

# Armstrong

## MEMORANDUM

**To:** University Curriculum Committee  
**From:** Phyllis Fulton  
Catalog Editor and Committee Secretary  
**Date:** November 26, 2014  
**Re:** Agenda – December 3, 2014

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The University Curriculum Committee will meet at 3:00 p.m. on Wednesday, December 3 in University Hall 282.

## A G E N D A

### CALL TO ORDER

David Lake

### APPROVAL OF MINUTES – November 5, 2014

### ITEMS

I. College of Education (no items)

### II. College of Health Professions

#### A. Diagnostic and Therapeutic Sciences

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

##### **Program for the Degree of Bachelor of Science in Radiologic Sciences**

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

~~(Nuclear Medicine students must complete a general chemistry course with lab)~~

**Core Area F ..... 18 hours**

BIOL 2081 Human Anatomy and Physiology I

BIOL 2082 Human Anatomy and Physiology II

HLPR 2000 Research in Health Professions

Guided Electives from the following list (4 credit hours)

RADS 2000 or RESP 2110

COMM 2280 (except for Sonography track), or a lower-level class (1000- or 2000-level) in MATH, CSCI, ITEC, BIOL, CHEM, PHYS, PHSC,

ASTR, GEOL, or ISCI

(Nuclear Medicine students who have not completed a Chemistry sequence in Area D must complete one general chemistry course with lab as the science elective)

One of the following:

PHSC 1211/1211L Physical Environment and Lab

PHYS 1111K Introductory Physics I

Rationale: Clarity.

**Effective Term: Fall 2015**

B. Health Sciences (no items)

C. Nursing (no items)

## D. Rehabilitation Sciences

### 1. Modify the following Program of Study:

#### Program for the Degree of Bachelor of Science in Communication Sciences and Disorders

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

**Core Area F .....18 hours**

CHEM 1151 Survey of Chemistry I

CHEM 1151L Survey of Chemistry I Laboratory

CSDS 1220 Introduction to Communication Disorders

HSCC 2500 Health Issues & Resources

~~PHSC 1211 Physical Science~~

~~PHSC 1211L Physical Science Lab~~

HLPR 2000 Introduction to Research in the Health Professions

HSCC 2200 Health Communication

PSYC 2950 Lifespan Developmental Psych

**Physical Education .....3 hours**

**First-Year Seminar ..... 1 hour**

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

CSDS 2230 Anatomy and Physiology of Speech and Hearing Mechanisms

CSDS 2240 Normal Speech and Language Development

CSDS 2250 Phonetics

CSDS 3400 Speech Science

CSDS 3410 Introduction to Audiology

CSDS 3420 Language Disorders

CSDS 3430 Organically Based Communication Disorders

CSDS 3450 Articulation Disorders

CSDS 4050 Intercultural Communication

CSDS 4190 Clinical Methods in Speech-Language Pathology  
 CSDS 4151 Clinical Writing for the Health Professions

**C. Related Field Courses ..... 12-15 hours**

~~PSYC 1101 General Psychology (if not taken in area E)~~

~~Note: PSYC 1101 should be completed during the first 36 hours~~

EDUC 3300 Educating Students w/Disabilities

RHAB 4000 Application of Research to the Rehabilitation Professions

**PSYC 3400 Introduction to Learning**

PSYC 5060U Basic Behavior Principles and Behavior Change

GERO 5500U Survey of Gerontology

**D. Electives ..... 12-15 hours**

At least ~~six~~ **nine** hours of electives must be courses numbered 3000 or above. **PSYC 1101 General Psychology (if not taken in area E).**

~~If the following sequence is taken in American Sign Language: CSDS 1001, 1002, 2001, all of the additional electives must be at 3000 level or higher.~~

**Total Semester Hours**

**124 hours**

~~**E. Admission to the program, Preservice Portfolio, Current Certification in CPR/First Aid, Criminal Background Check.**~~

**Rationale:** Program accreditation standards effective September 1, 2014 recommend a course in chemistry or physics to meet the physical science requirement.

PSYC 1101 is not a related field course. In addition, the program of study as well as the 15 to Finish Roadmap for the program specifies PSYC 1101 in the first year of study.

PSYC 3400 has been added as a prerequisite for PSYC 5060U/G which is listed in the current program of study.

Elective hours were adjusted in response to the addition of PYSC 3400 in the related field area.

Students are no longer required to gain admissions to the program or submit the Preservice Portfolio, Current Certification in CPR/First Aid, or Criminal Background Checks.

**Effective Term: Fall 2015**

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

**Program for the Associate of Science -Communication Sciences and Disorders Track**

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

**Physical Education.....3 hours**

**First-Year Seminar ..... 1 hour**

**B. Additional Requirements .....18 hours**

**CHEM 1151 Survey of Chemistry I**

**CHEM 1151L Survey of Chemistry I Laboratory**

**CSDS 1220 Introduction to Communication Disorders**

HLPR 2000 Introduction to Research in the Health Professions  
 HSCC 2200 Health Communication  
 HSCC 2500 Health Issues and Resources  
[PHSC 1211/PHSC 1211L Physical Science with lab](#)  
 PSYC 1101 Introduction to Psychology or PSYC 2950 Lifespan Developmental Psychology

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**Total Semester Hours** **64**

**C. Exit Exam**

**Rationale:** Program accreditation standards effective September 1, 2014 recommend a course in chemistry or physics to meet the physical science requirement.

