CALIFORNIA STATE UNIVERSITY CHANNEL ISLANDS

NEW COURSE PROPOSAL

PROGRAM AREA

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

Prefix PHYS Course# 310 Title ELECTRONICS Units (4)
Three hours lecture and two hours activity per week
☐ Prerequisites PHYS 101 or PHYS 201
☐ Corequisites
Description This course covers the basic analog and digital electronic circuits used in a scientific laboratory. Students will be introduced to the operation of simple electronic devices, the basic underlying theory of their operation, and the applications of a few analog and digital ICs. The emphasis is on applications rather than theory. Consequently there is a strong hands-on component to the subject to enable students to gain practical experience. Experiments will include the testing of actual and virtual circuits, and data acquisition.

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

2. Mode of Instruction.

	Units	Hours per Unit	Benchmark Enrollment	Graded Component	CS # (filled in by Dean)
Lecture	3	1	16	☐	
Seminar				☐	
Laboratory				☐	
Activity	1	2	16	☒	

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]*

Electronics is one of the fastest expanding fields in research, application development and commercialization. Substantial growth in the field has occurred due to the space program, the computer industry and computerized games and video. Electronics is everywhere in our lives.

This course provides a basic understanding of practical electronics, both analog and digital. It uses a hands-on approach, concentrating on experimentation rather than theory. It will be a required course for the BS in Applied Physics; and an elective for the BA in Applied Physics, the Applied Physics minor, and the Applied Physics emphasis in the Mathematics major. It may also be taken by Computer Science majors and others.

Through this course, students will be able to
- explain the basic concepts of analog and digital electronics
- describe the use of digital electronics in computers and everyday products
- describe electonic components and their applications
- read, analyze and use circuit diagrams
- build, test and use analog and digital circuits
- combine basic circuits into analog and digital systems
- apply their knowledge to real circuits and systems
- demonstrate the role of electronics in data acquisition, metrology and the control of experiments
- search and retrieve practical information on electronic chips and practical circuits
- use a variety of simulation programs, featuring data analysis and display, to derive conclusions about experimental situations
- organize and express ideas clearly and convincingly in oral and written forms.

The course does not meet the University Writing and/or Language requirements.

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]*

1 Basic concepts in electricity
2 DC circuits I: nodal analysis, Thevenin circuit
3 Capacitors and inductors
4 RLC circuits
5 AC sinusoidal steady state
6 Time vs. frequency domain
7 Resonance
8 Diodes
9 Bipolar transistors
10 Transistors, Load Lines
11 FETs
12 Introduction to Op Amps
13 Applications of Op Amps
14 A/D and Oscillators
15 Intro Digital devices
16 Digital Logic
17 Opto Electronics
18 Voltage Regulators
19 Electronic Sensors and data acquisition

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
ELEC 310
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.]*

Horowitz, P., and W. Hill. The Art of Electronics. 2nd ed. Cambridge Univ. Press, 1989.
Basic Engineering Circuit Analysis, 7th edition by J. David Irwin.
Digital Electronics: A Practical Approach (6th Edition) 2001. J. S. Reynolds ISBN: 0130896292.
Principles of Electronics Instrumentation - Diefenderfer & Holton, 1994, 3rd ed..

8. List Faculty Qualified to Teach This Course.

Dr. Geoff Dougherty

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

2/22/2005 — Date

Approvals

_____

Program Chair Date

_____

Curriculum Committee Chair Date

_____

Dean Date

California State University Channel Islands
New Course Proposal Consultation Sheet

1. Course Title: PHYS/ELEC 310 Electronics

2. Program Area: Biology and Physics

Recommend Approval

Program Area/Unit	Program/Unit Chair	YES	NO (attach objections)	Date
Art				
Biology				
Business & Economics				
Education				
English				
History				
Liberal Studies				
Mathematics & CS				
Multiple Programs				
Psychology				
Library				
Information Technology				