

## Phys 525: Analog and Digital Electronics, Spring 2015

**Instructor:** Prof. Gurudev Dutt, 224 Allen, phone: 412-383-6487, e-mail: [gdutt@pitt.edu](mailto:gdutt@pitt.edu),  
**Office hours:** Thursday 1:30 – 3:30 pm (subject to change)

**Lab coordinator:** Dr. Everett Ramer, 329 OEH, phone: 412-624-9030, e-mail: [evr13@pitt.edu](mailto:evr13@pitt.edu)  
**Teaching Assistant:** Walter Klahold, phone: 412-648-9930 e-mail : [wak19@pitt.edu](mailto:wak19@pitt.edu)

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Lectures	Tu 11:00-12:55 pm	106 Allen	<b>G. Dutt</b>
Laboratory	Tu 2:00-4:55 pm	324 OEH	<b>E. Ramer/W. Klahold</b>

The course manual will be distributed on courseweb. Print only what you need on a given day!

**E-mail:** We frequently use e-mail for announcements and distributing course material. Please, read your e-mail regularly, and make sure that your account is not over quota!

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### INTRODUCTION

Physics 0525 is a one-term lecture and laboratory course that introduces basic electronic circuits. The emphasis is on hands-on laboratory work, such as using standard electronic test instruments, building and testing circuits. Students typically complete eight standard experiments, and one or more special project of their own design.

**TEXTBOOK:** *Basic Electronics for Scientists and Engineers* by Dennis L. Eggleston.  
You should read the appropriate chapter in the book before the associated lecture.

### LAB NOTES AND LAB REPORTS:

The laboratory assignment for each week is described in a hand-out, which you can download from the CourseWeb site and print independently or on the lab computers. The lab handouts give step-by-step instructions on what to do with assignments at the end. I may assign different or additional homework problem from the textbook. The format of the lab hand-outs is such that most measured data and their analysis can be entered directly in blank spaces or in the blank graph forms. The data analysis (simple in most cases) can be performed either during the lab period (advisable) or later. Lab reports are due one week after the lab period in which the assignment was done.

**A lab report consists of (i) the completed hand-out (ii) a one-page summary (preferably typed), and (iii) the homework. Please staple them all together.**

**Late reports will be docked 10% per day.**

### COURSEWEB:

There is a CourseWeb site associated with this course. It can be accessed through your <http://my.pitt.edu> account. The site has:

- Important announcements
- Lab hand-outs and additional course materials
- Grade information
- Discussion board (good for comments and suggestions)

### EXAMINATIONS

There will be one midterm examination given during a regular lecture period on March 17th, and a comprehensive final exam on Friday, April 24th. For each examination, you will be permitted to bring in a calculator and equation sheet will be provided.

**GRADING**

- Lab performance: 60% (10 points maximum for each lab). Satisfactory reports typically earn 8 points. Extra points may be given for extra work. 20 points maximum for special projects.
- Homework: 10% (not much, but you are unlikely to do well in exams if you fail to do them).
- Midterm exam: 10%
- Final exam: 20%

**SPECIAL ACCOMMODATIONS FOR DISABILITY**

If you have a disability that requires special testing or other accommodations, you need to notify both the instructor and the Office of Disability Resources and Services no later than the 2nd week of the term. You may be asked to provide documentation of your disability to determine the appropriateness of accommodations. The Office of Disability Resources and Services is located in the William Pitt Union, Room 216. Call 648-7890 (Voice or TDD) to schedule an appointment.

**ACADEMIC INTEGRITY**

All students and instructors in this course are expected to follow the University of Pittsburgh academic integrity guidelines. If you are not aware of the specifics, you should obtain a copy of these guidelines from the CAS Dean's Office, 140 Thackeray Hall, or look them up on page 9 of the CAS publication "First-Year Viewpoint, 1999-2002" or on the College of Arts and Sciences Web page. Violations of these guidelines by a student may result in a zero score for an examination or a failing grade for the entire course.

**Approximate outline and schedule for the course (subject to change)**

Week	Date	Lecture Topic	Lab
1	1/6	Circuits review: R	Lab 1 (DC circuits)
2	1/13	Circuits Review: RC	Lab 2 (test instruments, RC)
3	1/20	Complex Impedance: filters	Lab 3(AC circuits)
4	1/27	Semiconductors, diodes	Lab 4 (diodes)
5	2/3	Transistors	Lab 5 (transistors)
6	2/10	Field Effect Transistors (FETs)	Lab 6 (FET transistors)
7	2/17	Operational amplifiers (op-amps)	Lab 7 (operational amplifiers)
8	2/24	Pulses and digital logic	Lab 8 (pulses and timing)
9	3/3	Introduction to Arduino	Lab 9 (Arduino LED)
	3/10	SPRING BREAK	
10	3/17	MIDTERM EXAM	Lab 10 (Arduino sound)
11	3/24	Converting between digital and analog	Lab 11 (Arduino temperature)
12	3/31	Frequency domain techniques*	Special projects
13	4/7	Noise sources and management*	Special projects
14	4/14	Transmission lines*	Special projects
	4/24	FINAL EXAM	

\*Topics for last 3 lectures are tentative