**Effective Term: Fall 2015**

**3. Create the following program of study:**

**Post Baccalaureate Certificate in Communication Sciences and Disorders**

The Post-baccalaureate program is designed for individuals who have earned a Bachelor's degree in disciplines other than Communication Sciences and Disorders and now wish to complete the prerequisite courses (i.e., "leveling courses") that are often required for admission into a graduate program in either audiology or speech-language pathology.

The certificate is available to students who hold a baccalaureate degree from an accredited institution and have earned a cumulative GPA of 3.0. Interested students should submit an application to the program. Course rotation begins each fall.

**Post-Baccalaureate Certificate in Communication Sciences and Disorders.....24 hours**

CSDS 1220 Introduction to Communication Sciences  
 CSDS 2230 Anatomy and Physiology of Speech and Hearing Mechanisms  
 CSDS 2240 Normal Speech and Language Development  
 CSDS 2250 Phonetics  
 CSDS 3400 Speech Science  
 CSDS 3410 Introduction to Audiology  
 CSDS 3420 Language Disorders  
 CSDS 4151 Writing for the Health Professions

Students completing the certificate in Communication Sciences and Disorders are required to obtain twenty-five clinical observation hours verified with a signature by a certified audiologist or speech-language pathologist as required by the American Speech-Language-Hearing Association. Students are also required to obtain 10 hours of volunteer

activities that are unpaid and serve the University or the Community for the certificate to be awarded.

While completion of the Post-baccalaureate program does not guarantee admission into the Communication Sciences and Disorders Graduate Program at Armstrong, it does qualify students to submit an application for admission into the graduate program at Armstrong and for many other graduate programs in the United States.

For more information about the certificate or for a career in Communication Sciences and Disorders, please contact the program.

**Rationale:** Communication Sciences and Disorders programs prepares students for careers in the high demand fields of audiology and speech-language pathology. The professions attract working professionals from various backgrounds who are seeking a career change. A graduate degree (Master's in speech-language pathology or Au.D. in audiology) is required in order to become a certified practitioner in the field of communication sciences and disorders. Many graduate programs in speech-language pathology and audiology require applicants to have either an undergraduate degree in the field or a core of prerequisite coursework in the field. Our post-baccalaureate studies program has been developed to help students who wish to pursue a career in speech-language pathology or audiology, but who have an undergraduate degree in an area other than communication sciences and disorders. The Communication Sciences and Disorders program has received significant interest in post-baccalaureate courses which continues to increase.

**Effective Term: Fall 2015**

### III. College of Liberal Arts

A. Art, Music, and Theatre (no items)

#### B. Criminal Justice, Social, and Political Science

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

#### **PROGRAM FOR THE DEGREE OF ASSOCIATE OF APPLIED SCIENCE IN CRIMINAL JUSTICE**

##### **A. General Requirements: Core Areas .....28 hours**

ENGL 1101 Composition I

ENGL 1102 Composition II

**MATH 1001 Quantitative Skills and Reasoning or**

MATH 1111 College Algebra

HIST/POLS 1100 Political History of America and Georgia

PSYC 1101 Introduction to Psychology

SOCI 1101 Introductory Sociology

One course from the following:

HIST 1111, HIST 1112, HIST 2111, HIST 2112, POLS 2100, ANTH 1102,  
ECON 2105

One course from the following:

ENGL 2100, ARTS 1100, ARTS 2710, ARTS 2720, THEA 1100, MUSC  
1100, PHIL2010, PHIL 2030

One course from the following:

BIOL 1107/1107L, CHEM 1211 (and lab), PHYS 1111K, PHSC 1211/1211L

Rationale: Adding Math 1001 allows the Associate degree to be consistent with the Bachelor degree.

**Effective Term: Fall 2015**

## C. Economics

### 1. Modify the major field courses for the BS in Business Economics

#### **PROGRAM FOR THE DEGREE OF BACHELOR OF SCIENCE IN BUSINESS ECONOMICS**

#### **B. Major Field Courses .....30 hours**

ECON 3230 Finance

ECON 3700 Econometrics or ECON/**MKTG** 3800 Quantitative Marketing  
Research

MGMT 3220 Management

MGMT 4111 Entrepreneurship or ECON 4900 Economic Methods and Senior  
Thesis

**MKTG** 3210 Marketing

Six credits selected from:

ECON 3050 Intermediate Macroeconomics and ECON 3060 Intermediate  
Microeconomics

ECON 3050 Intermediate Macroeconomics and ECON 3500 Managerial  
Economics

ECON 3060 Intermediate Microeconomics and ECON 3300 Money and  
Banking

~~Nine hours~~ **Six credits** selected from:

**ECON 3100 Multinational Economic Enterprises**

ECON 3200 International Trade

ECON 3300 Money and Banking

ECON 3400 Economics of Labor

ECON 3450 Environmental Economics

ECON 3460 Economics of Immigration

ECON 3470 Economics of Health

ECON 3500 Managerial Economics

ECON/**MKTG** 3800 **Quantitative** Marketing Research

ECON 4100 Financial Economics: Portfolio Analysis

ECON 4150 Money and Capital Markets

ECON 4310 International Finance

ECON 4410 Regional Economics

~~ECON 4450 Comparative Economics~~

ECON 4451 Industrial Organization

**ECON 4460 Economic Analysis of the Law**

ECON 4500 Public Finance

~~ECON 4520 Internship~~

**Three credits of upper division economics, 3000 and above, except for ECON 5150U.**

Rationale: ECON 3100 and 4460 are sufficiently business oriented to be included in the major field courses. ECON 4450 and 4520 were removed because they are taught as experiential learning courses. The new structure with six credits from a list and three credits from any upper division economics course allows the student to take no more than three credits of the major as experiential learning or as a less business-oriented economics course. Title and crosslist corrections.

