California State University Channel Islands

Program Modification

Program Changes must be submitted by November 5, 2007

Date: 12/31/2007 revised 1.23.08
Program Area: Math/ Applied Physics
Semester /Year First effected: Fall 2008

Instructions: Please use the following format to modify any existing program.
Enter the latest approved version of your entire program in the left and right boxes below.
Make your deletions in the left hand column by using the strike-out feature of Word or underline what you wish to delete, and highlight.
Amendments to the program (on the right side) also need to be highlight in GREY so they can be identified for approval.
Please align your changes so that they appear side-by-side as much as possible for readability. Thank you.

<table>
<thead>
<tr>
<th>CURRENTLY APPROVED PROGRAM</th>
<th>PROPOSED PROGRAM</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PROGRAMS OFFERED</strong></td>
<td><strong>PROGRAMS OFFERED</strong></td>
</tr>
<tr>
<td>• Bachelor of Science in Applied Physics with an Emphasis in Technology</td>
<td>• Bachelor of Science in Applied Physics with an Emphasis in Technology</td>
</tr>
<tr>
<td>• Bachelor of Science in Applied Physics with an Emphasis in Physical Sciences</td>
<td>• Bachelor of Science in Applied Physics with an Emphasis in Physical Sciences</td>
</tr>
<tr>
<td>• Minor in Applied Physics</td>
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</tr>
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</table>

Applied physics is the interface between science and technology, between the laboratory and industrial practice. It applies the concepts and models of physics to practical technological applications. Applied physics is essentially an interdisciplinary undertaking, interacting with mathematics, computer science, engineering, the life sciences, medicine and other disciplines. Applied physicists use their understanding and skills at the new scientific and technological frontiers that are developing rapidly at the interface between more traditional disciplines, e.g. biophysics, biomedical engineering, bioinformatics, materials science, and medical imaging. They have the flexibility to adapt to changing technological requirements and the ability to make meaningful contributions to modern, interdisciplinary investigations.

<table>
<thead>
<tr>
<th>CAREERS</th>
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Applied physics is the interface between science and technology, between the laboratory and industrial practice. It applies the concepts and models of physics to practical technological applications. Applied physics is essentially an interdisciplinary undertaking, interacting with mathematics, computer science, engineering, the life sciences, medicine and other disciplines. Applied physicists use their understanding and skills at the new scientific and technological frontiers that are developing rapidly at the interface between more traditional disciplines, e.g. biophysics, biomedical engineering, bioinformatics, materials science, and medical imaging. They have the flexibility to adapt to changing technological requirements and the ability to make meaningful contributions to modern, interdisciplinary investigations.

| CAREERS |
Graduates from the Bachelor of Science in Applied Physics will receive an excellent preparation for securing professional employment in industry or in the public sector.

The Bachelor of Science in Applied Physics with an Emphasis in Technology is designed to produce graduates with strong problem-solving, technical, industrial and management skills. This will enable them to obtain professional employment on graduation in research and development in industry or in the public sector in, for example, electronics, semiconductors, medical technology and telecommunications. Through appropriate selection of electives, students can concentrate on selected areas within applied physics and pursue further study in graduate or professional schools, for example in Experimental Physics, Computer Engineering, Materials Science, Biomedical Engineering, or Medical Physics.

The Bachelor of Science in Applied Physics with an Emphasis in Physical Sciences is designed to provide students with a broad foundation in applied physics as part of a liberal education in the sciences. The program is particularly appropriate for students interested in such careers as teaching, public service, business, scientific equipment sales or science journalism. It can serve as the depth and breadth of study necessary for securing a single Subject credential in Science for teaching at the high school and middle school level.

The Applied Physics Minor provides non-majors with the background in science and technology that is needed to pursue a career or graduate study in an interdisciplinary field. Students majoring in Mathematics or Computer Science, in particular, should consider obtaining an Applied Physics minor because of the considerable overlap with these fields.

