-month base salary per semester hour. The current full-time equivalent (FTE) of faculty in the School of Business Administration is 20.5. With the modification of an adjunct position and the additional teaching associated with the proposed MBA and to minimize an impact on the existing undergraduate program.

Currently, all School of Business Administration faculty are expected to remain current in their disciplines as active scholars, with greater research expectations for those who hold terminal degrees and tenured or tenure-track positions (see Appendix J for a copy of faculty *curriculum vitae*). These research expectations have been in line with AACSB and SACSCOC standards for an undergraduate only business program. Transition to a business program with both graduate and undergraduate degrees will necessitate higher research expectations and correspondingly higher levels of research and professional development support. In keeping with policy and practice at the University of South Carolina Aiken, the School of Business Administration faculty teaching graduate courses will receive one course release during each fall or spring semester in which they are teaching a graduate course. The two additional faculty positions and converted management instructor position will allow the School of Business Administration to cover the new graduate sections that must be offered each semester, as well as to cover the undergraduate sections affected by the release time requirement for graduate faculty.

All full-time School of Business Administration faculty are allotted a certain amount of faculty development funds from the school each year to support their research and travel to conferences; this amount is augmented each year for those who successfully publish one or more articles in peer-reviewed journals in the previous year. These internal school funds are supplemented by institutional funds for faculty travel expenses which are dispersed by the USCA Partnership Fund.

### 6. LIBRARY AND LEARNING RESOURCES

The Gregg-Graniteville Library occupies a two-story 40,000 square foot building situated on the main university quadrangle. The collection contains over 211,251 volumes of books and print journals, over 79,896 pieces of microfilm and microfiche, and over 4088 volumes of media materials. The USC Aiken library has access to 252 databases, including those through DISCUS and PASCAL, with E-journals totaling 29,776. USC Aiken students have access to approximately 62,626 E-books. The Gregg-Graniteville Library is an official depository for Federal and South Carolina documents, with holdings of 58,569 print and digital titles. The library is open 78 hours per week with variations during exam periods, inter-sessions, summer terms, and holidays.

Current print monograph holdings in areas related to Engineering, subdivided by subject include:

• Technology (General) -- (Library of Congress Call# Subclass T): 724 volumes

USC Aiken Substantive Change Prospectus: Industrial Process Engineering Program

- Engineering (General) (Library of Congress Call# Subclass TA): 1119 volumes
- Hydraulic Engineering (Library of Congress Call# Subclass TC): 48 volumes
- Environmental Technology (Library of Congress Call# Subclass TD): 451 volumes
- Highway Engineering (Library of Congress Call# Subclass TE): 13 volumes
- Railroad Engineering (Library of Congress Call# Subclass TF): 16 volumes
- Bridge Engineering (Library of Congress Call# Subclass TG): 17 volumes
- Building Construction (Library of Congress Call# Subclass TH): 84 volumes
- Mechanical Engineering (Library of Congress Call# Subclass TJ): 624 volumes
- Electrical Engineering (Library of Congress Call# Subclass TK): 2029 volumes
- Motor Vehicles (Library of Congress Call# Subclass TL): 348 volumes
- Mining Engineering (Library of Congress Call# Subclass TN): 112 volumes
- Chemical Technology (Library of Congress Call# Subclass TP): 332 volumes
- Total monographs (print and electronic) holdings: 5917 volumes.

Our current print collection is strongest in Economics, Management, Marketing and Commerce. The Finance area is most in need of strengthening. A qualitative examination of the titles in the USCA collection was conducted comparing the last four years (2008-2011) of *Choice Review's Outstanding Academic Titles* with our holdings. *Choice: Current Reviews for Academic Libraries* is published by the Association of College and Research Libraries and is the premier source for reviews and recommendations of academic books, electronic media, and Internet resources of interest to those in higher education. The comparison found that we own or have access to 23% of the outstanding titles recommend by *Choice* in the Business area. Our current collection is adequate to meet the needs of the faculty and students at USCA; however, additional resources should be acquired for an MBA program. To add these additional outstanding monographic titles would require approximately \$2,500 annually; an amount that could be handled within the current library budget.