**Effective Term: Fall 2015**

- D. Gender Studies (no items)
- E. History (no items)
- F. Languages, Literature, & Philosophy (no items)
- G. Liberal Studies (no items)
- H. Honors Program (no items)

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

### **A. Biology**

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

**BIOL 4240 BEHAVIORAL ECOLOGY**

**3-0-3**

Prerequisite: BIOL 3030 (minimum grade of C) or BIOL 3050 (minimum grade of C)  
Examines the survival value of behavior; how behavior is shaped by the environment; and the evolution of behavior.

Rationale: Biology majors will benefit from a comprehensive examination of animal behavior, a subject of biology that is not well addressed by the current curriculum. The subject has been previously offered on two occasions as a section of BIOL 4970, SPECIAL TOPICS.

**Effective Term: Fall 2015**

**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 course:**

**BIOL 3770 ~~DEVELOPMENTAL AND COMPARATIVE~~ Vertebrate ANATOMY ~~OF THE VERTEBRATES~~** **3-6-43-3-4**

Prerequisite: BIOL 1108 (minimum grade of C) or BIOL 1108H (minimum grade of C)

~~Development, anatomy, and evolution of vertebrate organ systems.~~ Form, function, and evolution of major vertebrate systems. Laboratories examine the anatomy of different vertebrate taxa.

Rationale: To better align the focus of the course with that of other institutions and address the needs of pre-veterinary biology students.

**Effective Term: Fall 2015**

**3. Modify the following course:**

**BIOL 2010 MICROBIOLOGY** **3-3-4**

Prerequisite: BIOL ~~1107-1108~~ (minimum grade of C) and CHEM 1211 (minimum grade of C). and ~~BIOL 1107L (minimum grade of C) or BIOL 1107H (minimum grade of C) and BIOL 1107A (minimum grade of C).~~

Rationale: Students will benefit from exposure to concepts in evolution addressed in BIOL 1108 and will benefit from practice with microscopic techniques in BIOL 1108L. Students will benefit from having learned basic chemistry principles that they can apply to understanding microbial metabolism.

**Effective Term: Fall 2015**

**4. Modify the following course:**

**BIOL 3050 GENERAL ECOLOGY** **3-4-33-0-3**

Prerequisites: BIOL 1108 (minimum grade of C) or BIOL 1108H (minimum grade of C) and BIOL 2010 (minimum grade of C)

Introduction to behavioral, individual, population, community, and ecosystem ecology. ~~Field and laboratory activities cover ecological principles and emphasize sampling procedures and data analysis.~~

Rationale: Currently, the laboratory section is required for all students who take General Ecology. With recent ecologist hires in Biology, more upper-level ecology courses will be offered and for these, BIOL 3050 will be a pre-requisite. The number of seats in the laboratory section are currently limiting enrollment and this course



suffers from bottlenecks. With the proposed change, BIOL 3050 will still be a required major field course for two tracks, but the lab will count as a biology elective.

**Effective Term: Fall 2015**

**CURCAT:**

**Major Department: Biology**

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

**Maximum number of credit hours: 34**

**Instruction type: Lecture and Laboratory**

**Course Equivalent: None**

**5. Modify in Banner/add to catalog the following course:**

**BIOL 3050L GENERAL ECOLOGY Laboratory**

**~~0-4-0-4-1~~**

Prerequisites: BIOL 1108 (minimum grade of C) or BIOL 1108H (minimum grade of C) and BIOL 2010 (minimum grade of C)

Prerequisite or Corequisite: BIOL 3050

Field and laboratory activities cover ecological principles and emphasize sampling procedures and data analysis.

Rationale: Currently, the laboratory section is required for all students who take General Ecology. With recent ecologist hires in Biology, more upper-level ecology courses will be offered and for these, BIOL 3050 will be a pre-requisite. The number of seats in the laboratory section are currently limiting enrollment and this course suffers from bottlenecks. With the proposed change, BIOL 3050 will still be a required major field course for two tracks, but the lab will count as a biology elective.

**Effective Term: Fall 2015**

**CURCAT:**

**Major Department: Biology**

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

**Maximum number of credit hours: ~~0~~ 1**

**Instruction type: Laboratory**

**Course Equivalent: None**

**6. Modify the following course:**

**BIOL 2400 Introduction to Cell and Molecular Biology**

**3-0-3**

Prerequisite: BIOL 1107 (minimum grade of C) and BIOL 1107L (minimum grade of C) or BIOL 1107H (minimum grade of C) and BIOL 1107A (minimum grade of C) and CHEM 1211 (minimum grade of C).

Rationale: Students will benefit from having learned basic chemistry principles that they can apply to understanding metabolic pathways, energy transformations, and molecular concepts.