**PROGRAM LEARNING OUTCOMES**

Students graduating from the Applied Physics program will be able to:

- explain the fundamental concepts of physics;
- analyze and solve problems by applying information in a novel context;
- formulate hypotheses and devise and perform experiments to test
hypotheses as individuals and in a team;
● apply current technology and scientific methodologies to analyze and solve problems in various scientific, professional and community settings;
● use and critically evaluate current technical/scientific research literature, online information, and information related to scientific issues in the mass media;
● communicate in written and oral forms key concepts in physics and general scientific issues with interested citizens and professionals;
● work co-operatively as part of a research team;
● learn independently and maintain life-long learning in the sciences and technology.

FACULTY

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Email: geoff.dougherty@csuci.edu
Physics Web Page: http://physics.csuci.edu

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Email: gregory.wood@csuci.edu

ADDITIONAL FACULTY

Simone Aloisio, Ph.D.
Assistant Professor of Chemistry
Academic Advisor for the Chemistry Program

hypotheses as individuals and in a team;
● apply current technology and scientific methodologies to analyze and solve problems in various scientific, professional and community settings;
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FACULTY

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Physics Web Page: http://physics.csuci.edu

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ACADEMIC ADVISOR FOR THE CHEMISTRY PROGRAM
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EMAIL: simone.aloisio@csuci.edu
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ASSISTANT PROFESSOR OF MATHEMATICS  
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EMAIL: philip.hampton@csuci.edu

Jack Reilly, MFA  
Professor of Art  
PHONE: (805) 437-8863
### CONTACT INFORMATION

http://physics.csuci.edu

### REQUIREMENTS FOR THE BACHELOR OF SCIENCE DEGREE WITH AN EMPHASIS IN TECHNOLOGY (120 UNITS)

#### LOWER DIVISION REQUIREMENTS (31-32 UNITS):

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
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<tbody>
<tr>
<td>PHYS 106*</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 200*</td>
<td>4</td>
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<tr>
<td>PHYS 201</td>
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<td>4</td>
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<tr>
<td>MATH 151</td>
<td>4</td>
</tr>
<tr>
<td>MATH 230*</td>
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### REQUIREMENTS FOR THE BACHELOR OF SCIENCE DEGREE IN APPLIED PHYSICS WITH AN EMPHASIS IN TECHNOLOGY (120 UNITS)

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<tr>
<td>MATH 150</td>
<td>4</td>
</tr>
<tr>
<td>MATH 151</td>
<td>4</td>
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5/25/2004 cp
MATH 240 Linear Algebra (3)
MATH 250 Calculus III (3)

AND

Either:
COMP 105* Introduction to Computer Science (3)
Or:
COMP 150* Object-Oriented Programming (4)

UPPER DIVISION REQUIREMENTS (37 UNITS):
PHYS 304 Electromagnetism (4)
PHYS 306 Modern Physics (3)
PHYS 310 Electronics (4)
PHYS 335* Physics of Music (3)
PHYS 338* Science and Conscience (3)
PHYS 345* Digital Image Processing (3)
PHYS 406 Solid State Physics (3)
PHYS 434* Introduction to Biomedical Imaging (4)
PHYS 448* Team-Based Research (3)
PHYS 499 Senior Colloquium (1)
MATH 350 Differential Equations and Dynamical Systems (3)

AND

3 units taken from the following:
PHYS 492 Internship (3) required for teachers
PHYS 494 Independent Research (1-3)
PHYS 497 Directed Studies (1-3)

ELECTIVES IN THE MAJOR (9-10 UNITS)

MATH 230* Logic and Mathematical Reasoning (3)
MATH 240 Linear Algebra (3)
MATH 250 Calculus III (3)

AND

Either:
COMP 105* Introduction to Computer Science (3)
Or:
COMP 150* Object-Oriented Programming (4)

* MAY BE DOUBLE-COUNTED TOWARD GE REQUIREMENTS

UPPER DIVISION REQUIREMENTS (37 UNITS):
PHYS 304 Electromagnetism (4)
PHYS 306 Modern Physics (3)
PHYS 310 Electronics (4)
PHYS 335* Physics of Music (3)
PAMU
PHYS/ 338* Science and Conscience (3)
ENGL
PHYS/ 345 Digital Image Processing (3)
COMP/MATH
PHYS 406 Solid State Physics (3)
PHYS/ 434* Introduction to Biomedical Imaging (4)

