

# Armstrong

UNIVERSITY CURRICULUM COMMITTEE  
University Hall 282  
Minutes, November 2, 2016

**PRESENT:** Kelly Brooksher, Jose da Cruz (vice chair), Katrina Embrey, Kathleen Fabrikant, Todd Hizer, Kam Lau, Rick McGrath (chair), Andi Beth Mincer, Jared Schlieper, Pamela Sears, Julie Swanstrom, Phyllis Fulton (Catalog Editor)

**ABSENT:** Myka Bussey-Campbell, Kathryn Craven,

**GUESTS:** Allison Belzer, Donna Brooks, Janet Buckenmeyer, Lesley Clack, Cameron Coates, Brent Feske, Glenn Gibney, Beth Howells, Bob LeFavi, Bryan Riemann, Heather Thornton,

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**CALL TO ORDER.** The meeting was called to order at 3:00 p.m. by Rick McGrath.

**APPROVAL OF MINUTES.** The minutes of September 7, 2016, were approved as presented.

## ITEMS

I. College of Education (no items)

## II. College of Health Professions

A. Diagnostic and Therapeutic Sciences (no items)

### B. Health Sciences

*Items 1-7 from the Department of Health Sciences were discussed and approved by the committee. They are being submitted to the Faculty Senate for approval.*

**1. Modify the following program of study:**

### PROGRAM FOR THE DEGREE OF BACHELOR OF HEALTH SCIENCE

#### Track Four: Health Informatics

**A. General Requirements (core Areas A, B, C, D.I, and E) 42 hours**

**Core Area F 18 hours**

~~CSCI 1150 Fundamentals of the Internet and World Wide Web~~

~~CSCI 2070 Introduction to Computer Ethics and Cyber Security~~

ACCT 2101 Principles of Financial Accounting

BIOL 1130 Human Biology\*

HSCC 2500 Health Issues and Resources  
 ITEC 1310 Programming for Information Technology  
 MATH 2200 Elementary Statistics\*  
 RESP 2110 Medical Terminology

*\*If not taken in Area D. If **BIOL 1130** and/or **MATH 2200** taken in Area D, select ~~a~~ course(s) from the following list:*

**BUSA 2106 Environment of Business**  
**CSCI 1150 Fundamentals of the Internet and World Wide Web**  
**CSCI 2070 Introduction to Computer Ethics and Cybersecurity**  
~~ANTH 1102 Anthropology~~  
~~ECON 1101 Survey of Economics~~  
 ECON 2105 Principles of Macroeconomics  
 ECON 2106 Principles of Microeconomics  
~~PSYC 1101 Introduction to Psychology~~  
~~SOCI 1101 Introductory Sociology~~

<b>Physical Education</b>	<b>3 hours</b>
<b>First-Year Seminar</b>	<b>1 hour</b>
<b>B. Major Field Courses</b>	<b>15 hours</b>
HITC 3000 Introduction to Health Informatics	
HLPR 3200 Interprofessional Teams in Healthcare Organizations	
HSCC 2300 Management of Health Information	
HSCC 3110 Legal Issues in the Health Care Environment	
HSCC 3140 Epidemiology	
<b>C. Related Field Courses</b>	<b>4536 hours</b>
HITC 4100 Analysis of Healthcare Data	
HITC 4700 Introduction to Project Management	
HITC 4750 Principles of Knowledge Management and Decision Support	
<del>HITC 4800 Special Topics in Health Informatics</del>	
HITC 4900 Internship (6 credit hours)	
HSCA 4620 Principles of Management in Health Services Organizations	
<del>HSCA 4630 Health Information Systems</del>	
HSCA 4655 Principles of Health Insurance and Reimbursement	
HSCA 4660 Survey of Health Outcomes	
HSCC 4020 Seminar in Professional Issues	
HSCP 2000 Ethical Theories/Moral Issues in Health	
ITEC 3500 Database Administration	
ITEC 3600 Systems Analysis and Design	
<del>ITEC 3700 Cybersecurity I</del>	
<b>D. Guided Electives</b>	<b>9 hours</b>
Select 9 credit hours from the following classes:	
CRJU 3300 Criminology	
CRJU 3500 Criminal Evidence and Procedure	
CRJU 3600 Topics in Criminal Justice	
CRJU 5500U Law and Legal Process	
CSCI 1301 Introduction to Programming Principles	
CSCI 1302 Advanced Programming Principles	

CSCI 2070 Introduction to Computer Ethics and Cybersecurity  
 HITC 4800 Special Topics in Health Informatics  
 HSCA 4630 Health Information Systems  
 ITEC 3700 Cybersecurity I  
 ITEC 4200 Cybersecurity II Network Security  
 ITEC 4300 Cybersecurity III Ethical Hacking

**Total Semester Hours** **124 hours**

**E. Exit Exam**

Rationale: The University System of Georgia Health Informatics Academic Advisory Board is moving towards the system-wide adoption of a uniform Area F for all HI programs to include similar courses such as basic accounting, human anatomy and physiology, medical terminology, and others. The adoption of uniform Area F coursework makes it necessary to make the proposed curriculum changes.

**Effective Term: Fall 2017**

**2. Create the following Minor**

**HITC Health Informatics** **18 hours**

HITC 3000, HITC 4100, HITC 4700, HITC 4750\*

2 courses from the following: CSCI 2070, HSCA 4630, HSCA 4655, ITEC 1310, ITEC 3500, ITEC 3600, ITEC 3700

*\*Prerequisite waiver may be available for students not required to take HSCC 2300.*

Rationale: A minor in Health Informatics is needed in order to enable students in other tracks/programs to be able to gain specific knowledge in informatics. Creation of the minor is also a strategy to increase campus awareness of the field, as well as potentially stimulate increased enrollment in health informatics courses.

**Effective Term: Spring 2017**

**3. Create the following course:**

**HSCF 3205 Advanced Exercise Physiology** **3-0-3**

Prerequisite: HSCF 3200

Description: Continuation of HSCF 3200. Further exploration into the acute and chronic physiological and biochemical responses of the human body to exercise. This course will also cover the integration of physiological systems and their response and adaptation to exercise.

Rationale: An additional course in exercise physiology is needed to allow more extensive study of the acute and chronic physiological and biochemical responses to exercise.

**Effective Term: Fall 2017**

**CURCAT:**

**Major Department – Health Sciences**

**Can course be repeated for additional credit? No**

**Maximum number of credits: 3**

**Grading Mode: Normal**

**Instruction Type: Lecture**

**Course Equivalent: None**

**4. Modify the following course:**

**HSCF 3500 Applied Kinesiology and Biomechanics**

Prerequisite: **HSCF 3005** ~~HP/FM majors only and permission of instructor~~

Rationale: HSCF 3005 is an appropriate prerequisite and has been used by the instructor in making permission decisions

**Effective Term: Fall 2017**

**5. Modify the following course:**

**HSCF 4020 Health and Fitness Entrepreneurship**

Prerequisite: ~~HSCA 3600~~ **ACCT 2101**; HP/FM majors only

Rationale: ACCT 2101 has replaced HSCA 3600 as a major course.

**Effective Term: Fall 2017**

**6. Modify the following course:**

**HSCF 4030 Health and Fitness Management**

Prerequisite: ~~Senior status in the BHS Health and Fitness Management track and HSCA 3600~~ **ACCT 2101**; HP/FM majors only

Rationale: ACCT 2101 has replaced HSCA 3600 as a major course.

**Effective Term: Fall 2017**

## 7. Modify the following program of study:

### PROGRAM FOR THE DEGREE OF BACHELOR OF HEALTH SCIENCE

#### Track Three: Human Performance/Fitness Management

#### C. Related Field Courses 51 hours

HSCF 3005 Applied Musculoskeletal Anatomy and Kinesiology

HSCF 3200 Exercise Physiology

**HSCF 3205 Advanced Exercise Physiology**

HSCF 3500 Applied Kinesiology and Biomechanics

~~HSCA 3600 Financial Management for Health-Related Organizations~~

HSCF 3710 Worksite Wellness and Safety

HSCF 4010 Evaluation and Prescription in Exercise and Sport

HSCF 4020 Health and Fitness Entrepreneurship

HSCF 4030 Health and Fitness Management

HSCF 4040 Personal Fitness Training

SMED 5555U Physical Activity in Disease Prevention/Treatment

~~SMED 5090U Nutritional Issues in Sports Medicine~~

~~SMED 5600U Healthy Weight Mgmt & Body Composition~~

~~Select one of the following Courses:~~

~~SMED 5015U Assessment and Evaluation of Musculoskeletal Injuries~~

~~SMED 5065U Movement and Posture Assessment and Exercise~~

**Select three of the following courses:**

**SMED 5090U Nutritional Issues in Sports Medicine**

**SMED 5600U Healthy Weight Mgmt & Body Composition**

**SMED 5015U Assessment and Evaluation of Musculoskeletal Injuries**

**SMED 5065U Movement and Posture Assessment and Exercise**

Electives (11 hours)

Rationale: The changes to the program of study relate to adding HSCF 3205 and replacing HSCA 3600 with ACCT 2101. The change related to choose three of the following relates to allowing students more flexibility in their guided elective choices.

**Effective Term: Fall 2017**

- C. Nursing (no items)
- D. Rehabilitation Sciences (no items)

### III. College of Liberal Arts

- A. Art, Music, and Theatre (no items)
- B. Criminal Justice, Social, and Political Science (no items)
- C. Economics (no items)

D. Gender Studies (no items)

## E. History

*Items 1-4 from the Department of History were discussed and approved by the committee. They are being submitted to the Faculty Senate for approval.*

1. Delete the following course:

~~GEOG 3111 PHYSICAL GEOGRAPHY~~ ~~3-0-3~~

Rationale: The topics in this course are more appropriate for a lower-level introductory course, which we are proposing to create.

**Effective Term: Fall 2017**

2. Create the following course:

**GEOG 1111 INTRODUCTION TO PHYSICAL GEOGRAPHY** **3-0-3**

Description: A survey of physical geography. Topics include earth-sun relationships, weather, climate and climate classification, soils, bio-geography, vegetation, and landforms with emphasis on global patterns of distribution.

Rationale: The topics in this course are appropriate for an introductory course. The numbering is modeled after the University of Georgia's physical geography course.

**Effective Term: Fall 2017**

**CURCAT:**

**Major Department: HIST**

**Can course be repeated for additional credit? No**

**Maximum number of credits: 3**

**Grading Mode: Normal**

**Instruction Type: Lecture**

**Course equivalent: GEOG 3111**

3. Create the following course:

**HIST 3585 TOPICS IN LAW AND HISTORY** **3-0-3**

Prerequisite: HIST 2001 or POLS 2001 or HIST 1111 or HIST 1112

Description: Detailed study or analysis of a particular theme, topic, and/or region in legal history. May be repeated as topics vary.

Rationale: Reflects Department of History's research and teaching interests.