**Effective Term: Fall 2015**

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

**PROGRAM FOR THE DEGREE OF BACHELOR OF SCIENCE IN BIOLOGY**

**Track I: General Biology**

**B. Major Field Courses .....32-39 hours**

Required Courses (15 hours)

- BIOL 2020 Plant Biology
- BIOL 3000 Cell Biology
- BIOL 3050 General Ecology
- BIOL 3700 Genetics

Elective Courses (18-24 hours)

Choose one of the following:

- BIOL 4150 Plant Physiology
- BIOL 4200 Mammalian Physiology
- BIOL 4210 Comparative Physiology

Choose one of the following:

- BIOL 3250 Limnology
- BIOL 3470 Environmental Restoration
- BIOL 3600 Salt Marsh Ecology
- BIOL 4320 Environmental Microbiology
- BIOL 4460 Phytoplankton Ecology
- BIOL 4750 Tropical Field Biology
- BIOL 4240 Behavioral Ecology**

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 3150 Horticulture
- BIOL 3200 Plant Taxonomy
- BIOL 3300 Entomology
- BIOL 3310 Invertebrate Zoology
- BIOL 3750 Natural History of Vertebrate Animals

BIOL 3770 ~~Developmental and~~ Comparative **Vertebrate** Anatomy ~~of the~~  
**Vertebrates**

BIOL 3800 Mycology

BIOL 3920 Parasitology

BIOL 3950 Human Embryology

BIOL 4470 Sea Turtle Biology

BIOL 4550 Biology of Marine Organisms

BIOL 4600 Ichthyology

### **Track II: Marine Biology**

#### **B. Major Field Courses .....32-35 hours**

Required Courses (19 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 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 3200 Plant Taxonomy

BIOL 3250 Limnology

BIOL 4320 Environmental Microbiology

BIOL 4460 Phytoplankton Ecology

BIOL 4470 Sea Turtle Biology

BIOL 4600 Ichthyology

**BIOL 4240 Behavioral Ecology**

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 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

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

## B. Chemistry and Physics

### 1. Modify the following course:

#### **PHYS 3120 DIGITAL ELECTRONICS AND MICROCONTROLLERS**

**1-5-32-2-3**

Prerequisite: PHYS 2212K (minimum grade of C) or both MATH 1161 and PHYS 1112K (minimum grade of C)

~~Introduction to discrete components and integrated circuits. Hands-on lab experience in constructing and investigating an array of digital circuits that are directly applicable in instrumentation.~~ **Digital circuits, analysis of logic signals, microcontroller programming and interfacing with applications to physical systems.**

Rationale: Given the rapid evolution of digital technology, the Digital Electronics course must be updated to reflect the current state of the art. The extreme increase in capabilities and decrease in cost that has transformed the personal computer industry has had the same effect on the microcontroller industry. As a result, many problems that would previously have required a handful of integrated circuits can now be addressed with a single microcontroller and several lines of code. The lab and lecture

hours are being adjusted to reduce the number of lab contact hours and increase the number of lecture contact hours.

**Effective term: Fall 2015**

**Courses for the proposed Robotics and Mechatronics Track:**

**2. Create the following course:**

**PHYS 3170 SENSOR DEVELOPMENT AND DATA ANALYSIS 2-2-3**

Prerequisite: PHYS 2212K (minimum grade of C) or both MATH 1161 and PHYS 1112K (minimum grade of C)

Design and construction of a variety of sensors for physical quantities. Implementation, data collection, and analysis of sensor output.

Rationale: The ubiquity of computers and embedded systems in modern life illustrates the importance of the interaction between the physical and virtual worlds. This course will discuss the principles behind that interaction and focus on ways to develop sensors for a variety of stimuli, as well as the analysis and interpretation of the data collected.

**Effective Term: Fall 2015**

**CURCAT:**

**Major Department: Chemistry and Physics**

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

**Maximum Number of Credit Hours: 3**

**Grading Mode: Normal**

**Instruction Type: Lecture-Lab**

**Equivalent Course: None**

**3. Create the following course:**

**PHYS 4200 ANALYSIS AND SYNTHESIS OF MECHATRONIC SYSTEMS 2-2-3**

Prerequisite: PHYS 3170 (minimum grade of C) and ENGR 1371 or CSCI 1301 (minimum grade of C)

Students will design and construct complete systems involving sensors, algorithms, and physical action on the environment. Hands-on lab experience through applications in experimental physics. Includes a variety of oral and written assignments. Physics faculty involved in assessments.

Rationale: The capstone course for students in the Mechatronics track. This will represent the synthesis of previous coursework; sensors, microcontrollers, and actuators will be combined into a unified device built to accomplish a particular task.

**Effective Term: Fall 2015**

**CURCAT:**

**Major Department: Chemistry and Physics**  
**Can course be repeated for additional credit: No**  
**Maximum Number of Credit Hours: 3**  
**Grading Mode: Normal**  
**Instruction Type: Lecture-Lab**  
**Equivalent Course: None**

**4. Create the following course:****PHYS 3370 HUMAN COMPUTER INTERACTION****3-0-3**

Prerequisite: CSCI 1301 or ITEC 1310 or ENGR 1371

Paradigms in user interface design and related human factors. Topics include: user-system compatibility analysis, techniques for user interface design, methods for interface analysis, multimodal interaction and interaction analysis.

Rationale: A key component in the construction of systems that collect data, analyze it, and act on the results is the way the system interfaces with its human programmer or operator. This course will involve haptic devices and their use to provide another channel for the bidirectional flow of information between human and computer.

**Effective Term: Fall 2015****CURCAT:**

**Major Department: Chemistry and Physics**  
**Can course be repeated for additional credit: No**  
**Maximum Number of Credit Hours: 3**  
**Grading Mode: Normal**  
**Instruction Type: Lecture**  
**Equivalent Course: CSCI 3370**

**5. Create the following course:****PHYS 2030 INTRODUCTION TO COMPUTER ENGINEERING****3-0-3**

Prerequisite: CSCI 1060 or CSCI 1301 or ENGR 1371 or CSCI 1371

Computer systems and digital design principles. Architectural concepts, software, Boolean algebra, number systems, combinational datapath elements, sequential logic, storage elements. Design of DRAM control and I/O bus.

Rationale: The design and development of computer hardware allows the students to move beyond prepackaged general purpose control devices and begin to create their own specialized circuitry.