AND

3 units taken from the following (ANY COMBINATION):
PHYS 492 Internship (3)
PHYS 494 Independent Research (1-3)
PHYS 497 Directed Studies (1-3)

ELECTIVES IN THE MAJOR (9-10 UNITS)

* MAY BE DOUBLE-COUNTED TOWARD GE REQUIREMENTS
Select **three** courses from the following:

- PHYS 445* Image Analysis and Pattern Recognition (3)
- PHYS 464 Medical Instrumentation (4)
- PHYS 490 Topics in Applied Physics (3)
- PHYS 492 Internship (3),
  *if not taken as a required course*
- PHYS 494 Independent Research (3),
  *if not taken as a required course*
- PHYS 497 Directed Studies (3),
  *if not taken as a required course.*

Additional courses:
- MATH 352 Probability and Statistics (3)
- MATH 448 Scientific Computing (3)
- MATH 450 Partial Differential Equations and Mathematical Physics (3)
- MATH 451 Complex Analysis (3)
- PHYS 301\‡ Classical Mechanics (3)
- PHYS 305\‡ Thermal and Statistical Physics (3)
- PHYS 401\‡ Quantum Mechanics (3)

\*\‡ - courses offered to students interested in taking the GRE exam for grad school

\* Courses with \* are double-counted toward GE credits.

**REQUIRED SUPPORTING AND OTHER GE COURSES (42 UNITS):**
- American Institutions Requirement (6)
- Other courses in GE categories A-E (27)
- Electives in Any Discipline (9)

**Select 9-10 units from the following:**

- PHYS 445/ Image Analysis and Pattern Recognition (3)
- COMP/MATH
- PHYS 464 Medical Instrumentation (4)
- BIOL
- PHYS 490 Topics in Applied Physics (3)
- PHYS 492 Internship (3),
  *if not taken as a required course*
- PHYS 494 Independent Research (1-3)
- PHYS 497 Directed Studies (1-3)
- MATH 352 Probability and Statistics (3)
- MATH 448 Scientific Computing (3)
- MATH 450 Partial Differential Equations and Mathematical Physics (3)
- MATH 451 Complex Analysis (3)
- PHYS 301\‡ Classical Mechanics (3)
- PHYS 305\‡ Thermal and Statistical Physics (3)
- PHYS 401\‡ Quantum Mechanics (3)

\* CANNOT EXCEED A TOTAL OF 3 UNITS, WHEN ADDED TO UNITS TAKEN WITHIN THE UPPER DIVISION REQUIREMENTS

\† Courses offered to students interested in taking the GRE exam for grad school

**REQUIRED SUPPORTING AND OTHER GE COURSES (42 UNITS):**
- American Institutions Requirement (6)
- Other courses in GE categories A-E (27)
- Electives in Any Discipline (9)

**PROPOSED COURSE OF STUDY FOR THE TECHNOLOGY EMPHASIS:**
### FRESHMAN YEAR (29 - 30 UNITS)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Units</th>
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<tbody>
<tr>
<td>PHYS 106</td>
<td>Applied Physics and Modern Society</td>
<td>3</td>
</tr>
<tr>
<td>MATH 150*</td>
<td>Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 151</td>
<td>Calculus II</td>
<td>4</td>
</tr>
<tr>
<td>COMP 150*</td>
<td>Object–Oriented Programming</td>
<td>4</td>
</tr>
<tr>
<td>(or COMP 105* Computer Programming Intro)</td>
<td>3</td>
<td></td>
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<tr>
<td>American Institutions</td>
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<tr>
<td>Other GE</td>
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### SOPHOMORE YEAR (29 UNITS)

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<tr>
<td>PHYS 200*</td>
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<tr>
<td>PHYS 201</td>
<td>Gen Physics II</td>
<td>4</td>
</tr>
<tr>
<td>MATH 230*</td>
<td>Logic and Mathematical Reasoning</td>
<td>3</td>
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<td>MATH 240</td>
<td>Linear Algebra</td>
<td>3</td>
</tr>
<tr>
<td>MATH 250</td>
<td>Calculus III</td>
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<td>Other GE</td>
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### JUNIOR YEAR (32 UNITS)