Business-specific databases currently accessible by USCA School of Business students include: Business Source Premier (EBSCO), Gale Business Insights: Global, Thomasnet (Thomas Register Online), and CCH Accounting Research Manager. Other databases which include business-related materials are Lexis-Nexis Academic Universe and Academic Search Premier (EBSCO). Our electronic databases are currently adequate for our undergraduate Business students, and would be adequate for the proposed MBA if we upgrade our current EBSCO databases to include Business Source Complete (\$7,730) and Academic Source Complete (\$8,972) for a total of \$16,702 in Year 1. The total cost for both upgraded databases is expected to increase by 5% annually. Less crucial, but also recommended, should funds allow, would be a subscription to the Mergent database (\$4,500), which provides extensive information on public and private companies as well as in-depth industry information and more.

The U.S. Government Documents Depository maintains a number of business related electronic databases and print resources published by agencies such as Congress, the Securities and Exchange Commission (EDGAR), the U.S. Commerce Department, the Small Business Administration, the Congressional Budget Office, the General Accounting Office,

the Office of the President and numerous other governmental agencies. Both a full-time Documents Librarian and support staff are available to aid in research.

The library currently subscribes directly to ten business related journals including the following essential titles: *The Economist, Review of Economics & Statistics, Harvard Business Review, Journal of Finance, Journal of Consumer Research, Journal of the Academy of Marketing Science, Management Accounting Quarterly, Strategic Finance, Journal of Financial Education, and The Wall Street Journal.* In addition to these titles, USCA Business faculty and students have access to hundreds of other titles in all fields of Business through our full-text databases and consortia journal packages, including such titles as the *Journal of Financial Economics, the Journal of Marketing, the Strategic Management Journal, the Journal of Accountancy,* and *The New York Times.* 

USCA maintains a formal agreement (see Appendix K) with all universities and colleges in South Carolina, the Partnership among South Carolina Academic Libraries (PASCAL <u>http://pascalsc.org/</u>), which supports both consortia purchasing of databases and statewide borrowing of materials. PASCAL Delivers provides for reciprocal library borrowing among private and public colleges/universities throughout the state. It is supported by a statewide courier service which makes book deliveries to campuses five days a week. The majority of the databases relevant for the proposed degree are not impacted by PASCAL.

USCA currently has access to the EBSCO databases Academic Search Premier and Business Source Premier through the S.C. State Library via DISCUS; however, our proposed upgrades to Academic Search Complete and Business Source Complete would be negotiated through PASCAL for special pricing. We currently receive a special consortia price for our subscription to Lexis Nexis via PASCAL.

Using ILLIAD, a web-based Interlibrary Loan system, librarians fill requests for articles or documents that are scanned and transmitted via Ariel software. USC Aiken belongs to the KUDZU Consortium of southeastern libraries, providing delivery of items not available within the state to faculty and students within a few days.

The library maintains an active program of research assistance and instruction. The library faculty support classroom instruction in the disciplines and offer both general and course-specific library instruction. Instruction sessions are tailored to the needs of the course and the specific requirements of individual faculty members with the stated purpose of enabling all members of the college community to achieve information literacy in preparation for lifelong learning in a changing and global society.

The Gregg-Graniteville Library receives faculty input through the Faculty Assembly's Library Committee. This committee includes representatives from each college and school with the Director of the Library serving as an ex officio member. The committee serves as an advisory body to the Director of the Library on such topics as budget and collections. The Library Committee members often serve as departmental liaisons to the Library concerning orders, allocations, and related matters. The School of Business faculty review library

holdings and participate in the decision making process of adding or deleting businessrelated library holdings.

### 7. STUDENT SUPPORT SERVICES

The University of South Carolina Aiken provides students with opportunities to maximize individual achievement in both academic and co-curricular settings. In fulfilling its role as an institution of higher learning, the University of South Carolina Aiken is a community of individuals engaged in broadly based educational experiences necessary for an enlightened society. The University encourages and fosters many co-curricular activities and organizations that are designed to complement and enhance the academic and social life of its students. Offices that provide student support programs, services and activities can be found in the divisions of Academic Affairs, Business and Administration, Student Life and Services, and Information Technology. Some services and programs are specifically designed to assist undergraduates as they transition to college life.