**Effective Term: Fall 2015****CURCAT:**

**Major Department: Chemistry and Physics**  
**Can course be repeated for additional credit: No**

**Maximum Number of Credit Hours: 3**

**Grading Mode: Normal**

**Instruction Type: Lecture**

**Equivalent Course: ENGR 2030**

**6. Create the following course:**

**PHYS 2031 DIGITAL DESIGN LABORATORY**

**1-3-2**

Prerequisite: ENGR 2030 or PHYS 2030 (minimum grade of C)

Design and implementation of digital systems, including a team design project. CAD tools, project design methodologies, logic synthesis, and assembly language programming.

Rationale: The design of special-purpose circuitry using FPGA (Field Programmable Gate Array) devices is an invaluable aid in finding solutions to problems involving sensor management and control. This lab will show students how to use the FPGA to combine the flexibility of software with the high performance of special-purpose integrated circuits.

**Effective Term: Fall 2015**

**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-Lab**

**Equivalent Course: ENGR 2031**

**7. Create the following course:**

**PHYS 2035 PROGRAMMING FOR HARDWARE/ SOFTWARE SYSTEMS**

**3-3-4**

Prerequisite: ENGR 2030 or PHYS 2030 (minimum grade of C)

Programming techniques for hardware and software systems including creation of complex execution and storage mechanisms based on instruction set architecture and software design including programming languages and operating systems. Students will apply and develop these concepts through programming design projects.

Rationale: Most programming courses focus on programs to be executed by personal computers; the microcontroller and embedded-device environments are quite different in terms of chip capabilities, capacities, and support circuitry. This course will move beyond standard PC programming and investigate these other areas.

**Effective Term: Fall 2015**

**CURCAT:**

**Major Department: Chemistry and Physics**

**Can course be repeated for additional credit: No**  
**Maximum Number of Credit Hours: 4**  
**Grading Mode: Normal**  
**Instruction Type: Lecture-Lab**  
**Equivalent Course: ENGR 2035**

**Courses for the proposed Health Physics Track:**

**8. Create the following course:**

**PHYS 3601 INTRODUCTION TO RADIATION SCIENCES I 3-0-3**

Prerequisite: PHYS 3801K (minimum grade of C)

Fundamentals about atomic physics and radiation: atomic structure, the nucleus, nuclear radiation, radioactive decays and interactions of heavy charged particles with matter.

Rationale: This course lays the foundation for the health physics track. Health physicists must have an understanding of radiation and its interactions with matter and how to detect radiation in the environment.

**Effective Term: Fall 2015**

**CURCAT:**

**Major Department: Chemistry and Physics**

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

**Maximum Number of Credit Hours: 3**

**Grading Mode: Normal**

**Instruction Type: Lecture**

**Equivalent Course: None**

**9. Create the following course:**

**PHYS 3602 INTRODUCTION TO RADIATION SCIENCES II 3-0-3**

Prerequisite: PHYS 3601 (minimum grade of C)

Fundamentals about atomic physics and radiation: interactions of electrons with matter, interactions of photons with matter, neutrons, fission, and methods of radiation detection.

Rationale: This course continues to lay the foundation for the health physics track. Health physicists must have an understanding of radiation and its interactions with matter and how to detect radiation in the environment.

**Effective Term: Fall 2015**

**CURCAT:**

**Major Department: Chemistry and Physics**

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

**Maximum Number of Credit Hours: 3**



**Grading Mode: Normal**  
**Instruction Type: Lecture**  
**Equivalent Course: None**

**10. Create the following course:**

**PHYS 3403 Biophysics**

**3-0-3**

Prerequisite: PHYS 3801K (minimum grade of C)

A survey of physics applications to biology, including the thermodynamics of life, forces affecting conformation in biological molecules, physics of membranes, and spectroscopy.

Rationale: The study of the intersection of physics and biology will give the health physics track major a deeper understanding of biological systems as they relate to physics. This course will be cross-listed by CHEM program as being equivalent to BCHM 3403.

**Effective Term: Fall 2015**

**CURCAT:**

**Major Department: Chemistry and Physics**

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

**Maximum Number of Credit Hours: 3**

**Grading Mode: Normal**

**Instruction Type: Lecture**

**Equivalent Course: BCHM 3403**

**11. Create the following course:**

**PHYS 3650 RADIATION EXPOSURE IN THE WORKPLACE AND IN THE ENVIRONMENT**

**3-0-3**

Prerequisite: PHYS 3801K (minimum grade of C)

A survey of how radiation is used in a variety of contexts how it is detected and measured (i.e. dosimetry and radiation detectors) and the effect on people and the environment.

Rationale: Health physicists must have knowledge of how radiation is used for the benefit of people in various sectors of society.

**Effective Term: Fall 2015**

**CURCAT:**

**Major Department: Chemistry and Physics**

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

**Maximum Number of Credit Hours: 3**

**Grading Mode: Normal**

**Instruction Type: Lecture**

**Equivalent Course: None**

**12. Create the following course:****PHYS 3660 MEDICAL IMAGING****3-0-3**

Prerequisite: PHYS 3801K (minimum grade of C)

A survey of how radiation is used in a variety of medical imaging techniques (such as CAT, MRI, and PET).

Rationale: Health physicists must have knowledge of medical imaging techniques.