<table>
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<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Units</th>
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<tbody>
<tr>
<td>PHYS 304</td>
<td>Electromagnetism</td>
<td>4</td>
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<tr>
<td>PHYS 306</td>
<td>Modern Physics</td>
<td>3</td>
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<tr>
<td>PHYS 310</td>
<td>Electronics</td>
<td>4</td>
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<tr>
<td>PHYS/335*</td>
<td>Physics of Music</td>
<td>3</td>
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<td>PAMU</td>
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<tr>
<td>PHYS/338*</td>
<td>Science and Conscience</td>
<td>3</td>
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<tr>
<td>ENGL</td>
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<td></td>
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<tr>
<td>PHYS/345</td>
<td>Digital Image Processing</td>
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<td>COMP/MATH</td>
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<td>UDIGE</td>
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<td>Other GE</td>
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### SENIOR YEAR (29-30 UNITS)

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</table>
## REQUIREMENTS FOR THE BACHELOR OF SCIENCE DEGREE WITH AN EMPHASIS IN PHYSICAL SCIENCES (120 UNITS):

### LOWER DIVISION REQUIREMENTS (32-33 UNITS):

- PHYS 106* Applied Physics and Modern Society (3)
- PHYS 200* General Physics I (4)
- PHYS 201 General Physics II (4)
- MATH 150 Calculus I (4)
- MATH 151 Calculus II (4)
- CHEM 105* Introduction to Chemistry (3)

AND

**Either:**
- PHYS 208* Physics of Art and Visual Perception (3)
  
**Or:**
- PHSC 170* Foundations in Physical Science (4) *(required for teachers)*

AND

**Either:**
- BIOL 100* Exploring the Living World (4)
  
**Or:**
- BIOL 170* Foundations of Life Science (4) *(required for teachers)*

### REQUIREMENTS FOR THE BACHELOR OF SCIENCE DEGREE IN APPLIED PHYSICS WITH AN EMPHASIS IN PHYSICAL SCIENCES (120 UNITS):

### LOWER DIVISION REQUIREMENTS (32-33 UNITS):

- PHYS 106 Applied Physics and Modern Society (3)
- PHYS 200* General Physics I (4)
- PHYS 201 General Physics II (4)
- MATH 150 Calculus I (4)
- MATH 151 Calculus II (4)
- CHEM 105 Introduction to Chemistry (3)

**Either:**
- PHYS 208 Physics of Art and Visual Perception (3)
  
**Or:**
- PHSC 170 Foundations in Physical Science (4) *(required for teachers)*

AND

**Either:**
- BIOL 100* Exploring the Living World (4)
  
**Or:**
- BIOL 170* Foundations of Life Science (4) *(required for teachers)*
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
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<tbody>
<tr>
<td>COMP 102</td>
<td>Web Development</td>
<td>3</td>
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<tr>
<td>Or:</td>
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<tr>
<td>COMP 105</td>
<td>Introduction to Computer Science</td>
<td>3</td>
</tr>
</tbody>
</table>

**UPPER DIVISION REQUIREMENTS (30 UNITS):**

- PHYS 304  Electromagnetism (4)
- PHYS 306  Modern Physics (3)
- PHYS 335* Physics of Music (3)
- PHYS 338* Science and Conscience (3)
- PHYS 344  Energy and Society (3)
- PHYS 434  Introduction to Biomedical Imaging (4)
- PHYS 448* Team-Based Research (3)
- PHYS 499  Senior Colloquium (1)
- MGT 325  Entrepreneurial Management (3)

**3 units taken from the following:**

- PHYS 492  Internship (required for teachers) (3)
- PHYS 494  Independent Research (1-3)
- PHYS 497  Directed Studies (1-3)

**ELECTIVES IN THE MAJOR (15-16 UNITS)**

*Chosen with advisor’s approval.*

- PHYS 310  Electronics (4)
- PHYS 345* Digital Image Processing (3)
- PHYS 436* Physics of the Performing Arts (3)
- PHYS 445* Image Analysis and Pattern Recognition (3)

* MAY BE DOUBLE-COUNTED TOWARD GE REQUIREMENTS

**UPPER DIVISION REQUIREMENTS (30 UNITS):**

- PHYS 304  Electromagnetism (4)
- PHYS 306  Modern Physics (3)
- PHYS 335* Physics of Music (3)

