I. Call To Order: The meeting was called to order at 12:00 on October 17, 2012 in Room 2502. Dr. Will Lynch presided.

II. Approval of Minutes: Dr. Lynch reported that change was made to the September 19, 2012 minutes. The issue in question was regarding who will be paying for the Inventory System and the same is currently under review by the Administration.

III. New Business
A. Faculty Senate Up-date – Dr. Baird reported that several colleges submitted changes to their curriculum and were all approved. An up-date of the upcoming First Class was presented. The Administrative Appraisal Survey Committee reported that they are currently revising the survey. Lastly, it was reported that some departments have encountered problems regarding the program that is currently used for posting announcements for new positions.

B. Chemistry Curriculum Committee - The chemistry curriculum committee met and Dr. Lynch reported that a couple of minor edits were made to the Chemistry curriculum regarding CHEM 4800, which were mostly editorial. The only substantial change is that the course is repeatable. The course in question offers only 3 hours that can count towards the BA in the Chemistry Major and 2 hours that can count towards the BS in the Chemistry Major. The course is designed for chemistry majors who have expressed an interest in becoming a high school teacher to allow them to experience the field and matriculate towards the MAT program within the College of Education. This course will support the NSF funded Noyce Scholarship Program and we view this course as an educational internship, similar to a chemical laboratory internship (CHEM 4960). For more information, please refer to Attachment #1.

The faculty voted unanimously in favor of adding CHEM 4800 to the chemistry curriculum.

The faculty, also, voted unanimously in favor of adding CHEM 1100, which is a course designed for non-science majors to have a greater understanding of environmental chemistry that effects their everyday lives and global environment. The course will expand core science offerings by giving a chemistry perspective on important scientific issues of the day allowing students to be better informed about decision they make that
impact the global community. Core D – non-lab science. For more details, please refer to Attachment #1.

C. Physics Curriculum Committee – The physics curriculum committee met on October 28, 2012 and the following items were discussed:

Item 1. PHYS 3210 Intermediate Mechanics be deleted since it is a course that has never been offered. Physics majors take PHYS 4170 Advance Mechanics instead.

Item 2. Change in the credit hours of PHYS 4950 Special. The physics faculty would like to have the option of offering 1 or 2 credit special topic courses as well. The current arrangement for special topics only allows for a minimum of three hour courses.

Item 3. Change in contact hours for the following courses:

A. PHYS 3120 Digital Electronics
The 7 contact hours for faculty has posed a problem with course assignments and remaining within the 12 hour or 15 hour allotment for faculty. All faculty agree the lab component can successfully be completed within the five hours.

B. PHYS 3801K Modern Physics
Three contact hours for an upper level physics lab is not sufficient to complete detailed experiments that require many hours of measurements and data analysis. The extra hour will benefit the students allowing them to not have to rush through their experiments.

C. PHYS 4120 Scientific Measurement with Digital Interfacing
The 7 contact hours for faculty has posed a problem with course assignments and remaining within the 12 hour or 15 hour allotment for faculty. All faculty agree the lab component can successfully be completed within the five hours.

Item 4: Change the Pre-Requisite, which is essentially cleaning up a few pre-requisites and adding a C requirement through their curriculum. The following are the affected courses: PHYS 1010, PHYS 3120, PHYS 3220, PHYS 3230, PHYS 3300, PHYS 3312, PYS 3400, PHYS 3500, PHYS 3802, PHYS 4120, PHYS 4170 and PHYS 4960.

Item 5. Create the Following Courses:
PHYS 3200 and PHYS 3142 effective Spring 2013.
PHYS 4800 effective Fall 2013.

The faculty voted unanimously in favor of all the above changes with a friendly advice to speak to Dr. Brawner from the Math Department in regards to PHYS 3200 and to speak to the Department of Computer Science in regards to PHYS 3142. For more details, please refer to Attachment #2.

D. Chemistry Planning Committee
The committee met on October 5, 2012 and most of the discussion was dedicated to CPR (Comprehensive Program Review). The committee, also, discussed technology and instrumentation. The instruments’ list is attached for your convenience. Please refer to Attachment #3.
E. General Chemistry Committee – The committee met on October 10, 2012. Among the items discussed was the lab notebook, which has been difficult for faculty and students to read because of the gridded paper being too dark and the transfer pages being too light. Pearson is offering a bundle with a free student solutions manual in it. Also, the Pearson representative is willing to offer a training session to provide assistance with any of the recently changes made with mastering chemistry.

