

CALIFORNIA STATE UNIVERSITY CHANNEL ISLANDS

NEW COURSE PROPOSAL

PROGRAM AREA APPLIED PHYSICS

1. Catalog Description of the Course. *[Follow accepted catalog format.]*

Prefix PHYS Course# 106 Title APPLIED PHYSICS AND MODERN SOCIETY Units (3)
 3 hours lecture in the lab per week

- Prerequisites
 Corequisites

Description The course provides an introduction to current topics in applied physics in the fields of solid state physics, semiconductors, superconductors and nano-structures. It shows how scientific knowledge, imagination and ingenuity can combine to offer technological solutions to a variety of topical problems. Industries dealing with, for example, detectors, remote sensing, new materials, medical imaging, biophysics, homeland security, telecommunications, and lasers will be covered.

- Gen Ed Graded CR/NC Repeatable for up to units
 Categories B1
 Lab Fee Required A - Z Total Completions Allowed

2. Mode of Instruction.

	Units	Hours per Unit	Benchmark Enrollment	Graded Component	CS # <small>(filled in by Dean)</small>
Lecture	3	1	20	<input checked="" type="checkbox"/>	_____
Seminar	_____	_____	_____	<input type="checkbox"/>	_____
Laboratory	_____	_____	_____	<input type="checkbox"/>	_____
Activity	_____	_____	_____	<input type="checkbox"/>	_____

3. Justification and Learning Objectives for the Course. (Indicate whether required or elective, and whether it meets University Writing, and/or Language requirements) *[Use as much space as necessary]*

This course will be a key requirement for the Applied Physics major, when it is implemented. It may also be taken by many Computer Science and Math majors, and by those doing an Applied Physics minor.
 It does not meet the University Writing or Language requirements.

New applications of physics and advanced technologies based on physical principles affect every aspect of modern society. Advances in medical imaging encourage the public to be more health conscious. The development of semiconductors provide cell phones, digital cameras, laser pointers, bar-code readers, and laser printers, to name a few. In addition, the job market for physicists has changed significantly with the emergence of the high-tech economy. This course is designed to emphasize how physics is applied in research, design and development of novel solutions to specific problems; and considers the influence of applied physics on society.

Through this course, students will be able to

- describe the scientific method and its limitations
- describe the historical relationship between basic science and technological innovation
- list and analyze specific topical applications and problems
- apply the basic concepts and principles of physics to everyday applications
- search and retrieve practical information
- review the design process
- use a variety of simulation programs, featuring data analysis and display, to derive conclusions about experimental situations
- modify and revise existing solutions, and propose possible new solutions
- organize and express ideas clearly and convincingly in oral and written forms
- evaluate and critique existing instrumentation

- 4. Is this a General Education Course** YES NO
If Yes, indicate GE category and attach GE Criteria Form:

A (English Language, Communication, Critical Thinking)

- A-1 Oral Communication
A-2 English Writing
A-3 Critical Thinking

B (Mathematics, Sciences & Technology)

- B-1 Physical Sciences
B-2 Life Sciences – Biology
B-3 Mathematics – Mathematics and Applications
B-4 Computers and Information Technology

C (Fine Arts, Literature, Languages & Cultures)

- C-1 Art
C-2 Literature Courses
C-3a Language
C-3b Multicultural

D (Social Perspectives)

- E (Human Psychological and Physiological Perspectives)**

- UD Interdisciplinary**

5. Course Content in Outline Form. *[Be as brief as possible, but use as much space as necessary]*

The physics of atoms and molecules.

The concept of energy quantization.

Light interaction with matter. Various spectroscopic methods of detecting molecules, matter under the influence of electric and magnetic fields. Superconductors.

Neural networks and pattern recognition.

Emphasis is on how the application of physics principles has led to technological developments such as lasers, ultrasonic diagnosis, biopolymers, fibre optics, telecommunications, and the impact these have on our health and on the environment.

Does this course overlap a course offered in your academic program? YES NO

If YES, what course(s) and provide a justification of the overlap?

Does this course overlap a course offered in another academic area? YES NO

If YES, what course(s) and provide a justification of the overlap?

Signature of Academic Chair of the other academic area is required on the consultation sheet below.

6. Cross-listed Courses (Please fill out separate form for each PREFIX)

List Cross-listed Courses

Signature of Academic Chair(s) of the other academic area(s) is required on the consultation sheet below

Department responsible for staffing: Physics

7. References. *[Provide 3 - 5 references on which this course is based and/or support it.]*

1. Femtosecond technology for technical and medical applications, Friedrich Dausinger, Friedemann Lictner, Holger Lubatschowski (eds.), Berlin: Springer, 2004

2. Single quantum dots: fundamentals, applications, and new concepts, Peter Michler (ed.), New York, Springer, 2003

3. High-power diode lasers: fundamentals, technology, applications, Roland Diehl (ed.), New York, Springer, 2000

4. Nanotechnology and homeland security: new weapons for new wars, Danial Ratner, Mark A. Ratner, Upper Saddle River, NJ: Prentice Hall/PTR, 2004

8. List Faculty Qualified to Teach This Course.

Dr. Geoff Dougherty

Dr. Greg Wood

9. Frequency.

a. Projected semesters to be offered: Fall Spring Summer

10. New Resources Required. YES NO

If YES, list the resources needed and obtain signatures from the appropriate programs/units on the consultation sheet below.

a. Computer (data processing), audio visual, broadcasting needs, other equipment)

b. Library needs

c. Facility/space needs

11. Will this new course alter any degree, credential, certificate, or minor in your program? YES NO

If, YES attach a program modification form for all programs affected.

Dr. Geoff Dougherty
Proposer of Course

3/31/2005
Date