**PAMU**

- PHYS 338* Science and Conscience (3)
- ENGL
- PHYS 344  Energy and Society (3)
- PHYS 434* Introduction to Biomedical Imaging (4)

**BIOL/HLTH**

- PHYS 448* Team-Based Research (3)
- PHYS 499  Senior Colloquium (1)
- MGT 325  Entrepreneurial Management (3)

**3 units taken from the following (ANY COMBINATION):**

- PHYS 492  Internship (3)  *(required for teachers)*
- PHYS 494  Independent Research (1-3)
- PHYS 497  Directed Studies (1-3)

* MAY BE DOUBLE-COUNTED TOWARD GE REQUIREMENTS

**ELECTIVES IN THE MAJOR (15-16 UNITS)**

*Chosen with advisor’s approval.*

- PHYS 310  Electronics (4)
- PHYS 345 Digital Image Processing (3)
- COMP/MATH
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<td>Medical Instrumentation</td>
<td>4</td>
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<tr>
<td>PHYS 490</td>
<td>Topics in Applied Physics</td>
<td>3</td>
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<tr>
<td>PHYS 492</td>
<td>Internship</td>
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<tr>
<td>PHYS 497</td>
<td>Directed Studies (1-3)</td>
<td>, if not taken as a required course</td>
</tr>
<tr>
<td>EDUC 330</td>
<td>Teaching in Secondary Schools</td>
<td>3</td>
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<tr>
<td>MATH 240</td>
<td>Linear Algebra</td>
<td>3</td>
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*(Courses with * are double-counted toward GE credits)*

**REQUIRED SUPPORTING AND OTHER GE COURSES (42 UNITS):**
- American Institutions Requirement (6)
- Other courses in GE categories A-E (27)
- Electives in Any Discipline (9)

**PROPOSED COURSE OF STUDY:**
**BACHELOR OF SCIENCE IN APPLIED PHYSICS WITH AN EMPHASIS IN TECHNOLOGY**

**FRESHMAN YEAR (29 - 30 UNITS)**
- PHYS 106   Applied Physics and Modern Society | 3

PHYS/ 436 Physics of the Performing Arts (3)
PA
PHYS/ 445 Image Analysis and Pattern Recognition (3)
COMP/MATH
PHYS 464 Medical Instrumentation (4)
PHYS 490 Topics in Applied Physics (3)
PHYS 492 Internship (3), *(if not taken as a required course)*
PHYS 494 Independent Research (1-3)
PHYS 497 Directed Studies (1-3)
EDUC 330* Teaching in Secondary Schools (3)
MATH 240 Linear Algebra (3)
MATH 250 Calculus III (3)
MATH 350 Differential Equations and Dynamical Systems (3)
MATH 352 Probability and Statistics (3)
MATH 448 Scientific Computing (3)
MATH 450 Partial Differential Equations and Mathematical Physics (3)
MATH 451 Complex Analysis (3)

* CANNOT EXCEED A TOTAL OF 3 UNITS, WHEN ADDED TO UNITS TAKEN WITHIN THE UPPER DIVISION REQUIREMENTS

**REQUIRED SUPPORTING AND OTHER GE COURSES (42 UNITS):**
- American Institutions Requirement (6)
- Other courses in GE categories A-E (27)
- Electives in Any Discipline (9)
### MATH 150 Calculus I 4
### MATH 151 Calculus II 4
### COMP 150 Object–Oriented Programming 4
(or COMP 105 Computer Programming Intro 3)
### American Institutions 6
### Other GE 9

#### SOPHOMORE YEAR (29 UNITS)

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</tr>
<tr>
<td>PHYS 338* Science and Conscience</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 345 Digital Image Processing</td>
<td>3</td>
</tr>
<tr>
<td>University Electives</td>
<td>6</td>
</tr>
<tr>
<td>UDIGE</td>
<td>3</td>
</tr>
<tr>
<td>Other GE</td>
<td>3</td>
</tr>
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</table>

#### SENIOR YEAR (29-30 UNITS)

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td>PHYS 406 Solid State Physics</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 434* Intro to Biomedical Imaging</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 448 Team-Based Research</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 492, 494 or 497</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 499 Senior Colloquium</td>
<td>1</td>
</tr>
<tr>
<td>MATH 350 Differential Equations</td>
<td>3</td>
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</tbody>
</table>