**Effective Term: Fall 2017**

**CURCAT:****Major Department: HIST****Can course be repeated for additional credit? Yes****Maximum number of credits: 6****Grading Mode: Normal****Instruction Type: Lecture****4. Modify the following program of study:****PROGRAM FOR THE DEGREE OF BACHELOR OF ARTS WITH A MAJOR IN HISTORY****A. General Requirements****Core Areas A, B, C, D.I, and E** **42 hours****Area F** **18 hours**~~HIST 1111 Civilization I or HIST 1112/H Civilization II/Honors~~~~HIST 2111 History of America to 1877 (If taken to satisfy core area E, substitute a humanities or social science course at the 1000 or 2000 level.)~~~~HIST 2112 History of America since 1865 (If taken to satisfy core area E, substitute a humanities or social science course at the 1000 or 2000 level.)~~

Foreign Language 1001 Elementary Language I

Foreign Language 1002 Elementary Language II (If taken to satisfy core area B2, substitute a humanities or social science Global Perspectives course at the 1000 or 2000 level.)

Foreign Language 2001 Intermediate Language I (If taken to satisfy core area C1, substitute a Literature or Philosophy course at the 2000 level.)

Foreign Language 2002 Intermediate Language II OR GEOG 2120

Six credit hours from the following:

HIST 2000 Ethics and Values

HIST 2100 African Diaspora

HIST 2111 History of America to 1877

HIST 2112 History of America since 1865

**Physical Education** **3 hours****First-Year Seminar** **1 hour****D. Electives** **15 hours**~~(If core completed elsewhere without foreign language, Foreign Language 1002, 2001, 2002 required in lieu of 9hrs. of electives)~~Rationale: New Area F requirements assign the introductory language course to Area F instead of "Electives" and offer more choices for majors.**Effective Term: Fall 2017**

## E. Languages, Literature, & Philosophy

*Items 1-6 from the Department of Languages, Literature, and Philosophy were discussed and approved by the committee. They are being submitted to the Faculty Senate for approval.*

### 1. Modify the following courses:

#### a. Modify the following course:

SPAN 3031 SPANISH CONVERSATION ~~AND COMPOSITION I~~ 3-0-3

Prerequisite: SPAN 2002

Conversational Spanish to develop greater oral proficiency and awareness of Hispanic culture. Review of grammar and syntax through **speaking and listening**. ~~guided essays.~~

#### b. Modify the following course:

SPAN 3032 SPANISH ~~CONVERSATION AND~~ COMPOSITION ~~I~~ 3-0-3

Prerequisite: SPAN 2002

**Spanish composition to develop greater written proficiency and awareness of Hispanic culture. Review of grammar and syntax through guided essays.** ~~Continuation of Spanish 3031.~~

Rationale: These two skills have been taught together, but they are two separate skills that need to be split into two distinct courses to follow the common practice throughout the USG.

**Effective Term: Fall 2017**

### 2. The department requests a blanket change updating all instances of SPAN 3031 and SPAN 3032.

**Effective Term: Fall 2017**

### 3. Modify the following course:

SPAN 2050 SPANISH FOR HEALTH CARE SYSTEMS 3-0-3

Prerequisite: SPAN 2001 **or permission of instructor**

Rationale: SPAN 2050 Spanish For Health Care Systems is an option specifically geared toward Health Profession majors who don't have area F language requirements. We want these students to take courses that are specific to their disciplines as early as possible.

**Effective Term: Fall 2017**

### 4. Modify the following course:

SPAN 4050 Advanced Spanish for Health Care Professionals 3-0-3

Prerequisite: SPAN **2050 or permission of instructor** ~~3050 or 3060 or 3031 or 3032~~



Rationale: The materials covered in SPAN 2050 Spanish For Health Care Systems are the preparatory ones to the Advanced Spanish for Health Care Professionals. The department wants the students to have taken this general introductory course before getting into the more nuanced and advanced SPAN 4050 course.

**Effective Term: Fall 2017**

**5. Modify the following course:  
FREN 4950 DIRECTED STUDY**

**3-0-31-0-1**

Rationale: This course should have been listed for 3 credit hours. We are correcting an error we overlooked earlier.

**CURCAT:**

**Maximum number of credits: 13**

**Effective Term: Fall 2017**

**6. Create the following certificate (CER0) program:**

**Undergraduate Certificate in Spanish for the Professions**

The Certificate in Spanish for the Professions provides students with precise language skills for designated professional purposes such as business, healthcare, and translation, as well as increases their intercultural competencies to be prepared for success in a global economy. Upon completion of the certificate, students will be able to identify essential similarities and differences among Hispanic cultures in their respective fields; understand and produce intermediate to advanced conversation using vocabulary related to professional fields; interpret complex texts in Spanish; present information related to their fields in Spanish in both written and oral formats.

**Undergraduate Certificate in Spanish for the Professions**

**12-24 hours**

SPAN 1001 Elementary Spanish I

SPAN 1002 Elementary Spanish II

SPAN 2001 Intermediate Spanish

SPAN 2002 Intermediate Spanish I or SPAN 2050 Spanish for Health Care Systems

OR equivalent placement score for four semesters of college-level coursework

One course from:

SPAN 3031 Spanish Conversation

SPAN 3032 Spanish Composition

SPAN 3050 Advanced Grammar

SPAN 3060 Advanced Grammar and Syntax for Native Speakers

Two courses from:

SPAN 4000 Translation  
 SPAN 4050 Advanced Spanish for Health Professions  
 SPAN 4130 Business Spanish

One course from

SPAN 3200 Introduction to Literature  
 SPAN 3210 Survey of Spanish Peninsular Literature I  
 SPAN 3220 Survey of Spanish Peninsular Literature II  
 SPAN 3230 Survey of Spanish American Literature I  
 SPAN 3240 Survey of Spanish American Literature II  
 SPAN 4010 Special Genre  
 SPAN 4020 Special Author  
 SPAN 4030 Special Topics  
 SPAN 4060 Contemporary Spanish American Novel  
 SPAN 4070 Contemporary Spanish Peninsular Novel  
 SPAN 4080 Spanish Peninsular Theatre  
 SPAN 4090 Spanish American Theatre  
 SPAN 4100 Spanish Peninsular Poetry  
 SPAN 4110 Spanish American Poetry

Rationale: Professional fields increasingly need employees with demonstrated intercultural competences. This certificate's track provides specific language training through measurable outcomes to help prepare students for the challenges they will face when using Spanish in their chosen career. It presents students less interested in a traditional literature-based curriculum with an alternative language study program. The certificate is CER0.

**Effective Term: Fall 2017**

## **F. College of Liberal Arts - Interdisciplinary**

*Items 1-10 from the College of Liberal Arts were discussed and approved by the committee. They are being submitted to the Faculty Senate for approval.*

### **African American Studies**

#### **1. Create the following course:**

##### **AFAS 3991 INTERNSHIP**

**3-0-3**

Prerequisite: Permission of instructor and African American Studies program director.

An individually designed course of supervised off-campus study, research, or work in an appropriate public agency or private business. Course is repeatable, but only three hours may be counted for the minor.

Rationale: Students benefit from applying their understanding of African American Studies to work experience.

**Effective Term: Fall 2017**

**CURCAT:**

**Major Department: College of Liberal Arts**  
**Can course be repeated for additional credit? Yes**  
**Maximum number of credits: 6**  
**Grading Mode: S/U**  
**Instruction Type: Internship/Practicum**

**2. Modify the following Program of Study**

**African American Studies Minor**

**African American Studies**

**15 hours**

AFAS 2000 Introduction to African American Studies

Must include 9 hours of course work numbered 3000 or above with no more than 6 hours from a single discipline and at least 6 hours from each of the following areas of concentration:

Humanities: **AFAS 3991\***, AFAS 4000, AFAS 5000U, ENGL 2050, ENGL 3350, ENGL 5355U, ENGL 5350U, HIST 2100, HIST 3150, HIST 3160, HIST 3900, HIST 3910, HIST 5200U, HIST 5650U, MUSC 2010

Social Sciences: **AFAS 3991\***, AFAS 4000, AFAS 5000U, CSDS 4050, POLS 3980, POLS 5430U, POLS 5510U, POLS 5560U, PUBH 5570U, SOCI 3200

*\*Note: Students may use no more than three credits of AFAS 3991 toward the minor.*

Rationale: The interdisciplinary methods of the African American Studies curriculum is enhanced with an internship in which students experience the day to day challenges in the field of this discipline.

**Effective Term: Spring 2017**

**International Studies**

**3. Create the following course:**

**SABR 3000 Internship**

**0-V-(1-3)**

Description: Students must complete 40 – 120 hours of service or outreach related to diversity issues, multicultural issues, and/or study away experiences to complete the Global Communities Certificate.

Rationale: This course is needed for the creation of the Global Communities Certificate.

**Effective Term: Fall 2017**

**CURCAT**

**Major Department: College of Liberal Arts**

**Can course be repeated for additional credit? Yes**

**Maximum number of credits: 3**

**Grading Mode: S/U**

**Instruction Type: Internship/Practicum**

**Undergraduate Course Equivalent: None**

**4. Create the following course:**

**SABR 4900 Independent Study**

**0-V-3**

Prerequisite: SABR 2960 or SABR 3000

Description: In-depth, closely supervised portfolio that will include at least one final reflection paper specifically addressing local and global connections. This is a capstone course.

Rationale: This course is needed for the creation of the Global Communities Certificate.

**Effective Term: Fall 2017**

**CURCAT**

**Major Department: College of Liberal Arts**

**Can course be repeated for additional credit? No**

**Grading Mode: S/U**

**Maximum number of credits: 3**

**Instruction Type: Independent Study**

**Undergraduate Course Equivalent: None**

**5. Create the following certificate program of study:**

General Information:

The Global Communities Certificate (GCC) is an interdisciplinary undergraduate certificate and is available to all Armstrong State University students. The certificate will include 28 hours of coursework, study away, with at least 40 hours of community service. Students may combine their certificate requirements with requirements for other programs at Armstrong.

Undergraduate Certificate in Global Communities

28 credit hours

Foreign Language 1001 Elementary Language I (3)

Foreign Language 1002 Elementary Language II (3)

Foreign Language 2001 Intermediate Language I (3)

Foreign Language 2002 Intermediate Language II (3)

SABR 2960 Study Abroad or SPAN 3510 or SPAN 3520 (3)

SABR 3000 Internship (1-3)

SABR 4900 Independent Study (3)

9 credit hours from the following (at least 1 upper-level Foreign Language class and 1 other upper-level class ): ANTH 1150, ARTS/MUSC 1270, CHEM 2200, CRJU 2010, ECON 1150, ECON 3200, ECON 4310, ECON 4340, ENGL 2050, ENGL 5200U, EURO 2000, EURO 3990, EURO 4130, EURO 3234, EURO 4160, EURO 4230, EURO 4260, EURO 4330, EURO 4430, EURO 4500, EURO 4530, EURO 4630, EURO 4730, EURO 4760, EURO 4830, FILM 3400, FREN 2010, FREN 3001, FREN 3002, FREN 3100, FREN 3150, FREN 3160, FREN 3201, FREN 3250, FREN 3260, FREN 3300, FREN 3400, FREN 4001, FREN 4002, FREN 4210, FREN 4800, FREN 4950, FREN 4960, FREN 4980, FREN 4991, GEOG 1100, GEOG 2120, GNST 2200, HIST 3100, HIST 3110, HIST 3115, HIST 3150, HIST 3160, HIST 3165, HIST 3230, HIST 3390, HIST 3440, HIST 3450, HIST3460, HIST 3485, HIST 3495, HIST 3540, HIST 3670, HLPR 2010, HONS 2000, HSCC 3760, HSCP 3700, ITEC 3710, JOUR 3460, MHSA 5800U, MUSC 1100, MUSC 3710, MUSC 3720, NURS 4007, NURS 4212, PHIL 4000\*, POLS 1150, POLS 2290, POLS 4400, POLS 5130 U, POLS 5280U, POLS 5350U, PSYC 2300, RELI 2100, SPAN 2050, SPAN 3031, SPAN 3032, SPAN 3050, SPAN 3060, SPAN 3111, SPAN 3120, SPAN 3200, SPAN 3210, SPAN 3220, SPAN 3230, SPAN 3240, SPAN 3750, SPAN 4000, SPAN 4010, SPAN 4020, SPAN 4030, SPAN 4040, SPAN 4050, SPAN 4060, SPAN 4070, SPAN 4080, SPAN 4090, SPAN 4100, SPAN 4110, SPAN 4120, SPAN 4130, SPAN 4750, SPAN 4900, SPAN 4990, SPAN 5442U, SOCI 2000

*\*When topic is appropriate.*

Rationale: Armstrong's Strategic Goal #1 is the following:

Armstrong will impart the skills and habits of mind to motivated students that help them realize their potential as productive citizens of the world.

