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.

Gen Ed
Categories
Lab Fee Required
A - Z
Repeatable for up to ______ units

2. Mode of Instruction.

<table>
<thead>
<tr>
<th>Units</th>
<th>Hours per Unit</th>
<th>Benchmark</th>
<th>Graded Component</th>
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<tbody>
<tr>
<td>Lecture</td>
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<td>Seminar</td>
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<td>Activity</td>
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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 electronic 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:

5/25/2004 cp
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.]
8. List Faculty Qualified to Teach This Course.

Dr. Geoff Dougherty

   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  2/22/2005
Proposer of Course  Date
Approvals

___________________________________________________
Program Chair     Date

___________________________________________________
Curriculum Committee Chair   Date

___________________________________________________
Dean       Date
1. Course Title: PHYS/ELEC 310 Electronics

2. Program Area: Biology and Physics

**Recommend Approval**

<table>
<thead>
<tr>
<th>Program Area/Unit</th>
<th>Program/Unit Chair</th>
<th>YES</th>
<th>NO (attach objections)</th>
<th>Date</th>
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