Within the division of Academic Affairs, student support, services and activities are provided by the Academic Success Center, the Veteran and Military Student Success Center, the Language Learning Center, the Writing Room, International Programs, Career Services, Financial Aid, and the Registrar. The Academic Success Center encourages the academic success of students by assisting them in developing educational plans, connecting them to campus resources, and promoting engaged learning and personal responsibility. Among the services offered by the department are Academic Advisement, Early Warning, Tutoring, and Academic Consultations. The Veteran and Military Student Success Center hosts a professional staff that provides a conduit to benefits, opportunities, networking, and best practices for a successful military to community transition. The Language Learning Center supports the integration of technology into language instruction and linguistic acquisition. Through methods such as aural-oral programs, video, and internet access, the Language Learning Center provides students with opportunities to acquire, develop, and practice effective communicative skills and to gain insight into and appreciation of diverse cultures and peoples. The Writing Room provides an open teaching and learning environment for the collaborative discussion of writing so that students may become more aware and independent writers. Peer writing consultants come from a range of disciplines and are formally trained to provide feedback during all phases of the writing process. International Programs Office provides services to international students and their families and promotes international awareness among USCA students, faculty, and the Aiken community. Study abroad and international exchanges programs are coordinated through the office. Career Services provides comprehensive career planning services including career planning, experiential learning, job searches, and skill set assessments. The Career Services Office provides individual and group career counseling on topics such as career planning and decision making, job targeting, and assists students with mock interviews, resumes and cover letter reviews. Career Services plans several career panels throughout the year. The Office of Financial Aid is responsible for administering federal, state, institutional, and private funding to assist students with the costs of their education. The Office of the Registrar is responsible for course registration, records retention and protection, monitoring of academic policies, publication of the USC Aiken Programs Bulletin, administrative oversight of transfer credit and degree certification.

Within the division of Business and Administration, student support, services and activities are provided by the Bookstore, campus dining, the Children's Center, the Convocation Center, the Etherredge Center, and University Police. The Bookstore is the source for all course materials including textbooks, lab supplies, course packets, school supplies, and

study aids. The bookstore is located in the Student Activities Center. (SAC) near the Food Court. Operated by the University, the primary goal of the bookstore is to provide educational materials to students at the lowest cost possible. Campus Dining provides high quality products and excellent service to USC Aiken students, faculty, staff and visitors. The university contracts with one of the country's premier food service operators to provide several dining options at the Scoreboard Cafeteria located in the Student Activities Center which offers a full service cafeteria featuring a salad bar, display cooking, subs, and grilled entrees, the Station in the Humanities and Social Sciences Building which features subs, salads, pastries, and gourmet coffee; and Starbucks. The Children's Center is located on the south side of the campus and offers care for children ages six weeks to five years for faculty, staff, students and community members for a reasonable fee. The Center is licensed by the State of South Carolina and is nationally accredited. The Convocation Center is a state of the art facility with capacity for 3,500-to 4,100 patrons that is used for USC Aiken athletic events, USC Aiken and high school graduations, consumer /trade shows, community events such as fairs, concerts, and conventions, and corporate meetings and seminars. The Etherredge Center, USC Aiken's center for the fine and performing arts, provides a first-class facility and the support services of a professional staff to accommodate diverse cultural activities. The Center offers programming designed to educate students and encourage them to develop an appreciation for the visual and performing arts as well as to fulfill the cultural entertainment needs of the community. The building houses two theatres, an art gallery, and classrooms and offices for the academic department of Visual and Performing Arts. The USC Aiken Police Department protects life and property and enforces the law. In this effort, police officers work with the campus community in a cooperative community policing effort to prevent crime from occurring and to provide assistance to victims if a crime does occur. The Department also provides emergency medical first response for the campus community.