Productive citizens of the world have to interact in meaningful ways with different cultures throughout their academic career at Armstrong and beyond.

The Global Communities Certificate will complement internationally-oriented minors, such as the European Union and Latin American Studies Minors, the Certificate in Latin American Studies, the African American Studies, the Asian Studies minor, International Studies minor, minors in foreign languages, Environmental Studies Minor, Tourism Studies, etc.

1. Foreign Language: Students must complete the equivalence of at least two years of sequential college level coursework in foreign language (the equivalent of four courses or 12 credit hours)
2. International Experience: Students must participate in either an international service-learning program or in a study away program in a location related to their area of study. These programs must involve at least one three-hour course.
3. International Academics: Students must take at least nine credit hours of "international content" course work, preferably related to their area of specialty. (Two of the three classes must be upper-level classes). We recommend finishing a language minor (three upper-level classes after 2002), or taking the classes necessary to

complete any of the minors or other certificates available on campus (Latin America certificate, Asian Studies minor, International Studies minor, etc.)

4. Community Service (Internship Course): Students must complete at least 40 hours of service or outreach related to diversity issues, multicultural issues, and/or study away experiences. (We already have internship/community service programs established with our Office of International Education, the Multicultural Affairs Office, and other non-profit organizations around town.)

5. Reflection (Independent Study Course): Students will document their experiences in a portfolio that will include at least one final reflection paper (8-10 pages) specifically addressing the local and global connections of their experiences; this paper will be presented at the Armstrong Student Symposium in the Spring following their completion of the program. The portfolio and final reflection paper will be submitted separately. Students will register for course SABR 4900 for 3 credit hours for this final step.

**Effective Term: Fall 2017**

## Liberal Studies

### 6. Delete the following course:

~~LIST 3000 History of the Liberal Arts~~ ~~3-0-3~~

Rationale: This course is being replaced by LIST 2000.

**Effective Term: Fall 2017**

### 7. Create the following course:

**LIST 2000 History of the Liberal Arts** **3-0-3**

A study of the historical development of the liberal arts, from Plato to the present, including an analysis of the role of the liberal arts in higher education in the 21st century.

Rationale: Students in Liberal Studies are not required to take any courses in Liberal Studies, rather only courses in other disciplines. In order to directly address the programs SLOs, we are developing LIST 2000 and placing it in the revised area F of the Liberal Studies BLS and AA degrees. This course replaces LIST 3000 at a more appropriate level.

**Effective Term: Fall 2017**

## CURCAT

**Major Department: College of Liberal Arts**

**Can Course be repeated for additional credit? No.**

**Maximum number of Credit Hours: 3**

**Grading Mode: Normal**

**Instruction Type: Lecture**  
**Course Equivalent: LIST 3000**

**8. Create the following course:**

LIST 3010 Reacting to the Liberal Arts

3-0-3

Prerequisite: ENGL 1101

An advanced study of the liberal arts and their role in science, politics, and art. The course emphasizes pedagogical techniques that enhance student engagement through re-enactments, role-playing, research, and debate.

Rationale: The currently existing LIST 3000 (which is being changed to LIST 2000) is situated as an elective for Liberal Studies students, and although enrollments have been solid, it has not attracted the wide breadth of students initially imagined. By focusing LIST 3010 on the pedagogical methodologies of Reacting to the Past, this course will meet its twin goals of engaging Liberal Studies students in problem-based learning and helping them comprehend the extent and importance of the liberal arts.

**Effective Term: Fall 2017**

**CURCAT**

**Major Department: Liberal Studies**

**Can Course be repeated for additional credit? No.**

**Maximum number of Credit Hours: 3**

**Grading Mode: Normal**

**Instruction Type: Lecture**

**Course Equivalent: None**

**9. Modify Program of Study**

**PROGRAM FOR THE DEGREE OF BACHELOR OF LIBERAL STUDIES**

**A. General Requirements (Core Areas A, B, C, D.I, and E)**

**42 hours**

**Core Area F**

**18 hours**

~~COMM 2280 Speech Communication~~

Three credits selected from:

COMM 2280 Speech Communication

ETHC 2000 Interdisciplinary Ethics

LIST 2000 History of the Liberal Arts

Three to six credits ~~One or two courses~~ selected from:

~~ARTS 1100 Art Appreciation~~

~~ARTS 2710 Art History I~~

~~ARTS 2720 Art History II~~

~~ARTS 1270/MUSC 1270 World Art and Music~~

~~MUSC 1100 Music Appreciation~~

PHIL 2010 Introduction to Philosophy

PHIL 2030 Ethics and Contemporary Moral Philosophy

POLS 2100 Introduction to Political Science

POLS 2290 Foundations of International Relations

SOCI 2000 Global Sociology

SOCI 2500 Ethics, Values, and the Social World

RELI 2100 World Religions

~~THEA 1100 Theatre Appreciation~~

~~THEA 1200 Introduction to Theatre~~

~~THEA 2410 Oral Interpretation~~

Two foreign language courses beyond 1001 in sequence

Three to six credits ~~One or two courses~~ at the 1000 or 2000 level with the prefix; ~~selected from:~~ AFAS, ARTS, ANTH, BUSA, COMM, CRJU, ECON, ENGL, ETHC, EURO, FREN, GEOG, GNST, GRMN, HIST, HONS, LATN, LWSO, MUSC, PHIL, POLS, PSYC, SABR, SOCI, SPAN, THEA

~~AFAS 2000 Introduction to African American Studies~~

~~ANTH 1102 Introduction to Anthropology~~

~~CSCI 1060 Computer Programming Concepts~~

~~ECON 2105 Principles of Macroeconomics~~

~~ECON 2106 Principles of Microeconomics~~

~~GEOG 2120 Cultural Geography~~

~~GWST 1101 Introduction to Gender and Women's Studies~~

~~HIST 2111 History of America to 1877~~

~~HIST 2112 History of American Since 1865~~

~~ITEC 1050 Introduction to Computer Concepts and Applications~~

~~ITEC 1300 Fundamentals of Information Technology~~

~~ITEC 1310 Programming in Visual Basic~~

~~POLS 2100 Introduction to Political Science~~

~~PSYC 1101/H Introduction to Psychology/Honors~~

~~SOCI 1101 Introductory Sociology~~

~~One or two~~ Three to seven credits of core area D courses (not used for core area D)

**Physical Education**

**3 hours**

**First-Year Seminar**

**1 hour**

Total Semester Hours

124 hours

~~C. University Exit Exam~~

Rationale:

Assessment revealed downward trends in all areas of MAPP testing and minor reductions in GPAs for Liberal Studies' students. Graduation rates for these students have decreased slightly. And, the course offerings in Area F created a bottleneck that slowed progression through the degree. The following changes are being recommended to improve student learning outcomes and facilitate matriculation.

Part I Area F

Add LIST 2000: History of the Liberal Arts



Students in Liberal Studies are not required to take any courses in Liberal Studies, but rather, only courses in other disciplines. In order to directly address the programs SLOs, we are developing LIST 2000, and placing it here.

Add ETHC 2000: Interdisciplinary Ethics

Because of the large number of Liberal Studies students, we are including ETHC 2000, another interdisciplinary course that will help address the program's SLOs and facilitate matriculation.

Part II Area F

Further Area F changes have been made in order to address the program's SLOs. These courses are taught by faculty directly involved in Liberal Studies, so the faculty can be more responsive to the educational expectations of the program.

Removing the MAPP requirement

The MAPP test is no longer needed; a new assessment tool is now being used.

**Effective Term: Fall 2017**

## 10. Modify the following program of study

### PROGRAM FOR THE DEGREE OF ASSOCIATE OF ARTS

<b>A. General Requirements (Core Areas A, B, C, D.I, and E)</b>	<b>42 hours</b>
<b>Physical Education</b>	<b>2 hours</b>
<b>First-Year Seminar</b>	<b>1 hour</b>
<b>B. Additional Requirements</b>	<b>18 hours</b>
Three credits selected from:	
COMM 2280 Speech Communication	
ETHC 2000 Interdisciplinary Ethics	
LIST 2000 History of the Liberal Arts	
Fifteen additional semester hours of electives or courses in the area of concentration	
Students planning work toward a baccalaureate degree should select courses that meet listed requirements of that degree program.	
Total Semester Hours	63 hours
<del>C. University Exit Exam</del>	

#### Rationale:

Assessment revealed downward trends in all areas of MAPP testing and minor reductions in GPAs for Liberal Studies' students. Graduation rates for these students have decreased slightly. And, the course offerings in Area F created a bottleneck that slowed progression through the degree. The following changes are being recommended to improve student learning outcomes and facilitate matriculation.

Add LIST 2000: History of the Liberal Arts

Students in Liberal Studies are not required to take any courses in Liberal Studies, only courses in other disciplines. In order to directly address the programs SLOs, we are developing LIST 2000, and placing it here.

Add ETHC 2000: Interdisciplinary Ethics

Because of the large number of Liberal Studies students, we are including ETHC 2000, another interdisciplinary course that will help address the program's SLOs and facilitate matriculation.

Removing the MAPP requirement

The MAPP test is no longer needed; a new assessment tool is now being used.

**Effective Term: Fall 2017**

### **European Studies Program**

*Items pertaining to the European Studies Program were postponed for consideration at the next meeting.*

## **IV. College of Science and Technology**

### **A. Biology**

*Items 1-2 from the Department of Biology were discussed and approved by the committee. They are being submitted to the Faculty Senate for approval.*

#### **1. Create the following course:**

##### **BIOL 4040 STREAM ECOLOGY**

**3-0-3**

Prerequisite: BIOL 3050 (minimum grade of C) or BIOL 3250 (minimum grade of C) or BIOL 3300 (minimum grade of C) or BIOL 3310 (minimum grade of C) or BIOL 3800 (minimum grade of C).

Description: Advanced study of the structural (physical and biological) and functional (energy and nutrients) characteristics of stream and river habitats. Students will explore topics including watershed, litter processing, food webs, nutrient spiraling, ecosystem metabolism, the river continuum concept, and the flood pulse concept.

Rationale: Upper-level biology majors, particularly of the marine track and the general track, will benefit from a thorough discussion of landscape and riverine processes and will have a unique opportunity to use coastal Georgia as a template. In accordance with the American Association for the Advancement of Science (AAAS) Vision and Change report, it is paramount that undergraduate biology students think beyond traditional disciplinary boundaries and understand the interconnectedness of

living ecosystems. The subject has been previously offered as a section of BIOL 4970, SPECIAL TOPICS.