After much discussion it was decided that the lab attendance policy would be changed to lower the allowed amount of absences from three to only two in the coming semester. For more details, please refer to Attachment #4.

F. Space Allocation – Once again Dr. Lynch brought up the space allocation subject as he has done in the past. The instrument room located in room 2202 is actually overcrowded and has become a space issue. The bench space where students place their lab notebooks is actually nonexistent. Dr. Lynch suggested converting the students’ room located in room 2302 into a dry instrument room, preferably during the December break. He is willing to discuss the matter with those who may oppose his suggestion.

IV. Old Business
A. Budget 2012-2013 – The department is in pretty good shape regarding the budget and should be ready to start purchasing everything needed for the upcoming semester.
   i. Scifinder up-date- The Sci-finder has already been purchased and was paid from the departmental budget.
   ii. Chematix – Currently the purchase of the Chematix remains at a standstill. The department provided the VP with a liability exposure list. Essentially, we are just waiting to hear from the VP.

V. Announcements
A. Dr. Lynch reminded everyone of the upcoming advisement period.
B. ACS International Domestic Student Summit (IDSS) 2012. Stephanie Canonico-May and Jared Wagenaar (undergraduate chemistry majors) were selected from nominees across the country to attend the ACS International-Domestic Student Summit (IDSS2012) in Raleigh, North Carolina during the week of November 12. The Summit is designed to bring international and U.S. students together as a team to discuss issues related to international students studying in the United States. Jared is a native of South Africa whereas Stephanie is a citizen of the U.S.

C. ACS Coastal Georgia Section will be having its annual Low Country Boil on October 26 at the Bamboo Farms starting at 6:00pm.

Adjournment
The meeting was adjourned at 1:00 pm.

cc: Dr. Robert Gregerson, Dean, College of Science and Technology
    Dr. Delana Nivens, Assistant Dean, College of Science and Technology
ATTACHMENT #1

Memorandum

To: CST Curr. Comm.

From: W. Lynch, Chemistry and Physics

Re: Chemistry curriculum changes

Date: October 3, 2012

1. Add the following course:

CHEM 4800 Pedagogy and Supplemental Instruction in Chemistry (0-3,0-9,1-3)
Pre-Requisite: Open only to chemistry majors, CHEM 2300 (minimum grade of C), CHEM 2102 (minimum grade of C), CHEM 2102L (minimum grade of C) and permission of Department Head.
This course is designed to provide pre-service high school chemistry educators with the knowledge, skills, and strategies fundamental to the best practices of inclusive chemistry instruction in high school settings. Course goals will be accomplished through the reading of pedagogical works, mentoring with an instructor, direct supplemental instruction, tutoring, lesson planning and delivery in a lower-level chemistry course. Completion of a chemistry education project is also required.

Rationale: The course is designed for chemistry majors who have expressed an interest in becoming a high school teacher to allow them to experience the field and matriculate towards the MAT program within the College of Education. This course will support the NSF funded Noyce Scholarship Program and we view this course as an educational internship, similar to a chemical laboratory internship (CHEM 4960).

Effective Term: Fall 2013

CURCAT:
Major Department: Chemistry & Physics
Can course be repeated for additional credit? No
Maximum number of credit hours: 9
Grading Mode: Normal
Instruction Type: Lecture / Lab
Course equivalent: None

2. Add the following course:

CHEM 1100 Chemistry of the Environment (3-0-3)
Pre-Requisite or Co-requisite: MATH 1001 or MATH 1111
Introduction to chemical principles in the context of global and local environmental systems. Topics may include: implications of energy and mineral usage and the effect on the environment; source and fate of contaminants in ground and water systems; water,
solid and hazardous waste management; toxic chemicals (metals and organics) and toxicology, air pollution, global warming and ozone depletion.  
(Credit in CHEM 1100 may not be applied to the major field requirement in chemistry)

**Rationale:** The course is designed for non-science majors to have a greater understanding of environmental chemistry that effects their everyday lives and global environment. The course will expand core science offerings by giving a chemistry perspective on important scientific issues of the day allowing students to be better informed about decision they make that impact the global community. Core D – non-lab science.