**Effective Term: Fall 2015****CURCAT:****Major Department: Chemistry and Physics****Can course be repeated for additional credit: No****Maximum Number of Credit Hours: 3****Grading Mode: Normal****Instruction Type: Lecture****Equivalent Course: None****13. Create tracks for the program of study for the B.S. in Applied Physics as follows:****PROGRAM FOR THE DEGREE OF BACHELOR OF SCIENCE IN APPLIED PHYSICS****Track 1: Applied Physics****A. General Requirements****Core Areas A, B, C, D.IIA, and E .....42 hours**

Applied physics majors are required to take MATH 1113 in core area A and MATH 1161 in core area D

**Area F .....18 hours**

PHYS 2211K, 2212K Principles of Physics I, II (unless taken to satisfy core area D, in which case replace with 8 hours of lower division electives)

MATH 2072 Calculus II

MATH 2083 Calculus III

One hour excess for MATH 1161 from Core Area D

1 hour excess from PHYS 1000 or from any science or math course

**Physical Education .....3 hours****First-Year Seminar ..... 1 hour****B. Major Field Courses .....30 hours**

Choose one of the following courses:

PHYS 3100 Electrical Circuit Analysis or ENGR 3100 Circuit Analysis

PHYS 3120 Digital Electronics

PHYS 3300 Thermodynamics or PHYS 3400 Chemical Thermodynamics

PHYS 3801K Modern Physics

PHYS 3802 Introduction to Quantum Mechanics

PHYS 4120 Scientific Measurement with Digital Interfacing

## PHYS 4170 Advanced Mechanics

Choose twelve semester hours from:

- PHYS 2900 Introduction to Research in Physics
- PHYS 3100 Electrical Circuit Analysis or ENGR 3100 Circuit Analysis (if not previously counted above)
- PHYS 3120 Digital Electronics (if not previously counted above)
- PHYS 3142 Computational Physics
- PHYS 3200 Mathematical Methods for Physicists
- PHYS 3220 Mechanics of Deformable Bodies
- PHYS 3230 Fluid Mechanics
- PHYS 3312 Electromagnetism
- PHYS 3500 Diffraction and Crystallography
- PHYS 3700K Optics
- PHYS 4800 Pedagogy and Supplemental Instruction in Physics (maximum of 3 hours can be used in this section)
- PHYS 4900 Independent Study in Physics
- PHYS 4950 Special Topics in Physics
- PHYS 4960 Physics Internship
- PHYS 4991 Advanced Research in Physics

**C. Related Field Courses .....23 hours**

- CHEM 1211 Principles of Chemistry I (and lab)
- CHEM 1212 Principles of Chemistry II (and lab)
- CSCI 1301 Introduction to Programming Principles or ENGR 1371 Computing for Engineers
- MATH 2160 Linear Algebra
- MATH 3411 Differential Equations
- A three semester-hour upper-division math course (3000 or 4000 level, excluding MATH 3411, 3900, 3911, 3912, 3932, 4000, 4750, 4900, 4910, 4961, 4962, 4963, 5412U, 5600U, 5700U, 5900U, 5911U)
- Three semester hours of related field electives approved by the physics faculty

**D. Electives .....7 hours**

- Upper-division courses (6 semester hours)
- Free elective (1 semester hour)

**Total Semester Hours****124 hours****E. Exit Exam****Track II: Robotics and Mechatronics****A. General Requirements****Core Areas A, B, C, D.IIA, and E .....42 hours**

Applied physics majors are required to take MATH 1113 in core area A and MATH 1161 in core area D

**Area F .....18 hours**

PHYS 2211K, 2212K Principles of Physics I, II (unless taken to satisfy core area D, in which case replace with 8 hours of lower division electives)

MATH 2072 Calculus II

MATH 2160  
CSCI 1301 or ENGR 1371

<b>Physical Education</b> .....	<b>3 hours</b>
<b>First-Year Seminar</b> .....	<b>1 hour</b>
<b>B. Major Field Courses</b> .....	<b>30 hours</b>
PHYS 2030 Introduction to Computer Engineering	
PHYS 2031 Digital Design Laboratory	
PHYS 2035 Programming for Hardware/Software Systems	
PHYS 3100 Electrical Circuit Analysis	
PHYS 3120 Digital Electronics and Microcontrollers	
PHYS 3142 Computational Physics	
PHYS 3170 Sensor Development and Data Analysis	
PHYS 3801K Modern Physics	
PHYS 4200 Analysis and Synthesis of Mechatronic Systems	
PHYS 3370 Human Computer Interaction	
<b>C. Related Field Courses</b> .....	<b>23 hours</b>
CHEM 1211 Principles of Chemistry I (and lab)	
CHEM 1212 Principles of Chemistry II (and lab)	
MATH 3411 Differential Equations	
Twelve semester hours (nine hours of which must be upper division level) of related field electives approved by the physics faculty.	
<b>D. Electives</b> .....	<b>7 hours</b>
Upper-division courses (6 semester hours)	
Free elective (1 semester hour)	

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

**E. Exit Exam**

**Track III: Health Physics**

**A. General Requirements**

**Core Areas A, B, C, D.IIA, and E** ..... **42 hours**

Applied physics majors are required to take MATH 1113 in core area A and MATH 1161  
in core area D

**Area F** ..... **18 hours**

PHYS 2211K, 2212K Principles of Physics I, II (unless taken to satisfy core area D,  
in which case replace with 8 hours of lower division electives)

MATH 2160 or STAT 3231

MATH 2072 Calculus II

CSCI 1301 Introduction to Programming Principles or ENGR 1371 Computing for  
Engineers