**Effective Term: Fall 2017**

**CURCAT:**

**Major Department: Biology**

**Can Course be repeated for additional credit? No**

**Maximum Number of Credit Hours: 3**

**Grading Mode: Normal**

**Instruction Type: Lecture**

**Course Equivalent: None**

**2. Modify the following Program of Study**

**PROGRAM FOR THE DEGREE OF BACHELOR OF SCIENCE WITH A MAJOR IN BIOLOGY**

**Track I: General Biology**

**B. Major Field Courses**

**31-38 hours**

Required Courses (14 hours)

BIOL 2020 Plant Biology

BIOL 3000 Cell Biology

BIOL 3050 General Ecology

BIOL 3700 Genetics

Elective Courses (17-24 hours)

Choose one of the following:

BIOL 3110 Sensory Physiology

BIOL 4120 Reproductive Biology

BIOL 4150 Plant Physiology

BIOL 4200 Mammalian Physiology

BIOL 4210 Comparative Physiology

Choose one of the following:

BIOL 3240 Invasive Species

BIOL 3250 Limnology

BIOL 3470 Environmental Restoration

BIOL 3600 Salt Marsh Ecology

**BIOL 4040 Stream Ecology**

BIOL 4240 Behavioral Ecology

BIOL 4320 Environmental Microbiology

BIOL 4750 Tropical Field Biology

Choose two of the following:

BIOL 3030 Evolution

BIOL 3520 Medical Microbiology

BIOL 4000 Cancer Biology

BIOL 4100 Cell and Molecular Biology Laboratory  
 BIOL 4220 Endocrinology  
 BIOL 4230 Neurophysiology and Disease  
 BIOL 4310 Applied Microbiology  
 BIOL 4400 Virology  
 BIOL 4500 Bioinformatics and Biotechnology  
 BIOL 4510 Molecular Development  
 BIOL 4520 Epigenetics  
 BIOL 4650 Immunology  
 Choose two of the following:  
 BIOL 3020 Vertebrate Zoology  
 BIOL 3040 Herpetology  
 BIOL 3150 Horticulture  
 BIOL 3200 Plant Taxonomy  
 BIOL 3300 Entomology  
 BIOL 3310 Invertebrate Zoology  
 BIOL 3750 Natural History of Vertebrate Animals  
 BIOL 3770 Comparative Vertebrate Anatomy  
 BIOL 3800 Mycology  
 BIOL 3920 Parasitology  
 BIOL 3950 Human Embryology  
 BIOL 4460 Phycology  
 BIOL 4470 Sea Turtle Biology  
 BIOL 4550 Biology of Marine Organisms  
 BIOL 4600 Ichthyology

## **Track II: Marine Biology**

### **B. Major Field Courses**

**31-34 hours**

Required Courses (18 hours)

BIOL 2020 Plant Biology  
 BIOL 3000 Cell Biology  
 BIOL 3050 General Ecology  
 BIOL 3700 Genetics  
 BIOL 4550 Biology of Marine Organisms

Elective Courses (13-16 hours)

Choose one of the following:

BIOL 3110 Sensory Physiology  
 BIOL 4120 Reproductive Biology  
 BIOL 4150 Plant Physiology  
 BIOL 4200 Mammalian Physiology  
 BIOL 4210 Comparative Physiology

Choose one of the following:

BIOL 3020 Vertebrate Zoology  
 BIOL 3310 Invertebrate Zoology  
 BIOL 3750 Natural History of Vertebrate Animals

BIOL 3770 Comparative Vertebrate Anatomy

Choose two of the following:

BIOL 3030 Evolution

BIOL 3040 Herpetology

BIOL 3200 Plant Taxonomy

BIOL 3240 Invasive Species

BIOL 3250 Limnology

**BIOL 4040 Stream Ecology**

BIOL 4240 Behavioral Ecology

BIOL 4320 Environmental Microbiology

BIOL 4460 Phycology

BIOL 4470 Sea Turtle Biology

BIOL 4600 Ichthyology

BIOL 4750 Tropical Field Biology

### **Track III: Cell and Molecular Biology**

#### **B. Major Field Courses**

**25-28 hours**

Required Courses (12 hours)

BIOL 3000 Cell Biology

BIOL 3700 Genetics

BIOL 4100 Cell and Molecular Biology Laboratory

BIOL 4500 Bioinformatics and Biotechnology

Elective Courses (13-16 hours)

Choose one of the following:

BIOL 3110 Sensory Physiology

BIOL 4120 Reproductive Biology

BIOL 4150 Plant Physiology

BIOL 4200 Mammalian Physiology

BIOL 4210 Comparative Physiology

Choose one of the following:

BIOL 3020 Vertebrate Zoology

BIOL 3030 Evolution

BIOL 3300 Entomology

BIOL 3310 Invertebrate Zoology

BIOL 3750 Natural History of Vertebrate Animals

BIOL 3770 Comparative Vertebrate Anatomy

BIOL 3800 Mycology

BIOL 3920 Parasitology

BIOL 4460 Phycology

Choose two of the following:

BIOL 3520 Medical Microbiology

BIOL 3950 Human Embryology

BIOL 4000 Cancer Biology

BIOL 4220 Endocrinology

BIOL 4230 Neurophysiology and Disease

BIOL 4310 Applied Microbiology

BIOL 4320 Environmental Microbiology  
 BIOL 4400 Virology  
 BIOL 4510 Molecular Development  
 BIOL 4520 Epigenetics  
 BIOL 4650 Immunology

**Effective Term: Fall 2017**

## **B. Chemistry and Physics**

*Items 1-5 from the Department of Chemistry and Physics were discussed and approved by the committee. They are being submitted to the Faculty Senate for approval.*

1. Modify the following course:

**CHEM 3801 BIOCHEMISTRY I**

**3-0-3**

Prerequisite: CHEM 2102 (minimum grade of C) & CHEM 2102L (minimum grade of C)

Chemistry of cellular components: introduction to protein structure and function, enzyme kinetics and bioenergetics, mechanisms of catalysis, ~~carbohydrate and lipid metabolism and biosynthesis~~ and major pathways of carbohydrate metabolism.

Rationale: The course description has been modified to accurately reflect the material taught since the adoption of the biochemistry major.

**Effective Term: Fall 2017**

2. Modify the following course:

**CHEM 3802 Biochemistry II**

**3-0-3**

Prerequisite: CHEM 3801 (minimum grade of C)

Chemistry of cellular components: function and analysis of proteins, metabolism and biosynthesis of amino acids and nucleic acids, DNA replication and repair, DNA manipulations and recombinant technology, DNA transcription, RNA translation, protein modification, ~~and~~ regulation of gene expression, lipid metabolism, and photosynthesis.

Rationale: The course description has been modified to accurately reflect the material taught since the adoption of the biochemistry major.

**Effective Term: Fall 2017**

**3. Modify the following course:****BCHM 3403 BIOPHYSICAL CHEMISTRY****3-0-3**

Prerequisite: CHEM 2300 (minimum grade of C) and MATH 1161 (minimum grade of C)

Prerequisite or corequisite: PHYS 1112K or PHYS 2212K

The fundamentals of physical chemistry from a biochemical perspective. Topics including gas laws, heat and work, and the laws of thermodynamics, material and reaction equilibrium, standard thermodynamic functions, and reaction kinetics. Cross-listed with PHYS 3403.

Rationale: The pre-requisite for BCHM 3403 is being modified to match departmental policy on math pre-requisites.

**Effective Term: Fall 2017**

**4. Create the following course:****CHEM 3600 Polymer Chemistry****2-0-2**

Prerequisite: CHEM 2101 with a C or better

Fundamental principles in polymer chemistry. Topics include but are not limited to the history of polymers and macromolecules and their impact on modern society, preparation of polymers from both a conceptual and mechanistic perspective, molecular/bulk-chemical and physical properties of polymers, characterization, disposal, and breakdown of polymers, and biopolymers (e.g. DNA, RNA, proteins, polysaccharides).

Rationale: This course is being created to partially satisfy new mandated guidelines issued by the American Chemical Society to include more coverage of polymer concepts in the ACS-certified B.S. degree. Compliance with this mandate is necessary to retain the ACS certification. This course will be required of students earning the ACS-certified B.S. in Chemistry, and will serve as an elective course to those earning a B.S. or B.A. in Chemistry, a B.S. in Biochemistry, or individuals seeking a minor in chemistry.

**Effective Term: Spring 2017**

**CURCAT:**

**Major Department: Chemistry and Physics**

**Can Course be repeated for additional credit? No**

**Maximum Number of Credit Hours: 2**

**Grading Mode: Normal**

**Instruction Type: Lecture**

**Course Equivalent: None**

5. Make the following changes to the Programs of Study for the four departmental majors

**PROGRAM FOR THE DEGREE OF BACHELOR OF ARTS WITH A MAJOR IN CHEMISTRY**

**B. Major Field Courses** **33 hours**

Required (20 Hours)

CHEM 2101/2101L Organic Chemistry I with laboratory  
 CHEM 2102/2102L Organic Chemistry II with laboratory  
 CHEM 2300 Principles of Chemical Analysis  
 CHEM 3200 Inorganic Chemistry  
 CHEM 3401 Physical Chemistry: Thermodynamics and Kinetics

Approved upper-division electives (13 hours) in the major from:

CHEM 3300 Instrumental Analysis  
 CHEM 3402 Physical Chemistry: Quantum Mechanics and Spectroscopy  
**CHEM 3600 Polymer Chemistry**  
 CHEM 3801 Biochemistry I  
 CHEM 3802 Biochemistry II  
 CHEM 3803 Biochemistry Laboratory  
 CHEM 4100 Advanced Topics in Organic Chemistry  
 CHEM 4200 Advanced Topics in Inorganic Chemistry  
 CHEM 4300 Advanced Topics in Analytical Chemistry  
 CHEM 4400 Advanced Topics in Physical Chemistry  
 CHEM 4500 Chemistry Seminar  
 CHEM 4600 Advanced Topics in Interdisciplinary Chemistry  
 CHEM 4940 Special Topics in Chemistry  
 CHEM 4950 Special Lecture Topics in Chemistry  
 with a maximum 3 hours total from:  
 CHEM 3900 Chemical Research  
 CHEM 4800 Pedagogy and Supplemental Instruction in Chemistry  
 CHEM 4960 Internship  
 CHEM 4991 Advanced Chemical Research  
 Transfer credit for similar courses

**PROGRAM FOR THE DEGREE OF BACHELOR OF SCIENCE WITH A MAJOR IN CHEMISTRY**

**B. Major Field Courses** **39 hours**

CHEM 2101/2101L Organic Chemistry I with laboratory  
 CHEM 2102/2102L Organic Chemistry II with laboratory  
 CHEM 2300 Principles of Chemical Analysis  
 CHEM 3200 Inorganic Chemistry  
 CHEM 3300 Instrumental Analysis  
 CHEM 3401 Physical Chemistry: Thermodynamics and Kinetics  
 CHEM 3402 Physical Chemistry: Quantum Mechanics and Spectroscopy



CHEM 4500 Chemistry Seminar

9 hours from:

CHEM 3600, 3801, 3802, 3803, 4100, 4200, 4300, 4400, 4600, 4940, 4950,  
with a maximum 2 hours total from: CHEM 3900, 4800, 4960, 4991