Effective Term: Fall 2013

**CURCAT:**

- Major Department: Chemistry & Physics
- Can course be repeated for additional credit? No
- Maximum number of credit hours: 3
- Grading Mode: Normal
- Instruction Type: Lecture
- Course equivalent: None

**Progress Requirements**

A grade of C or better in all chemistry courses applied toward the major, and the successful completion of the chemistry exit exam are graduation requirements. If any credit for major or related field courses is transferred from another college, the department may require that it be validated by examination. All minors also require a C or better in each course.

A grade of C or better in all physics courses applied toward the major and the successful completion of the applied physics exit exam are graduation requirements.

**Minors**

- **Chemistry** ...................................................................................................................... 15 hours
  - Six semester hours of lower division chemistry courses
  - Nine semester hours of upper division chemistry courses

- **Applied Physics** ........................................................................................................... 15 hours
  - Six semester hours of lower division physics courses
  - Nine semester hours of upper division physics courses

- **Physical Sciences** ......................................................................................................... 15 hours
  - Six semester hours in chemistry, physical science, or physics
  - Nine semester hours selected from: ASTR 3000, GEOL 3100, METR 3100, OCEA 3100

**PROGRAM FOR THE DEGREE OF BACHELOR OF ARTS IN CHEMISTRY**

**A. General Requirements**

- Core Areas A, B, C, D, and E ............................................................................................... 42 hours
- Chemistry majors are required to take MATH 1113 in Core Area A and MATH 1161 in Core Area D
- Area F ................................................................................................................................ 18 hours
- CHEM 1211 and 1212 (and labs) - Principles of Chemistry I, II (unless taken to satisfy Area D, in which case replace with 8 hours of lower division electives)

Choose one sequence from:

- PHYS 1111K - Introductory Physics I and
- PHYS 1112K - Introductory Physics II or
- PHYS 2211K - Principles of Physics I and
- PHYS 2212K - Principles of Physics II
One hour excess for MATH 1161 from Core Area D
One hour lower division approved elective
Physical Education ........................................................................................................ 3 hours

Track I: Chemistry
B. Major Field Courses .................................................................................................. 33 hours
Required (20 Hours)
- CHEM 2101/2101L - Organic Chemistry I
- CHEM 2102/2102L - Organic Chemistry II
- CHEM 2300 - Principles of Chemical Analysis
- CHEM 3200 - Inorganic Chemistry
- CHEM 3401 - Physical Chemistry I

Approved upper-division electives (13 hours) in the major from:
- CHEM 3300 - Instrumental Analysis
- CHEM 3402 - Physical Chemistry II
- 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

with a maximum 3 hours total from:
- CHEM 3900 - Chemical Research
- CHEM 4960 – Internship

Transfer credit for similar courses

CHEM 4800 – Chemistry Pedagogy and Supplemental Instruction in Chemistry
CHEM 4991 - Advanced Chemical Research

C. Electives ..................................................................................................................... 27 hours
18 hours of upper-division courses
9 hours of free electives

Track II: Biochemistry
B. Major Field Courses .................................................................................................. 33 hours
Required (30 Hours)
- CHEM 2101/2101L - Organic Chemistry I
- CHEM 2102/2102L - Organic Chemistry II
- CHEM 2300 - Principles of Chemical Analysis
- CHEM 3200 - Inorganic Chemistry
- CHEM 3300 Instrumental Analysis
- CHEM 3401 - Physical Chemistry I
- CHEM 3801 - Biochemistry I
- CHEM 3802 - Biochemistry II
- CHEM 3803 - Biochemistry Laboratory

Approved upper-division electives (3 hours) in the major from:
- CHEM 3402 - Physical Chemistry II
- CHEM 3900 - Chemical Research - Biochemistry Approved
- CHEM 4100 - Advanced Topics in Organic Chemistry
- CHEM 4200 - Advanced Topics in Inorganic Chemistry
- CHEM 4300 - Advanced Topics in Analytical Chemistry - Biochemistry Approved
- CHEM 4400 – Advanced Topics in Physical Chemistry – Biochemistry Approved
- CHEM 4600 - Advanced Topics in Interdisciplinary Chemistry - Biochemistry Approved
- CHEM 4940 - Special Topics in Chemistry - Biochemistry Approved
- CHEM 4950 - Special Lecture Topics in Chemistry - Biochemistry Approved
- CHEM 4960 - Internship - Biochemistry Approved