5/25/2004 cp
PROPOSED COURSE OF STUDY:
BACHELOR OF SCIENCE IN APPLIED PHYSICS WITH AN
EMPHASIS IN
PHYSICAL SCIENCES

FRESHMAN YEAR (30 UNITS)

PHYS 106  Applied Physics and Modern Society 3
MATH 150 Calculus I  4
MATH 151 Calculus II  4
CHEM 105 Introduction To Chemistry 3
BIOL 100 Exploring the Living World 4
(or BIOL 170 Foundations of Life Science 4)
American Institutions 6
Other GE (Including ENGL 105) 6

SOPHOMORE YEAR (29-30 UNITS)

PHYS 200 General Physics I 4
PHYS 201 General Physics II 4
COMP 105 Computer Programming Intro 3
(or COMP 102 Web Development 3)
PHYS 208 Physics of Art and Visual Perception 3
(or PHSC 170 Foundations in Physical Sciences 4)
Other GE 15

JUNIOR YEAR (31-32 UNITS)

PHYS 304 Electromagnetism 4
PHYS 335 Physics of Music 3
PHYS 338 Science and Conscience 3
PHYS 344 Energy and Society 3

PROPOSED COURSE OF STUDY FOR THE PHYSICAL SCIENCES
EMPHASIS:

FRESHMAN YEAR (30 UNITS)

PHYS 106  Applied Physics and Modern Society 3
MATH 150* Calculus I  4
MATH 151 Calculus II  4
CHEM 105 Introduction To Chemistry 3
BIOL 100* Exploring the Living World 4
(or BIOL 170* Foundations of Life Science 4)
American Institutions 6
Other GE (Including ENGL 105) 6

SOPHOMORE YEAR (29-30 UNITS)

PHYS 200* General Physics I 4
PHYS 201 General Physics II 4
COMP 105 Computer Programming Intro 3
(or COMP 102 Web Development 3)
PHYS/ 308 Physics of Art and Visual Perception 3
(or PHSC 170 Foundations in Physical Sciences 4)
Other GE 15

JUNIOR YEAR (31-32 UNITS)

PHYS 304 Electromagnetism 4
PHYS/ 335 Physics of Music 3

5/25/2004 cp
<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>MGT 325 Entrepreneurial Management</td>
<td>3</td>
</tr>
<tr>
<td>Applied Physics Electives</td>
<td>6-7</td>
</tr>
<tr>
<td>University Electives</td>
<td>6</td>
</tr>
<tr>
<td>UDIGE</td>
<td>3</td>
</tr>
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**SENIOR YEAR (29 UNITS)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 306 Modern Physics</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 434 Intro to Biomedical Imaging</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 448 Team-Based Research</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 492, 494 or 497</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 499 Senior Colloquium</td>
<td>1</td>
</tr>
<tr>
<td>Applied Physics Electives</td>
<td>9</td>
</tr>
<tr>
<td>University electives</td>
<td>3 Other GE</td>
</tr>
</tbody>
</table>

Note to Students: To maximize University Electives, it is recommended that the nine units of upper-division, interdisciplinary general education courses (numbered 330-349 or 430-449) be taken from those courses marked with an asterisk (*), in order to meet simultaneously Categories A-E and the nine units of Upper-Division General Education.

**REQUIREMENTS FOR THE MINOR IN APPLIED PHYSICS (25 UNITS):**

Physics is the fundamental science from which many fields of science and engineering developed. It is essentially an inter-disciplinary undertaking, interacting with computer science, mathematics, the life sciences, medicine, and

**PAMU**

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td>PHYS/ 338* Science and Conscience</td>
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</tbody>
</table>

**ENGL**

<table>
<thead>
<tr>
<th>Course</th>
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</thead>
<tbody>
<tr>
<td>PHYS/ 344 Energy and Society</td>
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**CHEM**

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<tr>
<th>Course</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td>MGT 325 Entrepreneurial Management</td>
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<tr>
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<td>University Electives</td>
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**SENIOR YEAR (29 UNITS)**