**PROGRAM FOR THE DEGREE OF BACHELOR OF SCIENCE WITH A  
MAJOR IN CHEMISTRY WITH AMERICAN CHEMICAL SOCIETY  
CERTIFICATION**

**B. Major Field Courses**

**42 hours**

CHEM 2101/2101L Organic Chemistry I with laboratory

CHEM 2102/2102L Organic Chemistry II with laboratory

CHEM 2300 Principles of Chemical Analysis

CHEM 3200 Inorganic Chemistry

CHEM 3300 Instrumental Analysis

CHEM 3401 Physical Chemistry: Thermodynamics and Kinetics

CHEM 3402 Physical Chemistry: Quantum Mechanics and Spectroscopy

**CHEM 3600 Polymer Chemistry**

CHEM 3801 Biochemistry I

CHEM 4500 Chemistry Seminar

CHEM 4991 Advanced Chemical Research (3 hours)

~~Three~~ **Two** courses from:

CHEM 4100 Advanced Topics in Organic Chemistry

CHEM 4200 Advanced Topics in Inorganic Chemistry

CHEM 4300 Advanced Topics in Analytical Chemistry

CHEM 4400 Advanced Topics in Physical Chemistry

CHEM 4600 Advanced Topics in Interdisciplinary Chemistry

**Effective Term: Fall 2017**

C. Computer Science and Information Technology (no items)

**D. Engineering Studies**

*Items 1-3 from the Engineering Studies Program were discussed and approved by the committee. They are being submitted to the Faculty Senate for approval.*

**1. Modify an existing course:**

**ENGR 2001 STATICS**

**3-0-3**

Prerequisite: PHYS 2211K **and** MATH 2072

~~Pre or corequisite:~~ MATH 2083

Rationale: Armstrong's dominant partner transfer institutions do not require Calculus III as a co-requisite for this course. Allows more flexibility for proposed BSATL program.

**Effective Term: Fall 2017**

**2. Create the following three courses to support the proposed BSATL degree:**  
**a. ENGR 2900 Fundamentals of Project Leadership** **2-0-2**

Prerequisite: ENGR 2110

Description: This course provides a comprehensive understanding of how to plan, optimize and efficiently manage projects (or tasks) to implement products, services or developments. This includes building structures, processes, components and linkages with a team for successful project delivery within schedule, budget and quality requirements.

Rationale: In today's cost-competitive and often complex work environment, STEM employees are very likely to be called upon to manage projects (or tasks) related to their company's products, services, or developments in an optimized, efficient manner. This course provides students with skills and knowledge in organizing multi-disciplinary teams to achieve successful project outcomes; enables students to understand the key components of a successful project and to embed the necessary processes, components, and attributes into execution of their projects; allows practice of communication skills to organize project teams; and allows students to develop project trouble-shooting capabilities through careful analysis and root cause determinations. Specific learning objectives are: To prepare students to plan, develop, lead, manage, and successfully implement and deliver projects within their chosen practice area. This involves an in-depth study of the various components, phases, and attributes of a project. Students will have the opportunity to link their knowledge and skills together to understand the basis of a successful project.

**Effective Term: Fall 2017, Pending BOR approval of degree**

**CURCAT:**

**Major Department: Engineering Studies**

**Can Course be repeated for additional credit? No**

**Maximum Number of Credit Hours: 2**

**Grading Mode: Normal**

**Instruction Type: Lecture**

**Course Equivalent: None**

**b. ENGR 4100 Systems and Project Design I** **1-2-3**

Prerequisite: ENGR 2900, senior standing in the BSATL program

Description: The first course in two semester design course sequence in which students design a component, process or system using their STEM knowledge and skills acquired in earlier course work while incorporating appropriate technical

standards and realistic constraints. Students will use standard management and planning tools to execute their designs, incorporating specification development, detailed design and quality assurance. 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.

Rationale: A final design course that combines theoretical STEM constructs with real world constraints will enhance the student's ability to develop practical technical solutions to real world STEM related problems, improve critical thinking and project management. Students will have the opportunity to understand the relationships across disciplines and use those relationships to optimize the performance of some physical system or process. The first course provides experience in project planning, problem definition, feasibility studies, developing research based customer requirements, specification development, evaluating competition, and detailed design with prototype production.

The objectives are to:

- a. Familiarize the student with the technical design process: Definition, Synthesis, and Analysis
- b. Have students understand, develop and apply effective communication practices.
- c. Have students understand, develop and apply effective organizational practices
- d. Simulate the post graduate job environment

**Effective Term: Fall 2017, Pending BOR approval of degree**

**CURCAT:**

**Major Department: Engineering Studies**

**Can Course be repeated for additional credit? No**

**Maximum Number of Credit Hours: 3**

**Grading Mode: Normal**

**Instruction Type: Lecture and Lab**

**Course Equivalent: None**

- c. **ENGR 4110 Systems and Project Design II** 1-2-3  
 Prerequisite: ENGR 4100  
 Description: The second course in two course design sequence in which student's design a component, process or system using their STEM knowledge and skills acquired in earlier course work while incorporating appropriate technical standards and realistic constraints. Students will develop and use product/process evaluation and product/process implementation and support tools. The Systems and Project Design II course serves as the second of a two semester design course intended to prepare the student for industry.

Rationale: A final design course that combines theoretical STEM constructs with real world constraints will enhance the student's ability to develop practical technical solutions to real world STEM related problems, improve critical thinking and project management. Students will have the opportunity to understand the relationships across disciplines and use those relationships to optimize the performance of some physical system or process. The second course provides experience in using standard product evaluation tools, quality assurance, product/process support, product end of life, with emphasis on economic, environmental, social, political impacts.

The objectives are to:

- a. Familiarize the student with the technical design process: Design Evaluation, Implementation and Support.
- b. Have students understand, develop and apply effective communication practices.
- c. Have students understand, develop and apply effective organizational practices.
- d. Stress importance of other influences on design such as economics, reliability, performance, safety, ethics and social impacts.
- e. Simulate the post graduate job environment

**Effective Term: Fall 2017, Pending BOR approval of degree**

**CURCAT:**

**Major Department: Engineering Studies**

**Can Course be repeated for additional credit? No**

**Maximum Number of Credit Hours: 3**

**Grading Mode: Normal**

**Instruction Type: Lecture and Lab**

**Course Equivalent: None**

### **3. Create a Bachelor of Science with a Major in Applied Science, Technology and Leadership**

#### **A. General Requirements (Core Areas A, B, C, D.IIA, E) 42 hours**

In core area A, MATH 1113 Pre-Calculus must be taken

In core area D, MATH 1161 Calculus I must be taken for the course in mathematics, science, or technology

In core area D, the laboratory science sequence must be taken from

PHYS 2211K/2212K Principles of Physics I/II

CHEM 1211/1211L and either CHEM 1212/1212L or 1212H (and lab)

Principles of Chemistry I/II

#### **Core Area F**

**18 hours**

PHYS 2211K/2212K Principles of Physics I/II unless taken in core area D otherwise

CHEM 1211/1211L and either CHEM 1212/1212L or 1212H (and lab)

ENGR 1170 Engineering Graphics

ENGR 1371 Computing for Engineers

ECON 2106 Principles of Microeconomics

1 hour excess from Area D

**Physical Education**

**3 hours**

**First-Year Seminar**

**1 hour**

**B. Major Field Courses**

**33 hours**

MGMT 3220 Management

ECON 3450 Environmental Economics

ENGR 2001 Statics

ENGR 2110 Creative Decisions and Design

ENGR 3322 Thermodynamics

ENGR 3700 Circuits and Electronics

ENGR 4100 Systems and Project Design I

ENGR 4110 Systems and Project Design II

MGMT 3111 Skills in Entrepreneurship

Two courses taken from the following options:

MKTG 3210 Marketing

ECON 3500 Managerial Economics

PSYC 5300U Leadership and Group Dynamics

**C. Related Field Courses**

**27 hours**

ENGR 1100 Introduction to Engineering

MATH 2072 Calculus II

ENGL 3720 Business and Technical Communication

ENGR 2900 Fundamentals of Project Leadership (2)

15 hours from the following, excluding any course already taken as a major field course (with 9 hours at the 3000 level or greater)

ACCT 2101 Principles of Financial Accounting

BIOL 1140 Environmental Biology

CSCI 1301 Introduction to Programming Principles

CSCI 1302 Advanced Programming Principles

CSCI 3201 Foundations of Digital Systems

CSCI 3301 UNIX and Secure Web Development

ECON 2105 Principles of Macroeconomics

ECON 3230 Finance

ECON 3500 Managerial Economics

ECON 4451 Industrial Organization

ENGR 2025 Signal Processing (4)

ENGR 2030 Introduction to Computer Engineering

ENGR 2000 Engineering Materials

ENGR 2010 Computational Modeling

ENGR 2202 Dynamics

ENGR 3100 Circuit Analysis

ENGR 3220 Mechanics of Materials

ENGR 3230 Fluid Mechanics

ENGR 3320 Heat Transfer

ENGR 3960 Engineering Internship

ENGR 4990 Topics in Engineering

ENGR 4999 Independent Study

GEOG 1100 World Regional Geography

GEOG 3112 Geographic Information Systems  
 GEOG 3800 Advanced Geographic Information Systems  
 MATH 2160 Linear Algebra  
 MATH 3411 Differential Equations  
 MATH 3460 Introduction to Operations Research  
 MATH 3480 Optimization  
 MKTG 3210 Marketing  
 PHIL 3340 Symbolic Logic  
 PHYS 3312 Electromagnetism  
 PHYS 3120 Digital Electronics  
 PHYS 4120 Scientific Measurement with Digital Interfacing  
 PHYS 4200 Analysis and Synthesis of Mechatronic Systems  
 PSYC 1101 Introduction to Psychology  
 PSYC 3200 Industrial and Organizational Psychology  
 PSYC 5300U Leadership and Group Dynamics  
 STAT 3211 Probability and Statistics Applications I

**Total Semester Hours**

**124 hours**

**D. Exit Exam**

Rationale: See Attachment 1. A Sample Curriculum is shown below.