CHEM 4800 – Chemistry Pedagogy and Supplemental Instruction in Chemistry
CHEM 4991 - Advanced Chemical Research - Biochemistry Approved
Transfer credit for similar courses
C. Related Field Courses ................................................................. 17 hours
BIOL 1107/1107L
BIOL 1108/1108L
BIOL 2500 Principles of Modern Biology (Note: One Hour counted in Area F)
BIOL 3000 Cell Biology
One course selected from:
   BIOL 3700 Genetics
   BIOL 3530 Immunology
   BIOL 4090 Molecular Biology

D. Electives .............................................................................. 10 hours
10 hours of upper-division courses

Total Semester Hours ......................................................... 123 hours

E. Exit Exam

PROGRAM FOR THE DEGREE OF BACHELOR OF SCIENCE IN CHEMISTRY

A. General Requirements
Core Areas A, B, C, D, and E ................................................. 42 hours
Chemistry majors are required to take MATH 1113 in Core Area A and MATH 1161 in Core Area D
Area F .................................................................................. 18 hours
CHEM 1211 and 1212 (and labs) - Principles of Chemistry I, II (unless taken to satisfy Area D, in which case
replace with 8 hours of lower division electives)
Choose one sequence from:
   PHYS 1111K - Introductory Physics I and
   PHYS 1112K - Introductory Physics II or
   PHYS 2211K - Principles of Physics I and
   PHYS 2212K - Principles of Physics II
One hour excess for MATH 1161 from Core Area D
One hour lower division approved elective
Physical Education ................................................................. 3 hours

B. Major Field Courses .......................................................... 39 hours
CHEM 2101/2101L - Organic Chemistry I
CHEM 2102/2102L - Organic Chemistry II
CHEM 2300 - Principles of Chemical Analysis
CHEM 3200 - Inorganic Chemistry
CHEM 3300 - Instrumental Analysis
CHEM 3401 - Physical Chemistry I
CHEM 3402 - Physical Chemistry II
CHEM 4500 - Chemistry Seminar
9 hours from:
   CHEM 3801, 3802, 3803, 4100, 4200, 4300, 4400, 4600, 4940, 4950, with a maximum 2 hours total from:
   CHEM 3900, 4960, 4800, 4991

C. Electives .............................................................................. 21 hours
14 hours of upper-division courses
7 hours of free electives

Total Semester Hours ......................................................... 123 hours

D. Exit Exam
Proper course selection will allow the student to pursue any one of the following degree options.

Pre-professional/Biochemistry Option:
B. Major Field Courses .......................................................... 39 hours
   Add CHEM 3801, 3802 - Biochemistry I, II as requirements

C. Related Field Courses .......................................................... 7 hours
   BIOL 1107 - Principles of Biology I and BIOL 1108 - Principles of Biology II (one hour counted in Area F)

D. Electives .............................................................................. 14 hours
   Upper-division courses.

Pre-Graduate Study Option:
   Note: PHYS 2211K and PHYS 2212K is the recommended physics sequence.

C. Related Field Courses .......................................................... 10 hours
MATH 2072 - Calculus II (one hour counted in Area F) and
MATH 2083 - Calculus III and
PHYS 3801/3801L - Optics and Modern Physics as requirements

D. Electives .................................................................12 hours
Upper-division courses from chemistry or other subjects within the College of Liberal Arts

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

A. General Requirements
Core Areas A, B, C, D, and E ........................................42 hours
Chemistry majors are required to take MATH 1113 in core area A and MATH 1161 in core area D
Area F .................................................................18 hours
CHEM 1211 and 1212 (and labs) - Principles of Chemistry I, II (unless taken to satisfy area D, in which case
replace with 8 hours of lower division electives)
PHYS 2211K - Principles of Physics I and
PHYS 2212K - Principles of Physics II
One hour excess for MATH 1161 from core area D (or A)
One hour excess from MATH 2072
Physical Education ...........................................................3 hours

B. Major Field Courses ...........................................42 hours
CHEM 2101/2101L - Organic Chemistry I
CHEM 2102/2102L - Organic Chemistry II
CHEM 2300 - Principles of Chemical Analysis
CHEM 3200 - Inorganic Chemistry
CHEM 3300 - Instrumental Analysis
CHEM 3401 - Physical Chemistry I
CHEM 3402 - Physical Chemistry II
CHEM 3801 - Biochemistry I
CHEM 4500 - Chemistry Seminar
CHEM 4991 - Advanced Chemical Research (3 hours)
Three 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

C. Related Field Course .........................................................7 hours
MATH 2072 (1 hour in area F)
MATH 2083

D. Electives .................................................................11 hours
9 hours of upper-division electives
2 hours of free electives

Total Semester Hours 123 hours

E. Exit Exam
Physics Curriculum Committee items – October 2012

I. DELETE THE FOLLOWING COURSE

**PHYS 3210** INTERMEDIATE MECHANICS 3-0-3
Prerequisite: ENGR 2201

Kinematics of particles and rigid bodies; kinetics of particles and rigid bodies using force-mass-acceleration, work-energy, and momentum methods in two- and three-dimensional motion. Computer modeling of mechanical systems.