In the division of Student Life and Services, student support, services, and activities are provided by Athletics, the Wellness Center, the Counseling Center, the Health Center, Disabilities Services, Housing, Intramurals, Leadership Programs, and Student Government and Organizations. With the goals of both athletic and academic excellence. Athletics at USC Aiken has emerged as a well-rounded intercollegiate program. USC Aiken is committed to fielding competitive athletic teams which are comprised of academically qualified student athletes. USC Aiken holds membership in the NCAA Division II and is a charter member of the Peach Belt Conference (PBC). USC Aiken has earned conference championships in twelve different sports. The "Pacers" currently compete on a conference, state, and national level in eleven different sports: volleyball, men's and women's soccer, women's cross-country, men's and women's basketball, softball, golf, baseball, and men's and women's tennis. The Wellness Center delivers educational and rehabilitative programs to promote a healthy lifestyle by providing the USC Aiken family and extended community access to safe, clean, well-equipped facilities and trained, caring staff. The Wellness Center has cardiovascular equipment, Nautilus weight equipment, dumbbells and a 1/16 mile walking track. There is a carpeted aerobics room with wall to wall mirrors, gymnasium, Jacuzzi, dry sauna, locker rooms, and an exercise physiology laboratory, as well as an instructional classroom. The facility is supervised by CPR trained staff. A 25-vard indoor/outdoor Natatorium facility is located in the Student Activities Center. The heated pool, designed for lap swimming, is 4 feet to 10 feet deep and has six lanes. The Counseling Center supports students in their individual development by maximizing their problemsolving and decision-making skills in order to facilitate constructive choices in accomplishing their academic and personal goals. In conjunction with this mission, the Counseling Center works with members of the University community to ensure a college environment that is as

beneficial as possible to the overall wellbeing of students, thereby empowering them to meet their fullest potential. The Center offers a holistic, developmental and short-term approach to assessing, consulting, individual counseling, group counseling, psycho-education, and training. The Center has a staff consisting of a Licensed Independent Social Worker -Clinical Practitioner, an AOD (Alcohol and Other Drugs) Programmer who is a Licensed Practical Counselor, and a Licensed Professional Counselor and Master Addiction Counselor. The Student Health Center provides comprehensive primary healthcare services that support the overall health of the USC Aiken community. The medical staff at the Health Center includes a registered nurse and two nurse practitioners. The Office of Disabilities Services assists undergraduate and graduate students who have medical, psychiatric, or learning disabilities by providing an integration of on-campus services. The goal is to make all USC Aiken programs and services accessible. Special classroom accommodations are provided to students with documented disabilities based on individual needs. These services are the result of a cooperative effort with the student's instructor and may include priority seating, a note taker, test proctoring, permission to tape record lectures, or alternative media. USC Aiken also has an Assistive Technology Center with equipment and software to improve access for eligible students. University Housing provides a variety of enrichment programs and activities to students residing in its three housing complexes. Pacer Crossings, a 300 bed residence hall that features a shared, four-bedroom suite with four baths, a living room area, free high-speed wireless internet access, phone service, micro fridge in each bedroom, and cable TV. Also within the residence hall is a laundry facility, 12 study rooms, 8 kitchens, a learning center, lounge space and game room. Pacer Crossings is staffed by a live-in Assistant Director and 12 Resident Assistants. Pacer Commons consists of 79 4-person apartments housing 316 residents. Each apartment has two full bathrooms, a living area and a fully equipped kitchen. Pacer Commons has an outdoor recreational area with a volleyball court and a basketball court. Within the halls of Pacer Commons there are 6 lounges, 2 classrooms, a computer room, a game room, and a vending and laundry facility. Pacer Commons is staffed by a live-in Assistant Director and 11 Resident Assistants. Pacer Downs is an apartment complex housing 352 residents. Each apartment has two double bedrooms, two full bathrooms, a living area, and a fully equipped kitchen. The recreation area adjacent to Pacer Downs has a pool with covered patio. volleyball court and basketball court. A Community Center by the pool includes a computer lab, kitchen, and lounge. Pacer Downs is staffed by a live-in Assistant Director and 12 Resident Assistants. The Intramurals Program at the University is founded on the philosophy that exercise and relaxation are vital to student development. The program is designed to offer a variety of challenging and enjoyable activities to every member of the student body. Activities include vigorous team sports such as football and basketball: competitive individual events such as table tennis, billiards, and one-on-one basketball; and non-competitive recreational activities. The University of South Carolina Aiken believes that through guality programs students can become effective leaders not only on campus but within the communities in which they live. Through Leadership Programs, training is provided for student leaders through an annual Student Leadership Retreat, workshops are conducted for student organization officers and advisors, and outstanding leaders are recognized at the student activities Leadership Award Banquet each April. The Student Activities Center is a focal point of campus life—providing comfortable lounge facilities, a cafeteria, and meeting and work areas for student organizations. There are more than 60 active student organizations on the campus offering opportunities for student involvement. Campus clubs and organizations include a variety of special interest groups, service groups, and social groups such as fraternities and sororities. Involvement in Student Government provides students the opportunity to participate in the decision-making process at USC Aiken. Campus-wide elections are held once during each academic year to fill SGA seats