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</tr>
<tr>
<td>PHYS/ 434* Intro to Biomedical Imaging</td>
<td>4</td>
</tr>
<tr>
<td>BIOL/HLTH</td>
<td></td>
</tr>
<tr>
<td>PHYS 448 Team-Based Research</td>
<td>3</td>
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</tr>
<tr>
<td>University electives</td>
<td>3</td>
</tr>
<tr>
<td>Other GE</td>
<td>3</td>
</tr>
</tbody>
</table>

Note to Students: Courses with an asterisk (*) will double count with general education (GE) requirements. Only two upper division interdisciplinary GE major courses (numbered 330-349 and/or 430-449) may be used towards the upper division major GE requirement. The third course must come from outside the major.

**REQUIREMENTS FOR THE MINOR IN APPLIED PHYSICS (25 UNITS):**

Applied physics focuses on the hi-tech applications of physics, and on
other disciplines. Applied physics focuses on the hi-tech applications of physics, and on developing technological skills. It applies a thorough analytic understanding of the principles to the complexities of real applications at the frontiers of science and technology, e.g. in imaging and computer vision, electronic instrumentation, and biomedical engineering. The Applied Physics Minor will equip you with the solid cross-disciplinary background that is highly valued by industry and academia. It takes a unifying, systems approach to science and technology to provide you with a strong background in fundamental science and the transferable skills (such as analytical thinking, communication skills, computer literacy and cooperative learning) relevant to a rapidly changing working environment.

CAREERS
The program gives you the opportunity to explore selected area(s) in greater depth, thus providing you with the depth and flexibility to explore a wide variety of career opportunities, including graduate study, medical school, teaching, imaging science, instrumentation, investments and technical management.

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Academic Advisor for the Physics Program
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Web Page: http://faculty.csuci.edu/geoff.dougherty
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Email: gregory.wood@csuci.edu

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<table>
<thead>
<tr>
<th>LOWER DIVISION REQUIREMENTS (12 UNITS):</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 150  Calculus I (4)</td>
</tr>
<tr>
<td>PHYS 200  General Physics I (4)</td>
</tr>
<tr>
<td>PHYS 201  General Physics II (4)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>UPPER DIVISION REQUIREMENTS (30 units):</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Applied Physics (10-11)</td>
</tr>
<tr>
<td>PHYS/ 345  Digital Image Processing (3)</td>
</tr>
<tr>
<td>MATH/COMP</td>
</tr>
<tr>
<td>PHYS/ 434  Introduction to Biomedical Imaging (4)</td>
</tr>
<tr>
<td>and either</td>
</tr>
<tr>
<td>PHYS/ 445  Image Analysis and Pattern Recognition (3)</td>
</tr>
<tr>
<td>or</td>
</tr>
<tr>
<td>PHYS/ 464  Medical Instrumentation (4)</td>
</tr>
<tr>
<td>BIOL/HLTH</td>
</tr>
</tbody>
</table>

2. Applied Physics Electives (2-3 units)  
Choose from:
- PHYS 490  Topics in Physics (3)  
- PHYS 492  Internship (3)  
- PHYS 494  Independent Research (1-3)  
- PHYS 497  Directed Studies (1-3)  
- PHYS 499  Senior Colloquium (1)
SUMMARY OF CHANGES

1. Moved “Proposed Course of Study” for Technology to follow Major requirements.
2. Updated office locations for Dougherty and Wood
3. Added cross-listed course information per Steve Lefevre
4. Changed the wording of the “Note to Students” to more accurately reflect the information
5. Annotated with an asterisk (*) courses needed to fulfill GE requirements.
6. Matrix for CCTC sent as separate document
7. Removed “Additional Faculty”, added subset to “Faculty”
8. Replaced Φ in earlier version by † and modified wording
9. Miscellaneous minor edits

JUSTIFICATION

The changes are updates and edits to clarify and improve the readability of the document.

Geoff Dougherty 12/31/2007
Proposer of Program Modification Date
## Program:

<table>
<thead>
<tr>
<th>Role</th>
<th>Signature</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program Chair</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Curriculum Chair</td>
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<td></td>
</tr>
<tr>
<td>Dean of Faculty</td>
<td></td>
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</tbody>
</table>

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