Rationale: Phys 3210 is never offered. Physics majors take Advanced Mechanics PHYS 4170.

II. CHANGE THE CREDIT HOURS POSSIBLE

**PHYS 4950** SPECIAL TOPICS IN PHYSICS V-V-(31-9)
Prerequisite: announced with the topic; permission of instructor or department

Advanced study in an area of physics not covered elsewhere. Topics are chosen from all areas of physics, and will be announced when the course is offered. Offered by special arrangement.

RATIONALE: The physics faculty would like to have the option of offering 1 or 2 credit special topic courses as well. The current arrangement for special topics only allows for a minimum of three hour courses.

III. CHANGE CONTACT HOURS FOR THE FOLLOWING COURSES

A. **PHYS 3120**

**DIGITAL ELECTRONICS** 1-6-3 1-5-3
Prerequisite: Either PHYS 1112K (minimum grade of C) and MATH 1116 (minimum grade of C), OR PHYS 2212K (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.

RATIONALE: The 7 contacts hours for faculty has posed a problem with course assignments and remaining within the 12 hour or 15 hour allotment for faculty. All faculty agree the lab component can successfully be completed within the five hours.

B. **PHYS 3801K**

**MODERN PHYSICS** 2-3-3 2-4-3
Prerequisite: PHYS 2212K (minimum grade of C) or both MATH 1161 (minimum grade of C) and PHYS 1112K (minimum grade of C)

Modern physics, relativity, atomic physics, and nuclear physics. Includes laboratory investigation.

RATIONALE: Three contact hours for an upper level physics lab is not sufficient to complete detailed experiments that require many hours of measurements and data analysis. The extra hour will benefit the students allowing them to not have to rush through their experiments.
C. **PHYS 4120**

**SCIENTIFIC MEASUREMENT WITH DIGITAL INTERFACING**

1-6-3

Prerequisite: PHYS 3120 and CSCI 1301

Principles and techniques used in measuring physical quantities, including transducers, data acquisition interfaces, and data analysis. Data acquisition and process control capabilities of the computer as a general purpose lab instrument. Hands-on lab experience through applications in experimental physics. Includes a variety of oral and written assignments. Physics faculty involved in assessments.

RATIONALE: The 7 contacts hours for faculty has posed a problem with course assignments and remaining within the 12 hour or 15 hour allotment for faculty. All faculty agree the lab component can successfully be completed within the five hours.

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IV. CHANGE THE PRE-REQUISITE

A. **PHYS 1010 THE PHYSICS OF SPORTS**

3-0-3

Prerequisite: MATH 1111 *(minimum grade of C)*

Fundamental concepts, laws, and theories of physics as they relate to a variety of sports, including volleyball, soccer, tennis, golf, and more. For non-science majors interested in the concepts underlying the mechanics of the skills and movements involved in a variety of physical activities. Includes in-class demonstrations and activities.

RATIONALE: Students will need a proficient understanding of college algebra to successfully complete PHYS 1010.

B. **PHYS 3120**

**DIGITAL ELECTRONICS**

1-6-3

Prerequisite: MATH 1113 *(minimum grade of C)* and 8 semester hours of lab science

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.

RATIONALE: Students that earned a D in MATH 1113 do not generally succeed in PHYS 3120. To benefit the student, the pre-requisite of minimum grade of C has been added to MATH 1113.

C. **PHYS 3220**

**MECHANICS OF DEFORMABLE BODIES**

3-0-3

Prerequisite: ENGR 2020, MATH 3411 *(minimum grade of C)* and PHYS 2212K *(minimum grade of C)*

Internal effects and dimension changes of solids resulting from external applied loads; shear and bending moment diagrams, analysis of stress and strain; beam deflection; column stability.