vacated on a rotating basis.

With the division of Information Technology, Computer Services assists faculty, staff and students in meeting their academic and administrative computing needs and coordinates telecommunications services. USC Aiken's primary student computing resources are located in the Business and Education Building where a lab with Windows and Macintosh computers and dedicated Macintosh and Windows classrooms are available. Staff and trained student assistants are available at the Help Desk to assist with computing needs throughout the year. Students have access to computer facilities in the Business and Education Building 24 hours-a-day, seven days-a-week using their USCA student ID card. Computer Services manages several Windows servers, providing the campus community with electronic mail, network printing, file sharing, www services, and network applications. A wireless network is also available for student use within all academic buildings and University housing.

### 8. PHYSICAL RESOURCES

As shown on the campus map (see Appendix L), the University of South Carolina Aiken operates and maintains physical facilities on a 453 acre campus that appropriately serve the needs of the educational programs, support services, and other mission-related activities of the institution. The total gross building footage is 907,604 square feet.

USCA has six buildings that house academic units. There are 41 classrooms, 5 auditoriums, 14 labs, and 8 computer classrooms that are designated as academic areas. All classrooms and auditoriums are wired for computers and have LCD projection systems. The 8 computer classrooms house 141 computers.

The program will be part of the Department of Mathematical Science which is housed in the Penland Building. Engineering classes will continue to be held in the Penland Building as they have for the past 25 years. Classroom space is adequate.

A classroom has been identified that will be outfitted with lab tables and electricity to accommodate for additional engineering activities. Additional lab space is available in the science building in the physics classroom if needed. Funding for this modification will be a reallocation of internal resources as well as some external funding that has been raised for the program.

The following materials/equipment/software will be purchased over the next few years to support the program:

Software – Pro/ENGINEER (Creo Parametric), MatLab - \$75,000 Measuring Equipment - \$25,000 Laboratory Equipment - \$65,000 3D Printer - \$125,000 Large Format Printer - \$5,000 Additional Equipment/materials to be identified - \$50,000

No known critical physical resource problems exist that directly prevent the University of South Carolina Aiken from meeting its objectives. Current space allocated to any institutional function is adequate for the effective operation of that function. The South Carolina Commission on Higher Education conducts regular audits of space allocation and use. South Carolina Commission on Higher Education CHEMIS Facilities Reports, detailed statistics are monitored including but not limited to assignable area by function,

capacity/enrollment ratios, station utilization and space factor ratios for classrooms, and square footage of academic and support facilities per FTE students. These data allow the university to determine its relative standing within the state of South Carolina with respect to key facilities-related indicators. They show that the facilities needs of the institution's educational programs, support services, and other mission-related activities are being appropriately served and that the current physical plant will provide adequate space for the Industrial Process Engineering program.

#### 9. FINANCIAL SUPPORT

The University of South Carolina Aiken's Office of Financial Aid is responsible for administering federal, state, institutional, and private funding to assist students with their educational costs. For 2013-2014, the Office of Financial Aid awarded over \$32 million in compliance with the Title IV Higher Education Act of 1998, its amendments and regulations. The majority of financial aid awards were federal Title IV funds.

