# Physics 252 - Syllabus, spring 2014

## Instructor: Eugeniy E. Mikhailov.


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- Office Hours:
  - M 14:05-15:00
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  - and by appointment.

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## Course Objectives.

The primary purpose of this course is to teach you how to design basic analog electronic circuits for connecting one device to another properly and efficiently: this is generally the function of most lab-built electronic circuits.

Along the way, we will also learn how to do basic analog circuit design and to a lesser extent signal acquisition and detection. More specifically, you will learn about the following essential concepts:

- impedance
- amplification
- frequency analysis
- feedback

You will also learn to use the following components and equipment:

- resistors, capacitors, inductors.
- diodes, photo-diodes, transistors.
- Op-amps, comparators.
- Multimeters, oscilloscopes, function generators.
- Breadboards and soldering irons.
- Modern circuit design and lay-out software.

## Texts.

There is no official textbook for the course. All you need to know to succeed in this class will be posted in a form of lecture slides, and introductory chapters with lab descriptions created specifically for this course. These chapters and labs were originally created and edited by Prof. Jeff Nelson, Prof. Bill Cooke, Prof. Seth Aubin, Prof. Wouter Deconinck and myself. All of it will be available on my website before the lecture.

As a supplementary text from which I will assign extra reading material

- "Basic Electronics: An Introduction to Electronics for Science Students" by Curtis. A. Meyer
  - available at print on demand web service lulu.com (direct link)
  - **Note**: This book has several typos and errors, please visit the Erratum Page

As a **fantastic** reference book for design tips and concepts "The Art of Electronics" (2nd Edition, 1989-1999) by P. Horowitz and W. Hill.

- It is available in the Library under call number TK7815.H67 1989. A copy is also available for reading in my office.

Both books will be useful for the Digital Electronics class in the next semester.

## Evaluations.

**No lab can be skipped.**

Your final grade for the course will be determined from the following grading weight distribution:

- Logbooks: 40% (design exercises 15%, lab 25%)
- Quizzes: 10%
- Participation: 5%
- Midterm: 20%
- Final: 25%

**Instructor mistakes.**

I will be demanding, you have a right to be demanding as well.

If you see a typo, factual error, etc in provided material. Please, do not be shy about it, send me an email with exact location of the error and a suggested change. Once I confirm it, you will be awarded bonus points.

Likewise during the lecture time, if you see something wrong let me know. Moreover, speak up so the rest of the class is aware of the situation. Bonus point is guaranteed.

**Lab books.**

Your lab book should be a regular style notebook without rings with either line or quadrangle ruling or a computation logbook. It can be obtained at most stationary stores (i.e. Staples, etc ...) or online

Your lab book is the primary record of your work and data. You should record everything that you do in the lab book, so that anyone (such as the instructors and yourself) can understand what you have done and measured. You should include circuit diagrams, observations, questions, answers, design considerations, measurement data, and analysis. Diagrams, data, graphs, and other notes on separate pieces of paper should be glued, taped, or stapled into the lab book. If something falls out of the lab book during reading/shaking/transporting, it is not the part of the log book and will be discarded. All notes should be written in **pen**. Mistakes and errors in design, data, and analysis will occur, and they should be crossed out neatly.

The lab book will be graded primarily on completeness and to a lesser extent on neatness (i.e. better to be complete than neat, though doing both is better yet). It should also feature a table of contents. The lab books will be turned in every week or two and returned before the next lab.

You should enter you lab notes and data directly into the lab book. A "scratch" lab book that is neatly copied into the lab book at a later time is not appropriate and will result in a significantly reduced grade. It is OK though to use scratch paper which is glued into the lab book prior submission.

**Design Exercises.**

Most labs will include a design component. **Design exercises must be prepared prior to attending a lab**. Their main goal is to prepare you for the labs. I will check preparation of the design exercise at the beginning of each lab. **An unprepared/incomplete design exercise will have up to 50% penalty.**

**Quizzes.**

There will be 15 minutes quizzes at the beginning of a lab to encourage you to review concepts and circuit design.

## Grading.

| Grade | Score percentage | Grade | Score percentage | Grade | Score percentage |
|---|---|---|---|---|---|
| | | A | 94-100 | A- | 90-94 |
| B+ | 87-90 | B | 84-87 | B- | 80-84 |
| C+ | 77-80 | C | 74-77 | C- | 70-74 |
| D+ | 67-70 | D | 64-67 | D- | 60-64 |
| F | <60 | | | | |

## Midterm test.

There will 1 hour midterm test during the lab time on February 26-27. There will be a lab session after the midterm.

## Final exam.

There will be a final exam on Monday May 5th (2:00pm - 5:00pm) covering all course materials.

## Due dates/time.

Lab books are due by 5pm on next day after lab (i.e. Thursdays for the Wednesday section and Fridays for the Thursday section) and will be returned by the next lecture.

Late logbook submissions will have points deducted. If you know you will have a problem getting the report on time, please, send me an email as soon as you can to let me know about your situation.

## Illness.

Please notify the instructor if you are ill, so that arrangements can be made to make up missed labs.