RATIONALE: ENGR 2020 is not offered anymore at Armstrong. PHYS 2212K and MATH 3411 will provide the student with the foundation to succeed in PHYS 3220.
D. PHYS 3230
FLUID MECHANICS 3-0-3
Prerequisite: MATH 3411 (minimum grade of C) and either ENGR 2020 or ENGR 2202 or PHYS 3210 and either PHYS 3300 or PHYS 3400
Fluid statics; analysis of fluid motion using the continuity, momentum, and energy conservation relationships; introduction to viscous flows.

RATIONALE: ENGR 2020 is not offered at Armstrong anymore. PHYS 3210 is being deleted. Applied Physics Majors do not need to take ENGR 2202 anymore within the related fields. So this would add an extra course.

E. PHYS 3300
THERMODYNAMICS 3-0-3
Prerequisite: PHYS 2212K (minimum grade of C) and MATH 3411 (minimum grade of C)
Thermodynamic properties, energy and mass conservation, entropy and the second law. Second-law analysis of thermodynamic systems, gas cycles, and vapor cycles.

RATIONALE: Students that earned a D in MATH 3411 do not generally succeed in PHYS 3300. To benefit the student, the pre-requisite of minimum grade of C has been added to MATH 3411.

F. PHYS 3312
ELECTROMAGNETISM 3-0-3
Prerequisite: PHYS 2212K (minimum grade of C) and MATH 2083 (minimum grade of C)
Electrostatics, magnetostatics, electromagnetism, electromagnetic waves, and applications, using both the integral form and differential form of Maxwell’s equations.

RATIONALE: Students that earned a D in MATH 2083 do not generally succeed in PHYS 3312. To benefit the student, the pre-requisite of minimum grade of C has been added to MATH 2083.

G. PHYS 3400
CHEMICAL THERMODYNAMICS 3-0-3
Prerequisite: CHEM 1212 (minimum grade of C) and MATH 2072 (minimum grade of C) and either PHYS 1112K (minimum grade of C) or PHYS 2212K (minimum grade of C)
Fundamentals of physical chemistry: gas laws, heat and work, and laws of thermodynamics; material and reaction equilibrium and standard thermodynamic functions; single and multi-component phase equilibria; and reaction kinetics.

RATIONALE: Students that earned a D in MATH 2072 and CHEM 1212 do not generally succeed in PHYS 3400. To benefit the student, the pre-requisite of minimum grade of C has been added to MATH 2072 and CHEM 1212.
H. PHYS 3500
DIFFRACTION AND CRYSTALLOGRAPHY 3-0-3
Prerequisite: PHYS 3801K (minimum grade of C)
Diffraction and crystal structure with identification from single crystal and powder patterns. Lattice parameters and crystal orientation.

RATIONALE: Students that earned a D in PHYS 3801K have not demonstrated proficient skills to succeed in PHYS 3500. To benefit the student, the pre-requisite of minimum grade of C has been added to PHYS 3801K. PHYS 3801 has been changed in the recent past to PHYS 3801K.

I. PHYS 3802
INTRODUCTION TO QUANTUM MECHANICS 3-0-3
Prerequisite: MATH 2072 (minimum grade of C) and PHYS 3801K (minimum grade of C)
Introduction to quantum mechanical principles with applications in atomic and molecular structure.

RATIONALE: Students that earned a D in MATH 2072 do not generally succeed in PHYS 3802. To benefit the student, the pre-requisite of minimum grade of C has been added to MATH 2072. PHYS 3801 has been changed in recent past to PHYS 3801K.

J. PHYS 4120
SCIENTIFIC MEASUREMENT WITH DIGITAL INTERFACING 1-6-3
Prerequisite: PHYS 3120 (minimum grade of C) and CSCI 1301 (minimum grade of C)
Principles and techniques used in measuring physical quantities, including transducers, data acquisition interfaces, and data analysis. Data acquisition and process control capabilities of the computer as a general purpose lab instrument. Hands-on lab experience through applications in experimental physics. Includes a variety of oral and written assignments. Physics faculty involved in assessments.

RATIONALE: Students that earned a D in PHYS 3120 and/or CSCI 1301 have not demonstrated proficient skills to succeed in PHYS 4120. To benefit the student, the pre-requisite of minimum grade of C has been added to PHYS 3120 and CSCI 1301.

K. PHYS 4170
ADVANCED MECHANICS 3-0-3
Prerequisite: MATH 2083 (minimum grade of C) and PHYS 2212K (minimum grade of C). (MATH 3411 also recommended).
Mechanics of particles and systems of particles using Newtonian and Euler-Lagrangian/Hamiltonian principles.