**Physical Education** ..... **3 hours**

**First-Year Seminar** ..... **1 hour**

**B. Major Field Courses** ..... **30 hours**

PHYS 3100 Electrical Circuit Analysis or ENGR 3100 Circuit Analysis

PHYS 3801K Modern Physics

PHYS 3802 Introduction to Quantum Mechanics

PHYS 3403 Biophysics	
PHYS 3601 Introduction to Radiation Sciences I	
PHYS 3602 Introduction to Radiation Sciences II	
PHYS 3650 Radiation Exposure in the Workplace and Environment	
PHYS 3660 Medical Imaging	
Choose three semester hours from:	
PHYS 2900 Introduction to Research in Physics	
PHYS 3220 Mechanics of Deformable Bodies	
PHYS 3230 Fluid Mechanics	
PHYS 3312 Electromagnetism	
PHYS 3400 Chemical Thermodynamics	
PHYS 3500 Diffraction and Crystallography	
PHYS 4991 Advanced Research in Physics	
Choose three semester hours from:	
PHYS 4900 Independent Study in Physics	
PHYS 4950 Special Topics in Physics	
PHYS 4960 Physics Internship	
<b>C. Related Field Courses .....</b>	<b>23 hours</b>
CHEM 1211 Principles of Chemistry I (and lab)	
CHEM 1212 Principles of Chemistry II (and lab)	
MATH 3411 Differential Equations	
Twelve semester hours of related field electives approved by the physics faculty.	
<b>D. Electives .....</b>	<b>7 hours</b>
Upper-division courses (6 semester hours)	
Free elective (1 semester hour)	
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<b>Total Semester Hours</b>	<b>124 hours</b>
<b>E. Exit Exam</b>	

Rationale: As a result of program review, the physics program has concluded that the program should seek to become more attractive than just being able to offer the traditional applied physics major. We see this as an opportunity to offer specialized tracks in Robotics and Mechatronics and Health Physics.

The Robotics and Mechatronics track would prepare the graduate the skills from not only the world of physics but from engineering and computer science to be capable of understanding the processes of measurement and control that are being utilized in industry and manufacture. This would require the creation of six new physics courses. However, three of these courses are being created to cross-list pre-existing one CSCI and two ENGR courses as equivalent to physics courses in the physics major field. This is being done by consultation and agreement with CSCI and ENGR programs.

The Health Physics Track is being created to be in line with Armstrong's stated mission as being the regional health education institution in the USG system. This track would teach its graduate skills needed to either enter graduate school in

programs such as a biophysics or to pursue a career in policy design/decisions at laboratories and health facilities. This would require the creation of five new physics courses. However, one of these courses would be a cross-listing with a pre-existing BCHM course as equivalent to the course in the physics major field. This is being done by consultation and agreement with the BCHM program.

**Effective Term: Fall 2015**

## C. Computer Science and Information Technology

### 1. Create the following track:

#### PROGRAM FOR THE DEGREE OF ASSOCIATE OF SCIENCE.

##### Cyber Security Track

<b>A. General Requirements (Core Areas A, B, C, D.I, and E)</b>	<b>42 hours</b>
<b>Physical Education</b>	<b>3 hours</b>
<b>First-Year Seminar</b>	<b>1 hour</b>
<b>B. Additional Requirements</b>	<b>18 hours</b>
MATH 1111- College Algebra (if not taken in Core Area A)	
ITEC 1310 – Programming for IT	
CSCI 2070 - Ethical Considerations in Computer Science	
ITEC 3700 – Cyber Security I	
ITEC 4200 – Cyber Security II, Network Security	
ITEC 4300 – Cyber Security III, Ethical Hacking	
If MATH 1111 was taken in Core A, then select one of the following:	
MATH 1113 – Pre-Calculus Mathematics	
CSCI 1150 – Fundamentals of the Internet and the World Wide Web (if not taken in Area D)	

<b>Total Semester Hours</b>	<b>64</b>
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Rationale: By offering an Associate of Science with a Cyber Security track, the Cyber Security curriculum will become “stackable.” It allows a student who may have only matriculated to Armstrong for the undergraduate certificate, and then wanting to earn a degree, to take the credits earned for the certificate and apply them to an Associate’s degree. Should that student decide to earn a Bachelor’s in Information Technology at Armstrong, or an equivalent Bachelor’s degree at another institution (especially another USG institution), the Associate’s will then allow that student to seamlessly transition into the major program.

**Effective Term: Fall 2015**

## D. Engineering Studies

1. **Cross-list the following course as PHYS 2030:**  
**ENGR 2030 INTRODUCTION TO COMPUTER ENGINEERING** **3-0-3**

Rationale. This course is required for electrical and computer engineers in the engineering transfer program, it is also a course that may be taken towards obtaining an Associates of Science with a concentration in engineering. The physics program is currently proposing a mechatronics track within the BS Physics program. ENGR2030 would be a requisite course in this track, cross listed as PHYS 2030.

**Effective Term: Fall 2015**

**CURCAT:**

**Course Equivalent: PHYS 2030**

2. **Cross-list the following course as PHYS 2031:**  
**ENGR 2031 DIGITAL DESIGN LABORATORY** **1-3-2**

Rationale. This course is required for electrical and computer engineers in the engineering transfer program, it is also a course that may be taken towards obtaining an Associates of Science with a concentration in engineering. The physics program is currently proposing a mechatronics track within the BS Physics program. ENGR2031 would be a requisite course in this track, cross listed as PHYS 2031.

**Effective Term: Fall 2015**

**CURCAT:**

**Course Equivalent: PHYS 2031**

3. **Cross list the following course as PHYS 2035:**  
**ENGR 2035 – Programming for Hardware/Software Systems** **3-3-4**

Rationale. This course is required for electrical and computer engineers in the engineering transfer program, it is also a course that may be taken towards obtaining an Associates of Science with a concentration in engineering. The physics program is currently proposing a mechatronics track within the BS Physics program. ENGR2035 would be a requisite course in this track, cross listed as PHYS 2035.