<b>Freshman Year</b>	
<b>Fall Semester</b>	<b>Spring Semester</b>
ENGL 1101 English I (3) MATH 1113 Pre-Calculus I (3) CHEM 1211/1211L Chemistry I (4) ENGR1100 Introduction to Engr. (3) FYSS 1000 First Year Experience (1) Core area B1 (2)  16 hours	ENGL 1102 English II (3) ENGR 1170/1170L Engineering Graphics (3) MATH 1161 Calculus I (4) CHEM 1212/1212L Chemistry II (4) PEBC 1XXX (1)  15 hours
<b>Sophomore Year</b>	
<b>Fall Semester</b>	<b>Spring Semester</b>
PHYS 2211K Physics I (4) MATH 2072 Calculus II (4) ENGR 1371 Computing for Engr. (3) Core area B2 (2) ECON 2106 Microeconomics (3)  16 hours	ENGR 2001 Statics (3) PHYS 2212K Physics II (4) Core area C2 (3) ENGR 2110 Creative Decisions and Design (3) MGMT 3220 Management (3)  16 hours
<b>Junior Year</b>	
<b>Fall Semester</b>	<b>Spring Semester</b>
*ENGR 2900 Project Leadership (2) Related field elective I (3) ENGR 3710 Circuits and Electronics (3) ENGL 3720 Business and Tech. Comm. (3)	ENGR 3322 Thermodynamics (3) Related field elective II (3) #Major Field Option #1 (3) Core area E2 (3)

Core area E1 (3) PEBC 1XXX (1)  15 hours	Core area C1 (3) PEBC 1XXX (1)  16 hours
<b>Senior Year</b>	
<b>Fall Semester</b>	<b>Spring Semester</b>
*ENGR 4100 Systems and Project Design I (3) Related field elective III (3) MGMT 3111 Skills in Entrepreneurship (3) #Major field option #2 (3) Related field elective IV(3)  15 hours	*ENGR 4110 Systems and Project Design II (3) ECON 3450 Environmental Economics (3) Core area E3 (3) Core area E4 (3) Related field elective V (3)  15 hours

120 hours plus 3 hours of PE and 1 hr FYSS, \*-New Courses (3), # MKTG3210, ECON3500 or PSYC5300U

- E. Mathematics (no items)
- F. Psychology (no items)

**ADJOURNMENT.** The meeting was adjourned at 4:45 p.m.

Respectfully submitted,

Phyllis L. Fulton  
Catalog Editor and Secretary to the Committee

Formal Prospectus for Proposed Bachelor of Science in Applied Science, Technology and Leadership at  
Armstrong State University

**1. Program Description**

The Bachelor of Science in Applied Science, Technology and Leadership (BSASTL) is a flexible, customizable and interdisciplinary program that combines Science, Technology, Engineering and Mathematics (STEM) areas with business, management and entrepreneurship. The objective is to develop local, regional and national workforce innovation by graduating students with strong analytical ability, business acumen and leadership skills. BSASTL graduates will be expected to have technical problem-solving and critical thinking skills acquired from STEM coursework along with the organizational, planning, and leadership capabilities obtained from business coursework. There are no other undergraduate degree programs in the University System of Georgia of this nature. The proposed program is interdisciplinary, combining a wide variety of STEM courses with business courses such as finance, entrepreneurship, management and marketing.

Armstrong's BSASTL degree is expected to prepare students for project or general management positions involving current or emerging Science, Technology, Engineering or Mathematical (STEM) systems and personnel. Additionally, the BSASTL has an entrepreneurial component that increases the potential that graduates will engage in entrepreneurial and/or intrapreneurial pursuits in science, engineering and technology. As graduates are not limited to managing STEM systems only, their business and management coursework also prepares them to work as managers in non-STEM sectors such as banking, transportation, insurance and retail.

The BSASTL degree's curriculum is tailored towards the needs of local and regional industry in order to provide students with a sufficient depth in STEM to be employed as technical analysts or technical managers in training. The proposed program focuses on combining a broad knowledge of STEM systems and business principles. STEM coursework will be approximately 60% of the major coursework; this includes fundamental applied science subjects such as physics, environmental biology, chemistry, and general engineering courses.

The program will be delivered by traditional classroom and laboratory instruction. The majority of proposed courses are already being offered regularly by Armstrong's College of Science and Technology. The fundamental engineering courses offered are already also regularly being taught at Armstrong since it is partner in the Regents' Engineering Pathways Program (REPP). Other STEM courses and business courses are also already being taught, respectively within the College of Science and Technology and the Economics department. No additional faculty or resources will be needed for initial program implementation. The proposed curriculum is provided in Table 1. Only four new courses will be needed to implement this program, these are designated with an asterisk in Table 1. As local industry has a vested interest in the program, we expect strong partnerships with industry through internships, tours, curriculum review or other similar advisory boards, scholarships, and research. The program will be located on Armstrong's main campus in Savannah, GA.



**Table 1:** Proposed Bachelor of Science in Applied Science, Technology and Leadership Four Year Course Schedule

<b>Freshman Year</b>	
<b>Fall Semester</b>	<b>Spring Semester</b>
ENGL 1101 English I (3) MATH 1113 Pre-Calculus I (3) CHEM 1211/1211L Chemistry I (4) ENGR1100 Introduction to Engr. (3) FYSS 1000 First Year Experience (1) Core area B1 (2)  16 hours	ENGL 1102 English II (3) ENGR 1170 Engineering Graphics (3) MATH 1161 Calculus I (4) CHEM 1212/1212L Chemistry II (4) PEBC 1XXX (1)  15 hours
<b>Sophomore Year</b>	
<b>Fall Semester</b>	<b>Spring Semester</b>
PHYS 2211K Physics I (4) MATH 2072 Calculus II (4) ENGR 1371 Computing for Engr. (3) Core area B2 (2) ECON 2106 Microeconomics (3)  16 hours	ENGR 2001 Statics (3) PHYS 2212K Physics II (4) Core area C2 (3) ENGR 2110 Creative Decisions and Design (3) MGMT 3220 Management (3)  16 hours
<b>Junior Year</b>	
<b>Fall Semester</b>	<b>Spring Semester</b>
*ENGR 2900 Project Leadership (2) Related field elective I (3) ENGR 3710 Circuits and Electronics (3) ENGL 3720 Business and Tech. Comm. (3) Core area E1 (3) PEBC 1XXX (1)  15 hours	ENGR 3322 Thermodynamics (3) Related field elective II (3) #Major Field Option #1 (3) Core area E2 (3) Core area C1 (3) PEBC 1XXX (1)  16 hours
<b>Senior Year</b>	
<b>Fall Semester</b>	<b>Spring Semester</b>
*ENGR 4100 Systems and Project Design I (3) Related field elective III (3) MGMT 3111 Skills in Entrepreneurship (3) #Major field option #2 (3) Related field elective IV(3)  15 hours	*ENGR 4110 Systems and Project Design II (3) ECON 3450 Environmental Economics (3) Core area E3 (3) Core area E4 (3) Related field elective V (3)  15 hours

120 hours plus 3 hours of PE and 1 hr FYSS, \*-New Courses (3), # MKTG3210, ECON3500 or PSYC5300U

Related field electives are chosen from the courses below which are already regularly offered:

1. ACCT 2101 Principles of Financial Accounting
2. BIOL 1140 Environmental Biology
3. CSCI 1301 Introduction to Programming Principles
4. CSCI 1302 Advanced Programming Principles
5. CSCI 3201 Foundations of Digital Systems
6. CSCI 3301 UNIX and Secure Web Development
7. ECON 2105 Principles of Macroeconomics
8. ECON 3230 Finance
9. ECON 3500 Managerial Economics

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|---|---|
| 10. ECON 4451 Industrial Organization                 | 26. MATH 2160 Linear Algebra                                  |
| 11. ENGR 2025 Signal Processing (4)                   | 27. MATH 3411 Differential Equations                          |
| 12. ENGR 2030 Introduction to Computer Engineering    | 28. MATH 3460 Introduction to Operations Research             |
| 13. ENGR 2000 Engineering Materials                   | 29. MATH 3480 Optimization                                    |
| 14. ENGR 2010 Computational Modeling                  | 30. MKTG 3210 Marketing                                       |
| 15. ENGR 2202 Dynamics                                | 31. PHYS 3312 Electromagnetism                                |
| 16. ENGR 3100 Circuit Analysis                        | 32. PHYS 3120 Digital Electronics                             |
| 17. ENGR 3220 Mechanics of Materials                  | 33. PHYS 4120 Scientific Measurement with Digital Interfacing |
| 18. ENGR 3230 Fluid Mechanics                         | 34. PHYS 4200 Analysis and Synthesis of Mechatronic Systems   |
| 19. ENGR 3320 Heat Transfer                           | 35. PSYC 1101 Introduction to Psychology                      |
| 20. ENGR 3960 Engineering Internship                  | 36. PSYC 3200 Industrial and Organizational Psychology        |
| 21. ENGR 4990 Topics in Engineering                   | 37. PSYC 5300U Leadership and Group Dynamics                  |
| 22. ENGR 4999 Independent Study                       | 38. STAT 3211 Probability and Statistics Applications I       |
| 23. GEOG 1100 World Regional Geography                |   |
| 24. GEOG 3112 Geographic Information Systems          |   |
| 25. GEOG 3800 Advanced Geographic Information Systems |   |

***Justification of the need***

**a. Local**

Armstrong's College of Science and Technology recently conducted three surveys, one was issued to local high schools students, the second was issued to current students in the Associates of Science program at Armstrong and the third was issued to local employers. The results were as follows:

High School Survey Results:

Number of students:

110

1. 40% were either very or extremely interested in pursuing a degree program that combines science, engineering, business and entrepreneurship
2. 20% were moderately interested in pursuing a degree program that combines science, engineering, business and entrepreneurship
3. 30% either agreed or strongly agreed that they would prefer to pursue the BS degree in Applied Science, Technology and Leadership at Armstrong State University rather than a specialized Science or Engineering degree.

Local Industry Survey Results:

Number of participants:

27

1. 78% agree that a program that combines STEM, management and entrepreneurship would be beneficial to the southeast region.
2. 67% indicated that it was very valuable to their program that the managers and operations personnel have a strong STEM background.
3. 33% indicated that it was critical to their stability and growth that the managers and operations personnel have a strong STEM background.
3. 90% would hire or recommend for hire a BSASTL graduate for entry level technical positions at your company or in your department, if relevant tracks are implemented.
4. The majority (74%) of technical and management employers in the local and surrounding area have indicated that there is an ongoing challenge regarding the retention of employees with applied scientific and technical skills who come from outside the local region.

Local businesses report that the typical graduate with a technical degree who comes from a larger city, ex. Atlanta, leaves their position after a couple years. As the majority of Armstrong graduates are from the local area, BSASTL graduates of Armstrong are more likely to stay in positions offered locally. This serves to improve local STEM management capabilities by providing stability within local companies.

#### Armstrong Student Survey Results:

Number of participants:

63

1. 32% indicated they were very or extremely likely to pursue this degree at Armstrong if it were offered.
2. 29% indicated they were moderately likely to pursue this degree at Armstrong if it were offered.

The BSASTL degree provides another pathway for 4 year STEM degree completion for our current Associates of Science graduates. The proposed program is also designed to produce graduates who are prepared to energize the market with entrepreneurial ventures leading to new start-up companies in STEM fields, as well as intrapreneurship within existing companies. Both paths are sources of job creation, which, according to the University of Georgia's Terry College of Business annual report for 2015, is a significant driving factor for Georgia's economic growth.

With the exponential advancement of technology and advanced scientific principles in all aspects of business, there is now a clear demand for managers, supervisors and start-up entrepreneurs who have a strong STEM background [1, 2, 3, 4]. Science, engineering and technological tools are now being utilized ubiquitously in order to help businesses compete and thrive in the modern age. It is imperative that managers, supervisors, entrepreneurs and innovators within companies develop the ability to quickly learn increasingly complex organizational and management tools, whose designs are grounded in mathematics and applied science.

With a strong foundation in STEM, BSASTL graduates will have the business breadth to be employed as managers and supervisors in STEM and non-STEM fields, as well as enough technical depth to work directly as STEM professionals. The Georgia Department of Labor (GDOL), Department of Workforce Information & Analysis [5] predictions for management positions from 2012-2022 are shown in Table 2. BSASTL graduates will be well qualified for employment in the management sectors listed in Table 2. According to the GDOL, general and operations management positions will rank HIGHEST among ALL occupations requiring a Bachelor's degree with the most openings, with some 2,608 projected openings annually. Management analysts and general and operations management are second and third among ALL occupations requiring a Bachelor's degree with the greatest total predicted growth, 26.7% and 18.9% respectively. Both sectors are expected to add a combined 22,940 jobs from 2012-2022. Industrial production management and engineering management sectors are also predicted to grow 4.6% and 19.8%, respectively, adding a combined 1,170 jobs for the same period. Other potential employment fields include cost estimation, compliance officers, logisticians, business operations managers, natural sciences managers and training and development specialists, all of which are predicted to grow as well, adding a combined total number of 9,200 new jobs.

