

# Physics 5620 - Electronics and Electrical Measurements

Wayne State University - Fall 2016

Lecture: 4:05-5:30 MW, 177 Physics

## Physics 5621

Lab: 5:40-8:30 MW, 169 Physics

Amplifier circuits, operational amplifiers, oscillators, digital electronics, analog and digital measurements, microcontrollers.

- Instructor** Alan Sebastian  
Room: 170 Physics Research Building,  
Phone: 577-2699, E-mail: [alansebastian@wayne.edu](mailto:alansebastian@wayne.edu)  
Office hours: by appointment.
- Textbook** [Practical Electronics for Inventors - Fourth Edition](#) by Paul Scherz and Simon Monk.  
Other useful references are the set of lecture notes of Doug Gingrich at the [Univ. of Alberta](#) and the books, *An Introduction to Electronics for Science Students - Second Edition*, by Curtis A. Meyer and *Principles of Electronic Instrumentation – Third Edition*, by Diefenderfer and Holton.
- Learning objectives** At the end of this course you should be familiar with the fundamentals of analog and digital electronics as applied to scientific instrumentation. You will have an appreciation of the work of an electronics technician and of an electrical engineer and be able to converse with them professionally. You will be able to build prototype circuits and test their operation. You will be familiar with a several sensors and with methods of interfacing computers and microcontrollers to experiments.
- Laboratory** During the three-hour laboratory period you will construct circuits, make measurements, and compare expected with actual performance of the circuits. You will learn how to use common measuring instruments. You will use computers and microcontrollers to take data and control simple experiments. You will need a lab book to keep records of your circuits and measurements. Your lab books may be periodically inspected to see that you are recording your work correctly. A lab report is due one week after the lab. For this course, keep the lab reports simple, with brief explanations of the circuits and measurements, the results of the measurements, and any calculations or graphs that are requested.
- Homework** Problems will be assigned at approximately one week intervals. Problem sets will be due when the next problem set is assigned. Students may consult with the instructor or each other, but each student is responsible for writing up their own solutions. Copying of solutions will result in zero credit for all parties involved. Homework must include explanatory text and be neatly written or it will receive zero credit. The lowest homework score will be dropped in calculating grades.
- Exams** There will be two midterms and one final exam. Exams are closed book. There will be no make-up exams.
- Grades** Assignments will carry the following weighting:
- |               |          |                                 |
|---------------|----------|---------------------------------|
| Homework      | 30%      | Weekly                          |
| Midterm exams | 20% each | TBD                             |
| Final Exam    | 30%      | Monday, December 19 - tentative |