RATIONALE: Students that earned a D in MATH 2083 do not generally succeed in PHYS 3802. To benefit the student, the pre-requisite of minimum grade of C has been added to MATH 2083.
L. PHYSICS INTERNSHIP

PHYS 4960
Prerequisite: ENGR 2201 and PHYS 3100 and either PHYS 3300 or PHYS 3400 and permission of instructor or department head.
Project in industry or government to be determined, supervised, and evaluated by the sponsor of the activity and physics intern program director. Application and arrangements must be made through the department by mid-semester preceding the semester of internship. Open to transient students only with the permission of the department head. Offered by special arrangement.

RATIONALE: Delete the specific classes. The specific prerequisites are not valid for a student to complete an internship in applied physics and can restrict if a student is eligible for the internship.

V. CREATE THE FOLLOWING COURSE:

PHYS 3200 Mathematical Methods for Physicists
3-0-3
Prerequisite: PHYS2212K (minimum grade of C), MATH2083 (minimum grade of C), and MATH3411 (minimum grade of C).

Rationale: Each area of physics has a number of different mathematical methods employed in the subject. This course will present a variety of mathematical subjects within the context of the physical sciences. The course will build upon the prerequisites and expand the mathematical skill set of the students.

Effective Term: Spring 2013

CURCAT:
Major Department: Chemistry and Physics
Can course be repeated for additional credit? No
Maximum number of Credit Hours: 3
Cross-Listed Courses: None
Grading Mode: Normal
Instruction Type: Lecture

VI. CREATE THE FOLLOWING COURSE:

PHYS 3142 Computational Physics
V-V-3
Prerequisite: PHYS2212K (minimum grade of C), MATH2083 (minimum grade of C), and MATH3411 (minimum grade of C).
A survey of computational methods used in the natural sciences: approximation of functions, numerical calculus, numerical differential equations, Monte Carlo techniques, parallel computing, and distributed computing.
Rationale: Each area of physics has a number of different computational methods employed in the subject. This course will present a variety of computational subjects within the context of the physical sciences. The course will build upon the prerequisites and expand the mathematical skill set of the students. A new computational center is currently being assembled and will be a cornerstone of the physics program. This course has been offered as a special topics class twice since 2009 and will be offered again in Spring 2013. The computational physics course has become a part of the upper division physics course rotation and this should be reflected in the course catalog.

Effective Term: Spring 2013

CURCAT:
Major Department: Chemistry and Physics
Can course be repeated for additional credit? No
Maximum number of Credit Hours: 3
Cross-Listed Courses: None
Grading Mode: Normal
Instruction Type: Lecture

VII. CREATE THE FOLLOWING COURSE:

PHYS 4800  Pedagogy and Supplemental Instruction in Physics  
(0-3,0-9,1-3)
Pre-Requisite: Open only to applied physics majors, PHYS 2212K (minimum grade of C) and permission of Department Head.
This course is designed to provide pre-service high school physics educators with the knowledge, skills, and strategies fundamental to the best practices of inclusive physics instruction in high school settings. Course goals will be accomplished through the reading of pedagogical works, mentoring with an instructor, direct supplemental instruction, tutoring, lesson planning and delivery in a lower-level physics course. Completion of a physics education project is also required.

Rationale: The course is designed for physics majors who have expressed an interest in becoming a high school teacher to allow them to experience the field and matriculate towards the MAT program within the College of Education. This course will support the NSF funded Noyce Scholarship Program and we view this course as an educational internship, similar to a physics laboratory internship (PHYS 4960).

Effective Term: Fall 2013
CURCAT:
Major Department: Chemistry & Physics
Can course be repeated for additional credit? No
Maximum number of credit hours: 9
Grading Mode: Normal
Instruction Type: Lecture / Lab
Course equivalent: None
PROGRAM FOR THE DEGREE OF BACHELOR OF SCIENCE IN APPLIED PHYSICS

A. .................................................................................. General Requirements
Core Areas A, B, C, D, 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 approved by the physics faculty
Physical Education ................................................................. 3 hours

B. ..................................................................................... Major Field Courses  30 hours
PHYS 3100 - Electric Circuit Analysis
PHYS 3120 - Digital Electronics
PHYS 3210 - Intermediate Mechanics or PHYS 4170 - Advanced Mechanics
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
Nine semester hours from:
PHYS 2900 – Introduction to Research in Physics
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), approved by the physics faculty.
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)