**Table 2: GDOL projections for management job growth 2012-2022 [5]**

Occupation	2012 Base Employment	2022 Projected Employment	Total Change in Employment	Percent Change in Employment	Annual Growth Rate
General and Operations managers	71,410	84,890	13,480	18.9%	1.7%
Management Analysts	35,490	44,950	9,460	26.7%	2.4%
Industrial Production Managers	4,110	4,300	190	4.6%	0.5%
Architectural and Engineering Managers	4,910	5,890	980	19.8%	1.8%
Compliance Officers	6,810	7,170	360	5.3%	0.5%
Cost Estimators	4,780	6,440	1,660	34.7%	3.0%
Logisticians	4,120	5,130	1,010	24.6%	2.2%
Business Operations Specialists, All Other	34,210	37,530	3,320	9.7%	0.9%
Natural Sciences Managers	2,060	2,470	410	19.9%	1.8%
Training and Development Specialists	7,190	8,170	980	13.6%	1.3%
Chief Executives	14,840	16,390	1,550	10.5%	1.0%

**b. Investments in sectors relevant to the BSASTL**

BSASTL graduates can also be expected to find employment in aerospace, automotive and logistics sectors. According to the Georgia Department of Economic Development (GDEcD) 2014 report [6], investments in aerospace, automotive and logistics increased by 57%, 149% and 152% respectively. Additionally, BSASTL graduates may find employment in the defense, energy and the environment and manufacturing sectors, which have been identified by the GDEcD as playing a key role in Georgia's economic growth over the next decade.

The following are a list of mostly local companies that have indicated a willingness to support the program

- JC Bamford Excavators LTD
- Southern Company

- Mitsubishi Power Systems
- Delta Metals
- Smith and Vandebuck Engineering
- Thomas and Reel Engineering
- Georgia Ports Authority
- **Savannah Economic Development Authority**
- SIEMENS
- Eberley and Associates
- Chatham Engineering

***c. Emerging, Non-traditional and Interdisciplinary STEM fields***

For many professional technical positions, companies will generally train entry level graduates from 2-4 months to develop competence for either very broad or very specific STEM fields. Many project management or project engineering jobs typically require the applicant to hold any science, engineering or technical degree, i.e. expertise in a traditional area such as “electrical engineering” is generally not a requirement. Sample project engineering and project management jobs are provided in the Appendix. Note that the degree requirements for these positions are typically non-specific while maintaining a bias towards a strong STEM foundation. Requirements are listed as: a degree in a technical field, a degree in engineering or a related area, a degree in applied science etc. Project management/engineering can also be associated with a variety of sub-fields such as manufacturing, chemical processes, production, renewable energy, reliability, quality assurance, non-destructive testing, accident reconstruction and materials. Managers with a STEM background will have a distinct advantage in these fields.

Renewable energy is an emerging market that has repeatedly demonstrated itself as having an increasing essential role in the economic sustainability of our energy systems. The DOE recently released a 2016 study which indicated that state-level renewable electricity standards (RES) are helping to substantially improve public health and the environment, create jobs, and protect consumers [7]. Proper selection of electives available within the BSASTL curriculum would provide students with a fundamental knowledge and skill sets needed to pursue careers in alternative or renewable energy systems.

The inability to recruit entry-level professional technical personnel who are willing to relocate and/or retain these persons is a common problem faced by technical companies in Savannah-Chatham and neighboring areas. In a recent survey issued by Armstrong to local managers, 80% of them indicated that retention of professional technical personnel from the larger cities (ex. Atlanta, Houston, Charlotte, Orlando etc.) was not easy. This inability slows rural Georgia’s economic growth as the productivity of these companies is impacted by low recruitment and retention of capable entry level STEM workers or technical managers in training. 84% of respondents indicated that it was somewhat or very important that managers possess fundamental STEM knowledge. 58% agreed that a BSASTL graduate would have a strong potential to develop and implement innovative new product or services within your company or department. 84% also agreed that a graduate's ability to develop and implement innovative new products or services within their organization was somewhat or very important. 80% of managers surveyed agreed that employees with a broad STEM background coupled with fundamental business

principles would be beneficial to the southeast region. 90% of managers indicated that they would likely hire or recommend for hire a BSASTL graduate for specialized entry level technical positions at their company or in their department, if Armstrong implemented 4-5 courses in tracks related to their industry.

Armstrong's BSASTL degree contains courses relevant to the skill-set reported to be in demand by the STEM companies in the region. Armstrong graduates with a BSASTL degree will therefore be capable of filling local workforce needs in the short and long term.

**d. National**

According to the US Department of Labor, the majority of US businesses hire managers with applied science, engineering or business backgrounds [8]. The US Bureau of Labor Statistics indicates that technical managers should see employment growth of seven percent during the 2012-2022 decade. Project management principles have their roots in systems engineering. The rapid evolution of technology has allowed more persons with non-technical backgrounds to learn and apply complex analytical techniques that were once only available to mathematicians, scientists and engineers. However, if 21st century managers use these technological tools as black boxes, this would be a recipe for disaster. Recent texts and peer reviewed literature [9, 10, 11, 12] support the assertion that the complexity and diversity of computational methods used in project management are expected to increase. 21st century managers will therefore need a stronger grasp of the fundamental computational and applied scientific concepts behind the myriad of technology based management tools in use in order to apply them safely and effectively.

While there has been a push for a stronger technical foundation for managers, current peer reviewed literature indicates that 21st century technical professionals (scientists, engineers) will need substantially more breadth to include business and management practices [13, 14, 15, 16, 17]. The proposed degree will provide STEM graduates with the skill and knowledge to work as technical personnel who also having a firm grasp of general business principles. This type of technical employee is then an ideal candidate for leadership and management roles.

**e. Non duplication of similar USG programs**

Table 3 lists USG programs which currently offer subset components of the proposed degree, however no other program in the USG combines STEM courses with business and entrepreneurship to form a single Bachelor's degree. The management programs listed in Table 3 do have an entrepreneurial track; however the traditional engineering or science programs (not shown) do not. Additionally, none of the management programs listed incorporates as large a variety and quantity of additional STEM courses as the BSASTL program.

**Table 3:** Programs in USG with some aspects of the BSASTL.

	Georgia Southern	Georgia Tech	Savannah State	Armstrong State
Fundamental	Y	Y	Y	Y

Sciences				
Traditional engineering	Y	Y	N	*
Traditional Engineering Technology	N	N	Y	N
Construction Management	Y	N	N	N
Management	Y	N	Y	*
Business Admin	N	Y	N	*
Entrepreneurship Track	Y	Y	Y	*

\*The proposed degree contains elements of fundamental STEM subjects, business, management and entrepreneurship.

Table 4 provides the numbers of graduates with other specialized degrees that might compete with BSASTL graduates for jobs. The total number of graduates average 3,613 per year from 2012-2014. Based on Table 1, the number of job openings in areas available for these graduates will average 3,242 per year. According to a Georgia Tech 2012 survey, 48% of Georgia Tech graduates did not stay in state, while generally 31-45% of college graduates in Georgia can be expected to migrate to another state after graduation [18, 19]. Assuming a conservative state retention rate of 70% for Georgia recent college graduates in relevant fields, and that current USG graduation rates increase by 10% over 10 years, we estimate job availabilities of 505 per year  $[(3,242 - (0.70 * 3,613 * 1.01))]$  for local graduates of the proposed program. While potential in-migrant college graduates may also vie for these available positions, we argue that well qualified local graduates will be preferentially considered for the following reasons:

- Interviewers can access Georgia graduates faster,
- The scheduling for follow up interviews is more flexible,
- The process is cheaper as travel or relocation costs are nonexistent or minimal
- Companies generally prefer not to wait for applicants to move before they can begin working
- There is a concern that non-local candidates may not adjust to the new culture i.e. retention issues. According to our survey to local businesses, the majority overwhelmingly indicated that local graduates are less likely to leave their positions (to return to larger cities) compared to non-local graduates.

This estimate also does NOT consider the possibility of BSASTL graduates CREATING jobs (given that entrepreneurial coursework is included in the curriculum), job growth due to an improved economy or

that some 50% of traditional engineering graduates will work directly in their fields [20]. These considerations would result in an increase in job availability which, BSASTL graduates could readily fill.

**Table 4** Graduates of programs in which students may compete for similar jobs as BSASTL graduates

		2012	2013	2014
Georgia Tech	Engineering*	998	1054	1095
	Business/management	348	391	392
Georgia State	Business/management	287	256	273
University of Georgia	Business/management	194	192	178
	Engineering**	11	17	20
Georgia Southern	Business/management	125	136	112
	Logistics	76	84	103
	Engineering	n/a	17	113
	Engineering Technology	89	63	107
Kennesaw State/SPSU	Business/management	271	245	235
	Engineering	33	86	116
	Engineering Technology	193	211	131
Univ. N. Georgia	Business/operations/management	70	96	120
Dalton State College	Business/management	23	39	32
Savannah State	Business/management	38	40	43
	Civil Engineering Technology	6	12	12
Georgia Regents	Business/management	36	42	47
Univ. W. Georgia	Business/management	117	121	140
Valdosta State	Business/management	77	86	59
Albany State	Business/management	95	59	52
	Logistics	2	4	6
Clayton State	Business/management	59	53	40
	Logistics	23	23	35
Columbus State	Business/management	54	38	55
Fort Valley State	Business/management	34	43	23
Georgia College & state	Business/management	92	128	102
Georgia Southwestern	Business/management	119	101	90
Total		3470	3637	3731



\*mechanical, civil, aerospace, and industrial only

\*\*agricultural, biochemical, biological, computer excluded

***f. Alignment with USG initiatives***

The February, 2012 PCAST Report, Engage to Excel, recommends that post-secondary institutions produce 1 million more STEM graduates in the next decade. In response, the USG STEM initiative is working aggressively with USG institutions and K-12 partners to increase the number of K-12 students who are prepared for and are interested in majoring in STEM disciplines in college. The BSASTL degree is a viable and attractive STEM degree for the state of Georgia, particularly for the high school graduates in Southeastern Georgia.

Armstrong currently offers an Associates of Science (AS) degree with various tracks in the applied sciences. The proposed program is designed to provide AS graduates with a viable option which enables them to seamlessly transition to a four year STEM program at Armstrong. While many AS graduates transition to existing bachelor's programs such as chemistry, math or physics, many surveyed have also indicated a desire to pursue a more flexible program that provides broader options and better connects them to the local STEM businesses and technologies, rather than the pure sciences (See survey results in Need section). Additionally, based on our survey 30% of our students who originally enrolled in the REPP program have been unable to transition to the school of their choice for many reasons that include personal, financial and academic. These students have indicated a strong desire to complete a BS degree at Armstrong that accepts courses they have already taken (and passed) for the REPP program. We conservatively estimate some 50+ students between these two groups. This program therefore fills a unique void by providing students who desire or already have a foundation in STEM, pathways to a Bachelor's degree that can be tailored to meet the needs of a changing job market. Additionally, BSASTL graduates will have the business acumen and entrepreneurial skills to develop new businesses, thereby becoming sources of job creation within the state of Georgia and beyond.