There are no outstanding issues between the Department of Education and the University of South Carolina Aiken with regard to the administration of Title IV programs. The University submits a FISAP report to the Department of Education in a timely manner and has not been placed on a cost-reimbursement method of payment. The Institution has not been required to obtain a letter of credit in favor of the Department of Education. The Institution's current Program Participation Agreement is effective until 2016 (see Appendix M).

There are no significant unpaid dollar amounts due to the Department of Education and the University is not aware of any regulatory infractions which would jeopardize Title IV funding. The University of South Carolina Aiken's most recent 3-year default rate for the Federal Student Aid program is 8.2% for fiscal year 2011.

The University has carefully examined the finances necessary to support this program. The estimated costs and sources of financing are provided in the following table.

ESTIMATED COSTS BY YEAR											
CATEGORY	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020						
Program Administration	45,720	47,090	48,500	49,960	51,460						
Faculty Salaries	407,250	544,560	560,470	577,470	594,830						
Part-Time Faculty Salaries	15,000	15,480	15,960	16,440	16,920						
Graduate Assistants	-	-	-	-	-						
Clerical/Support Personnel	14,980	15,430	15,890	16,370	16,860						
Supplies and Materials	100,000	125,630	128,770	131,990	135,290						
Library Resources	66,350	68,010	69,710	71,450	73,230						
Equipment	345,000	51,250	52,530	53,840	55,190						
Facilities	50,000	50,000	-	-	-						
Other (Identify)	-	-	-	-	-						
TOTALS	1,044,300	917,450	891,830	917,520	943,780						
S	OURCES OF L	FINANCING	BY YEAR								
Tuition Funding	765,720	897,400	928,000	958,600	990,220						
Program-Specific Fees	27,750	35,850	35,850	35,850	35,850						
State Funding*	-	-	-	-	-						
Reallocation of Existing Funds**											
Federal Funding	-	-	-	-	-						
Other Funding (Specify)***	250,830										
TOTALS	1,044,300	933,250	963,850	994,450	1,026,070						
FUND BALANCE IMPACT	-	15,800	72,020	76,930	82,290						

\*\*\* Private sources

Faculty salaries are based on information presented in Section 5 above, and library resources come from Section 6. Other costs include marketing expenses, supplies, printing and software needs.

Estimated program costs will be financed by tuition funding and the temporary reallocation of existing funds for years 2 and 3. Tuition funding values are based upon projected enrollment figures as presented in Table A, Section 3. All of the projected enrollment in the MBA program is expected to come from students who are not already enrolled as graduate students elsewhere in the institution. It is assumed that all of the students will pay in-state tuition rates, since any students from neighboring counties across the state line in Georgia would be eligible to pay in-state tuition. The tuition funding includes an assumption of a 10% tuition premium for the MBA program which raises the E&G tuition cost per credit hour from \$427 to \$470, and assumes an annual growth rate of 3% from year 2 onward. The source of

the reallocated funds will be institutional reserves. By year 4 of the program, annual tuition revenue will regularly exceed annual program expenses, providing a cumulative positive margin by year 5 that is more than sufficient to return the reallocated funds borrowed in years 2 and 3.

No special state appropriations have been or will be requested for the MBA program.

The School of Business Administration currently has a full-time administrator serving as the Dean of the School and 3 full-time staff which are adequate to support the additional program. There are no additional staff or administrator needs at this time. The institution has also allocated \$10,000 for initial program marketing efforts.

### 10. EVALUATION AND ASSESSMENT

The University of South Carolina Aiken has a well-established process that identifies expected outcomes related to student learning, assesses the extent to which those outcomes are achieved through its educational programs, and effects curricular and programmatic improvements based upon the assessment results.

