

Course Syllabus: Physics 475, UH Fall Semester 2018

Instructor: Prof. Gary Varner
Class Hours: T Th 10:30 - 11:45am, Lab Th 12:30 - 3:20 Watanabe 415A

week	date	Lecture topics	Reading/Laboratory topics
1	21-Aug	Overview of electronics	Intro, Chap 1 - 12
	23-Aug	V,I,R, signals	LAB1: Intro/DC circuits
2	28-Aug	AC circuits	Chap 13 - 26
	30-Aug	Time/frequency domains	LAB2: Capacitors
3	4-Sep	Diodes	Chap 27
	6-Sep		LAB3: Diode circuits
4	11-Sep	Transistors	Chap 28 - 29
	13-Sep		LAB4: Transistors
5	18-Sep	Field Effect Transistors	Chap 30 - 31
	20-Sep		LAB5: FETs
6	25-Sep	Operational Amplifiers (I)	Chap 33
	27-Sep		LAB6: Op Amps I
7	2-Oct	Op Amps (II)	Chap 33
	4-Oct		LAB7: Op Amps II
8	9-Oct	Comparators & Vreg	Review
	11-Oct	555 timer, AMUX, review	LAB8: Comparators
9	16-Oct	Midterm #1	Class Notes
	18-Oct	Digital Logic I	LAB9: Logical Gates
10	23-Oct	Digital Logic II	Class Notes
	25-Oct	Flip Flops	LAB10: Flip-flops
11	30-Oct	Counters / Comp Intro	Class Notes
	1-Nov	Intro to Programmable Logic	LAB11: Counters and Timers
12	6-Nov	Programmable Logic II	Class Notes
	8-Nov	FW2 & Digital -> Analog	LAB12: Programmable Logic Intro
13	13-Nov	FW3 & Analog -> Digital	Class Notes
	15-Nov	Computers	LAB13: Prog Logic / A-D & D-A
14	20-Nov	Midterm #2	
	22-Nov	Holiday: Thanksgiving	
15	27-Nov	Student Project work	
	29-Nov	Design Review	Student project work
16	4-Dec	Student Project work	
	6-Dec	Student Project work	Student project work
17	8-Dec	Final Presentations (TBC) -- Project Write-ups due by 5pm (12/?)	

Trg/DAQ
Trg/DAQ

B2GM
B2GM

NSS
NSS

Prerequisite: Physics 272L, and at least junior standing, or permission from instructor

Text: Schultz: *Grob's Basic Electronics, 11th Edition*

Optional/Reference: Horowitz and Hill: *The Art of Electronics*

Office hours: WAT214 M 4-5pm, during lab period, any afternoon in WAT214 by appointment

email: varner@phys.hawaii.edu

Lecture: T Th 10:30 - 11:45am WAT 415A

Lab: Th 12:30 - 3:20 WAT415A, mandatory. **Scientific Calculator & lab notebook also mandatory**

Writing Intensive: Scientific writing and lab reports will be critiqued and graded on both lab and writing techniques by the formula at the bottom:

40% of the course grade is determined by satisfactory completion of the writing assignments

Homework: Assigned Tuesday, due next Tuesday, no late homework.

Grading: Based on curve derived from Total (100) = (MT1(100)+MT2(100)+HW(100)+FINAL(100)+Lab(100))/5

PHYS475 -- Electronics for Physicists

G. Varner August, 2018

Investigation of Kirchoff's Laws, electromagnetic circuit theory, Fourier analysis and stability theory with circuits. Applications to physical measurements are stressed.

Student Learning Outcomes

1. Practice using basic physical concepts, such as conservation of charge and energy, to analyze basic electronic circuits
2. Be able to estimate power, frequency, gain and noise limits under various conditions relevant to experimental scientific measurements
3. Analyze new electronic circuits and develop a systematic approach to reducing complex circuitry to its simple and comprehensible constituents
4. Design simple circuits to perform useful laboratory functions such as signal amplification, frequency-of-interest filtering, and automatic data logging
5. Prove mastery of fundamental course information through construction and presentation of a final student project
6. Learn to document the results of laboratory measurements in a concise and scientific matter. Reinforcement of basic writing skills through the feedback mechanism of the course being offered as WRITING INTENSIVE, with the requirements listed below.

WRITING INTENSIVE Requirements for Lab Write-ups and Final Report

1. Five lab reports of 500-600 words are required of students during the semester. In addition, a 2000 word final project document is required. The total number of expected written words is 4500-5000, in compliance with the University requirement.
2. The lab reports and the final project report will require the students to exercise both standard descriptive skills and technical writing skills and express in readable but concise language the scientific results of their work. As such, the number of pages will vary, with a minimum requirement of 6 pages per write-up, including figures and equations. In summarizing their data, measurements, and interpretations, they are required to apply course concepts in a cogent manner.
3. Each of the 5 lab reports constitutes 4% of the course grade (20% taken together), and the final project report constitutes 20%, a sum total of 40% of the grade.
4. Each lab report and the final project report will be graded for both content and presentation, with editorial comments provided to the student and rewrites required in some cases. This editorial feedback will be provided for each lab report for each student.
5. The format for the Lab reports and Project write-ups are free form, though they should include an Introduction and Conclusion/Summary, as well as coherent transitions between subtasks.
6. Any included figures should have clear and descriptive caption text, and should be explained in detail in the main text body.