***g. Need for Resources***

Armstrong does NOT require any new resources or additional faculty in order to offer the proposed degree. The Engineering Studies (ES) faculty are currently teaching fundamental engineering courses as a component of the Regents Engineering Pathways Program (REPP). ES faculty would teach the additional upper level courses by reducing the number of lower level sections currently offered for some courses. For example, certain sections that have consistently had 13-15 students will be combined to make one section. Other lower level courses will be offered one semester per year instead of two. The required business courses are already being taught by Armstrong's business and economics faculty and can therefore be implemented by the economics department without the need for new economics faculty, until capacity grows substantially.

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APPENDIX  
Sample Job Postings

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**Lighting Project Manager**, Power Design Incorporated Atlanta, GA 12/16/2015

**Job Description**

The Lighting Project Manager is responsible for partnering with the electrical project managers in the selection, procurement and distribution for all lighting fixtures for construction projects.

**SPECIFIC RESPONSIBILITIES INCLUDE, BUT ARE NOT LIMITED TO:**

- Work directly with the electrical project manager and customer on product selection.
- Research, negotiate and procure lighting vendors and materials and other products as needed, using cost and quality comparisons to find the product to best suit the customer's needs.
- Directly manage the distribution process of the selected product in the most cost effective and timely manner.
- Plan and schedule lighting resources to meet project milestones.
- Manage project related correspondence and documents.

**Job Requirements**

- **Bachelor's degree or equivalent experience required.**
  - Demonstrated knowledge of the lighting supply chain process, or have similar experience within construction-specific distribution.
  - General knowledge of electrical contracting, lighting design, distribution and construction processes.
  - Ability to multi-task in a high volume fast paced work environment with very tight deadlines.
  - Strong verbal and written communication skills.
  - Organized, detail oriented and efficient.
  - Must be proficient with the Microsoft Office suite.
  - Demonstrate and uphold all the core values of Power Design, which include integrity, accountability.
  - Demonstrate and uphold all of Power Design's core values, which include integrity, accountability, teamwork, innovation and growth.
  - Non-smoker.
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**Designer UGX - Entry Level, E-Z-Go - Augusta, GA 30903 12/3/2015****Job Description**

In support of current product the Designer will work with project engineers and system specialist in the design, development and integration of mechanical and electrical systems into people and burden carrying vehicles. As part of Engineering, She/he will often work with a variety of departments such as marketing, sales, purchasing, and/or planning to design component parts, platform level systems, and vehicles that are attractive, functional and perform well.

**Responsibilities:**

- Creates and revises Engineering documents.
- Prepares Engineering change records and documents.
- Creates complex CAD models from sketches and/or layout geometry.
- Produces Engineering drawing views from CAD geometry.
- Creates and releases Engineering component and assembly drawings.
- Ensures accuracy and completeness of assigned projects.
- Solves moderately complex and complex design problems.
- Works with outside suppliers to develop new components and systems.
- Works interactively with other departments within company to achieve goals.
- Develops and utilizes project timelines to meet design goals.
- Develops and utilizes DFMEAs for components and assemblies.
- Assist engineers with patent opportunities; prepare design information for patent disclosures.
- Develops design packaging layouts and performs tolerance studies of components and assemblies.
- Incorporates Geometric Dimensioning and Tolerancing (GD&T) on Engineering Drawings.
- Performs Design for Assembly (DFA) and Design for Manufacturing (DFM) assessments of comp.& asms.
- Maintains documentation, records, and notes concerning design history.
- Pursues continuous improvement and personal learning in both technical and business practices.
- Supports other Product Engineering and Textron Specialized Vehicles functions as required.

**Job Requirements**

- Work Complexity – Comfortably manages and completes a wide range of complex technical work assignments

- Problem Solving – Possesses and demonstrates skills that provide solutions to a variety of technical problems of moderate to difficult scope and complexity. Solutions marked by uniqueness and creativity.
- Knowledge/Creativity – Possesses and demonstrates a complete understanding and application of a wide variety of design principles, concepts and techniques. Provides design solutions to a wide range of difficult problems. Solutions are thorough, practical and consistent with engineering objectives. Frequently they are unique and creative.
- Independence – Works under general supervision. Independently determines and develops an approach to a solution. Work is reviewed upon completion.
- Lead Project Elements – Frequently leads all elements of the project. Provides frequent input to supervisor in establishing the design direction of the work project.
- Lead Entire Projects – Follows the leadership/direction of supervisor, engineer or other senior designers.
- Impact – Contributes to the completion of specific overall tasks. Errors in work may cause serious delays in program schedules and considerable expenditure of resources
- Negotiates/Manages External Performance – Maintains some contact with other functional areas as well as engineering. Represents Engineering in providing solutions to moderately technical issues associated with specific designs or components.
- Mentors – Provides formal mentoring input to others. Looks for opportunities to assist others toward improving their skills and/or understanding of technical or process related issues on their work projects.
- UG or other CAD training and experience
- Teamcenter or other CAD product data management tools
- Visual Basic or other programming languages
- Microsoft office products
- DFMEA software

### **EDUCATION:**

- Associate of Science degree in a technical field, **Bachelor of Science degree in a technical field**, or equivalent work experience

### **LICENSE AND/OR CERTIFICATION REQUIREMENTS:**

N/A

### **Physical Demands:**

- N/A

### **Additional Information:**

Direct Reports: None

Travel Requirements: 10 – 15%

Relocation Benefits: No

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**ENTRY-LEVEL ENGINEER/SCIENTIST, ITB, Merritt Island, Florida**

Anticipated Hire Date: January 2016

ITB, Inc is an engineering, management, and technical support firm that provides innovative management and technology-based solutions to government agencies and industry. ITB professionals solve difficult problems of national significance, largely in the areas of environmental sustainability, transportation, and operational security. ITB employees take pride in individual accomplishment and also want to be part of something bigger than themselves. We are energized by commitment to the mission of our customers. Our intellectual environment encourages cooperation and collaboration.

ITB is in need of an Entry-Level Engineer/Scientist to support our current and pending contracts. The position is a fulltime employee hire for work at ITB's Merritt Island, Florida office. The anticipated employment start date is January, 2016.

Assignments may include working as an individual or as part of a project team to assist with any of the following tasks: contact vendors, research literature and regulatory requirements; conduct scientific and routine calculations; review facility information relevant to projects; interpret data and results; prepare and evaluate data sets; and prepare technical reports and proposals. Some domestic travel may be required to perform assessments or attend customer meetings.

**Job Requirements**

- Applicants must possess a Bachelor's degree from an accredited 4 year college or university with an Engineering, **Physical Science, or Life Science focus**.
  - Up to three (3) years of engineering **or science** experience.
  - To thrive in this role, you will need to provide a professional image to all customers, communicate clearly and work well with a team.
  - Proficiency with MS Office applications
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**Director of Program Management, YER Atlanta, GA 12/18/2015**

The Director of Program Management will manage customer programs with Automotive OEM's and Tier 1 suppliers.

**Primary Duties:**

- Facilitating, supporting, and coordinating activity and communication between various customer groups and internal company groups (project management support).
- Functioning as a key person to manage Program Management, including compiling, summarizing, analyzing, communicating necessary data, and developing summary and status documents/materials.
- Managing the Project Management team; program meetings, change control management, new program launch, and kickoff.
- Managing all current projects; align timelines for internal launch planning, organize and update capacity planning and work closely with global project teams.
- Managing key customer relationships effectively.
- Developing effective plans and strategies to manage daily activities effectively within established budget constraints.
- Building piece price quotations and submit to customers on time by understanding the products, target & market price for the products, manufacturing processes, cost structures and profit potential.
- Managing customer negotiations including changes in terms in conditions, engineering changes and new business. Supporting the launch of new programs, track prototype and production profitability of components sold.
- Gathering customer and competitor information as well as internal information for product development, cost, capacity, etc.
- Overseeing pricing with each customer's purchasing personnel based on the developed quotes.
- Maintaining ongoing communication and performance feedback with the Managing Director throughout the year.
- Directing and supporting company short and long-term goals in North America.
- Preparing product strategy document and supporting integration of product strategy to the customer strategy for strategic account planning. Strategic mid and short term planning plus KPIs and capacities.
- Performing activities to improve the system and company performance as appropriate.
- Performing and ensuring ongoing contract management.
- Functioning as a hierarchical function of the department; HR aspect, training and coaching employees

**Job Requirements**



Knowledge, Skills, & Abilities Required:

- Computer literacy (MS Word, MS Excel, PowerPoint).
- Program Management/ Supervisory industry experience (5+ years).
- International/project management/engineering/sales experience.
- Ability to analyze competitor products and summarize cost and engineering strengths and weaknesses.
- Experience in developing relationships with key members at various OEM's, especially VW, Mercedes Benz, BMW and/or large Tier 1 suppliers.
- Familiarity with OEM purchasing procedures.
- Formed Metal parts experience in the automotive industry, preferably with a Tier 1 supplier relating to steel products (deep drawing of sheet metals - steel & aluminum).
- Very good commercial understanding and experience in Automotive industry - cost and sales price calculations.
- Good basic understanding of automotive quality requirements and related processes.
- Self-initiative, "out of the box" thinking, and ability to anticipate customer or the company's needs, and offer potential solutions before approaching.

Education:

- Bachelor's Degree in Engineering **or Applied Science** preferred (Bachelor's Degree in Business may be accepted based on proven technical skill).
- Fluent in German is a plus but not required.

Travel:

- Approximately 25%, but varies by customer and program needs.
  - Must be willing and available to travel to such locations (Domestic & International) and with such frequency as is necessary and desirable to meet business needs.
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**Quality Assurance Associate / Pharma Manufacturing / Batch Records, Pioneer Data Systems Inc Carlisle, PA 12/22/2015**

**Job Description**

- Accountable for activities involved in Quality oversight for review and release of finished goods, raw materials, and packaging components, issuance of master batch records and associated documentation, and tracking of investigations, change controls, and action items as they relate to material release activities.
- Maintains routine programs and processes to ensure high quality product and compliance with current cGMPs.
- Must be familiar with all aspects of the manufacturing and quality operations.
- Ability to effectively prioritize and manage a varied workload is an essential function of this position.

**Job Requirements**

- Support Manufacturing batch record review activities.
- Prepare and issue Production Batch Records.
- Perform review and release activities related to finished goods, raw materials, and packaging components.
- Assist in the development and implementation of QA systems and SOPs.
- Initiate and assist in Quality Investigations of cGMP products as required.
- Generate Incident Reports, Change Controls and CAPA reports as required.
- Perform initiation, maintenance and closure activities of Quality Assurance Operations systems such as Discrepancies, CAPAs, and Change Control to support QA operations and ensure compliance with SOPs.
- Identify, investigate, and prepare reports on quality issues.
- Interpret generated data and communicate results to Quality Management.
- Maintain effective communication and partnership with Operations department and Materials Management.
- Maintain relevant training.
- Perform additional assignments as directed by the Quality Assurance Manager.

**Job Snapshot**

**Employment Type:** Full-Time

**Job Type:** Manufacturing, QA - Quality Control, Health Care

**Education:** 4 Year Degree

**Experience:** 2 to 5 years

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