Physics 4700 Outline

The purpose of this course is to acquaint the student with the fundamentals of electronics and instrumentation. This is primarily a lab course and as such the emphasis is on analyzing, designing, building and testing circuits. By the end of the course you should be skilled at using a multimeter and an oscilloscope to measure voltages, currents, and waveforms as well as have practical knowledge about the workings of diodes, transistors, amplifiers, logic gates and flip-flops.

It is assumed that the student is already familiar with resistors, capacitors, and inductors at the level of Physics 1251. Many of the labs require the design of circuits. The philosophy of this course is to avoid "cookbook" labs where one only assembles a circuit with a prescribed set of components. Thus for many of the laboratory projects in this class only specifications of the circuits and not component values will be given. Details of the circuits can be obtained using information from the lectures, homework and/or reference books.

The course work will consist of eight lab reports and seven homework assignments. The will be no midterms, finals, or quizzes. The homework will count as much as two labs. The last lab consists of circuit simulations and the lab report is counted as one homework. Therefore the final grade consists of "nine" labs with the eighth lab reports and seven homeworks count as two labs. A lab report or homework submitted past its due date will have its grade deducted by 5% per day past due. This might not sound very much but if an assignment is submitted one week late, 35% of the points is lost! There is not much point in submitting an assignment two weeks late.

Lab report must be in **pdf** format. Word file is incompatible with the grading software and hence not acceptable. If you have difficulty converting a Word file into a pdf file, please let me know.

Unless limited by a lack of equipment, each student will work alone and have his/her own laboratory setup.

Each student is expected to keep a logbook that contains notes of all the lab work performed. These notes should form the basis of the lab reports. Each lab will be graded on the basis of 100 points. Each lab report should be self-contained with a section on:

Objectives/**circuit**
raw data
analysis (e.g. graphs)
conclusion(s)

If a lab has multiple sections, divide your report into **multiple self-contained sub-sections** with its own objectives, data, analysis, and conclusions. **All circuits** should be fully documented with **measured** component values (not the values written on the boxes that you picked the components from). There is no need to list the equipment used since all students use similar equipment. The lab reports should be written using a word processor. Plot style should follow the **guidelines** on the course website. Captured scope image must include **time stamp**. If the data for the image is reploted for clarity, a scope capture with time stamp is still needed. A well-written report and logbook will be a valuable reference for future work in electronics and instrumentation. You should feel

free to consult with your classmates while doing the lab. However, I expect each student to build his/her own circuits and prepare his/her own lab report.

Please note that OSU might shutdown anytime without warning due to the pandemic. It is therefore very important that you don't get behind in the lab. If you submit an incomplere lab report because you are behind in the lab without a medical excuse and OSU has shutdown, you will not be excused in fairness to other students.

In addition to the about six hours per week of lecture and lab work, students should expect to spend perhaps an equal amount of time on study, homework, and lab report. Please note that you are **not** allowed to access the lab outside lab hours per university pandemic guidance, unlike previous semesters.

Want to get an "A" in this class? This is easy! Just follow the advice:

- Attend all lectures
- Attend all lab classes and show your results, including graphs, to the instructor during the class upon completing a section so that you receive instant feed back to correct any problem.
- Submit your lab reports and homework on time.

Plagiarism is an academic misconduct that must be reported to the Committee on Academic Misconduct (COAM) for investigation, per OSU guidance. If you are retaking this class, you must redo all measurements to produce new lab reports. Othwise it would be considered as plagiarism.

The university strives to make all learning experiences as accessible as possible. In light of the current pandemic, students seeking to request COVID-related accommodations may do so through the university's request process, managed by Student Life Disability Services. If you anticipate or experience academic barriers based on your disability (including mental health, chronic, or temporary medical conditions), please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with Student Life Disability Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. SLDS contact information: slds@osu.edu; 614-292-3307; slds.osu.edu; 098 Baker Hall, 113 W. 12th Avenue.

Health and safety requirements: All students, faculty and staff are required to comply with and stay up to date on all university safety and health guidance (https://safeandhealthy.osu.edu), which includes wearing a face mask in any indoor space and maintaining a safe physical distance at all times. Non-compliance will result in a warning first, and disciplinary actions will be taken for repeated offenses.