**Effective Term: Fall 2015**

**CURCAT:**

**Course Equivalent: PHYS 2035**

## E. Mathematics

### 1. Create the following course:

**MATH 0987 Foundations for Quantitative Reasoning (MATH 1001) 3-0-3**

Prerequisite: Placement according to Math Placement Index (MPI)  $< 1075$

Description: Study of set relationships, Venn diagrams, real number arithmetic, algebraic expressions, equations, functions, slopes, rates of change, coordinate graphing, and introductory statistics topics. This course is designed to review common arithmetic topics as well as introduce students to foundational algebra and statistics topics covered in MATH 1001.

Rationale: This course is being created for all University System of Georgia institutions offering remediation for MATH 1001. It is intended as a full semester remedial course to be followed by a corequisite remedial course, MATH 0997

**Effective Term: Fall 2015**

#### **CURCAT:**

**Major Department: Mathematics**

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

**Maximum Number of Credit Hours: 3**

**Grading Mode: S/U**

**Instruction Type: Lecture**

**Course Equivalent: None**

### 2. Create the following course:

**MATH 0997 Support for Quantitative Reasoning (MATH 1001) 2-0-2**

Prerequisite: Placement according to Math Placement Index ( $1075 \leq \text{MPI} < 1165$ ) or successful completion of MATH 0987.

Description: Provides just-in-time support for students concurrently enrolled in MATH 1001. Additional review and practice will be provided for relevant MATH 1001 course topics: logic and reasoning, sets and Venn diagrams, units of measure, percentages, formulas, fundamentals of statistics and statistical graphics, probability, functions, and modeling.

Rationale: This course is being created for all University System of Georgia institutions offering remediation for MATH 1001. It will be taught concurrently with MATH 1001.

**Effective Term: Fall 2015**

#### **CURCAT:**

**Major Department: Mathematics**

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

**Maximum Number of Credit Hours: 2**

**Grading Mode: S/U**



**Instruction Type: Lecture**  
**Course Equivalent: None**

**3. Create the following course:**

**MATH 0989 Foundations for College Algebra (MATH 1111) 3-0-3**

Prerequisite: Placement according to Math Placement Index (MPI) < 1100

Description: A study of the essential mathematical concepts required for success in College Algebra (MATH 1111). Topics include properties of real numbers, linear equations and inequalities, quadratic equations, graphs, polynomials, and roots.

Rationale: This course is being created for all University System of Georgia institutions offering remediation for MATH 1111. It is intended as a full semester remedial course to be followed by a corequisite remedial course, MATH 0999.

**Effective Term: Fall 2015**

**CURCAT:**

**Major Department: Mathematics**

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

**Maximum Number of Credit Hours: 3**

**Grading Mode: S/U**

**Instruction Type: Lecture**

**Course Equivalent: None**

**4. Create the following course:**

**MATH 0999 Support for College Algebra (MATH 1111) 2-0-2**

Prerequisite: Placement according to Math Placement Index ( $1100 \leq \text{MPI} < 1265$ ) or successful completion of MATH 0989.

Description: Provides just-in-time support for students concurrently enrolled in MATH 1111. Topics will parallel topics studied in MATH 1111, as well as essential quantitative skills needed to be successful in MATH 1111, including factoring, polynomial expressions, and roots.

Rationale: This course is being created for all University System of Georgia institutions offering remediation for MATH 1111. It will be taught concurrently with MATH 1111.

**Effective Term: Fall 2015**

**CURCAT:**

**Major Department: Mathematics**

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

**Maximum Number of Credit Hours: 2**

**Grading Mode: S/U**

**Instruction Type: Lecture**

**Course Equivalent: None**

## F. Psychology

### 1. Modify the following course:

**PSYC 2190 – Careers and Professional Skills in Psychology** **3-0-3**

Prerequisites: PSYC 1101 and MATH 2200 (minimum grade of C)

Corequisites: PSYC 2200 and 2201

Rationale: The course content in PSYC 2190, 2200, and 2201 are complementary and taking these courses as a learning community will help students synthesize the course content across all three courses.

**Effective Term: Fall 2015**

### 2. Modify the following course:

**PSYC 2200 INTRODUCTION TO PSYCHOLOGICAL RESEARCH** **3-0-3**

Prerequisites: PSYC 1101 and MATH 2200 (minimum grade of C)

Prerequisite or Corequisites: PSYC 2190 and PSYC 2201

An introduction to scientific methodology and its application to psychology, with emphasis on data collection methods and statistical techniques including, but not limited to, correlation, factorial ANOVA, and nonparametric procedures. Students are required to perform statistical analyses using SPSS statistical programs, conduct an original psychological investigation, and write an APA style report of the research.

Rationale: The course content in PSYC 2190, 2200, and 2201 are complementary and taking these courses as a learning community will help students synthesize the course content across all three courses.

**Effective Term: Fall 2015**

### 3. Modify the following course:

**PSYC 2201 INTRODUCTION TO PSYCHOLOGICAL RESEARCH LAB** **0-1-1**

Prerequisites: PSYC 1101 and MATH 2200 (minimum grade of C)

Co-requisites: PSYC 2190 and PSYC 2200

Rationale: The course content in PSYC 2190, 2200, and 2201 are complementary and taking these courses as a learning community will help students synthesize the course content across all three courses.

**Effective Term: Fall 2015**

## OTHER BUSINESS

## ADJOURNMENT