<table>
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<tr>
<th>Total Semester Hours</th>
<th>123 hours</th>
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<td>E.</td>
<td>Exit Exam</td>
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ATTACHMENT # 3
Chemistry Planning Outcomes – Instrumentation and Technology
Oct. 5, 2012

Maintenance and Repair Items

1. LC-MS – Point: Feske
2. Microwave – Point: Hizer
3. Atomic Absorption (both instruments) – Point: Padgett, L.
4. TGA – Point: No

High Priority Items

1. Raman Spectrometer – Estimated Cost: $14,000 (next step, need quote, EOY request, or department budget) Must have polarization.
2. ELMO – 5 @ $2000 (2001, 2103, 2502, 2503, 2504), 7 total for the department (2 physics) total = $14,000. (next step, tech fee proposal, EOY request, or department budget) – Point: Carpenter
3. Refrigerated/Incubated Shaker: ~$9000 (New Brunswick) 4-2L Shaker clamps ~$200

Low Priority Items

1. TGA / DSC – Ours are functional but future purchase may be necessary, Estimate Cost: $15,000 (next step, need quote, EOY request, or department budget) Point: No
2. **Microcentrifuge with Adaptors: ~$3500 (Eppendorf) 96 well plate rotor ~50mL conical tube rotor ~ This is a cheaper option than buying both another microcentrifuge and an additional larger centrifuge to hold the 50mL tubes. Additionally we could accommodate 96 well plates which we currently do not have the ability to. Point: Weiland
3. **Base model Microcentrifuge: ~$1600 (Fisher) Point: Weiland
4. **Transilluminator: ~ $1600 Needed to visualize DNA gels – currently using one on loan from Dr. Gregerson. Point: Weiland
5. **Gel casting system: 2 set-ups ~$1150 ea (BioRad) Point: Weiland
6. **Electrophoresis Power Supply: ~$1400 (Fisher) Point: Weiland
7. -80 C freezer: - Upright 13cu. ft. ~$10,000 (Fisher) or - chest 3.0 cu. Ft. ~$7200 (Fisher) Point: Weiland
8. Analytical Balance: ~$1200 (Fisher) (biochemistry) The current balance has a broken door and needs to be replaced. Point: Weiland

**Biochemistry Degree Program
Needs:
1. Laptop replacement plan for General Chemistry & Organic Chemistry
1. Several items presented by Sarah Shepherd from Pearson were discussed.
   a. The new lab notebooks have been difficult for students and faculty to read because the gridded paper is too dark and the transfer pages are very light. This has been discussed with the sales rep, and she is going to work on it. Changing the paper grid type is simple, but she’ll have to look into the issues with the transfer paper. If the problem can’t be easily resolved, we will be moving to a different notebook without these problems.
   b. Pearson is offering a bundle with a free student solutions manual in it. It was decided that we would offer this as an option for the students. Sarah has been asked to clarify whether the solutions manual has a worked solution for every problem or only selected ones.
   c. Pearson can make available a mastering chemistry login with a grace period for students that have financial aid. This sounds good, but there is some concern about what the implementation will be like and if it will cause too many problems. Sarah has been contacted for more information before we discuss it with the bookstore.
   d. Sarah also wants to come for a training session to provide assistance with any of the changes made recently with mastering chemistry. She has been asked whether this could occur on reading day, 4 Dec 12.

2. Lab Attendance Policy
   a. After a significant amount of discussion, it was decided that we would lower the allowed amount of absences in lab from three to two in the coming semester. It was felt that this would stress to students that they needed to be present for lab and would address problems that occur in groups when there are members with poor attendance.
   b. The lab syllabus will be changed to read that students will automatically receive a failing grade upon exceeding the allowed absences rather than saying they will be withdrawn and a W or WF given.

3. Lab Equipment needs
   a. It was agreed that rotating the laptops through so that they were changed approximately every three years would be sufficient.
   b. Other equipment items suggested for purchase were to replace some of the genesys 20 spectrometers and labquests. Cathy is going to investigate whether we are missing any AA lamps that would be appropriate for our instrument.

4. Lab changes—there wasn’t much time to talk about new lab ideas, but a different polymer lab, a different stoichiometry lab, and a new thermodynamics lab are topics for future discussion.