As the means for analyzing, evaluating, and improving the curriculum and the learning process, academic assessment at USC Aiken is an ongoing activity at multiple levels that focuses on the extent to which goals for learning outcomes are being met. Faculty in each program have the primary responsibility for determining appropriate educational outcomes which extend beyond student performance as registered by final course grades as well as the methods and instruments for evaluating the level at which the outcomes have been accomplished. Several programs have used the Major Field Tests (MFT) from Educational Testing Service (ETS) as one way of evaluating the capabilities of students in their programs. Many academic units have assessment committees that carefully examine their programs' goals, objectives, and results at departmental meetings.

Each academic unit implements an ongoing assessment program that clearly articulates goals and objectives for student learning in the major, measures these outcomes on a regular basis at several points in the program and in multiple ways, analyzes the findings. and uses the results for curricular improvements and adjustments. Each academic unit submits full reports on its assessment activities to the Academic Assessment Committee for major assessment, the General Education Committee for the common core, and the Graduate Advisory Council for graduate programs. Each of these groups are standing committee of Faculty Assembly, and serve in an advisory capacity for assessment of academic programs at USC Aiken. The Committees ensure that all assessment programs adhere to best practice and institutional policy. The use of such committees allow faculty to embrace their responsibility to monitor and provide peer-directed guidance on assessment activities across departments and schools. To facilitate a consistent review of programs across academic years, evaluative rubrics are used that not only standardizes the evaluative process but also serves as a means to facilitate discussions among Committee members and Department and School representatives. The rubrics allow faculty to know in advance what the Committee is looking for in a program review. Its use has facilitated the growth of an assessment-conscious culture on campus founded on best practices.

USC Aiken's planning and assessment process is broad-based, systematic, and appropriate to the institution. With input from all units, the process continues to evolve with the primary goal of providing excellent programs and services for students. All academic and

administrative units participate in ongoing assessment activities and report how findings are used for improvements in annual program review reports. These reports are examined by the senior administrator responsible for each division and by Academic Council consisting of deans and department chairs. Changes based upon an examination of the collected data that require additional allocation of resources are carefully examined. An enterprise software system called TracDat provides the means through which administrators can collect data on similar requests to generate reports for consideration by various committees (e.g., the Campus Budget and Planning Committee or the Campus Technology Committee).

In addition to assessing student learning outcomes, department and schools annually track several other key indicators including the percentage of credit and contact hours that are taught by part-time faculty, teaching overloads, and average class size for lower, upper and graduate division classes across disciplines. Along with assessment data of student learning outcomes, these indicators are used by Academic Council in recommendations to allocate new full-time faculty slots.

For the new Engineering program, student learning outcomes will be assessed in a manner that is consistent with SACSCOC and ABET accreditation standards. The student learning outcomes for the program will be assessed each semester (fall, spring, summer) using both direct and indirect measures, such as in-class assessment instruments –e.g., course-embedded approaches, and rubrics of communication and other social skills, and project assignments – as well as surveys of entering freshmen, students upon completion of internships, graduating students, alumni and employers; and the Fundamentals of Engineering Exam Results.

Programmatic assessment will also use both direct measures – such as employment data for graduates of the program – and indirect measures, including feedback from alumni and employers of our graduates, to determine how well the program is meeting the needs of the local community and beyond.

Assessment results will be discussed and reviewed annually. Any curriculum changes or pedagogical adjustments that are found to be necessary as a result of the assessment findings will be implement by the faculty and future assessment data will then be reviewed to determine the effectiveness of any such changes in improving student learning or programmatic success.

### 11. APPENDICES

Appendix A: USC Aiken - Forward Together Report

- Appendix B: USC Aiken's Mission Statement
- Appendix C: Legal authority of the USC Board of Trustees
- Appendix D: USC Board of Trustees Bylaws
- Appendix E: Legal authority of the South Carolina Commission on Higher Education
- Appendix F: Small Business Development Center's Letter of support
- Appendix G: Carnegie Communications Environmental Scan Report
- Appendix H: Approval Documents
- Appendix I: Administrator of the Program curriculum vitae
- Appendix J: Faculty curriculum vitae
- Appendix K: USC Aiken's Consortia Agreement PASCAL
- Appendix L: Campus Map
- Appendix M: Program Participation Agreement