

# PHY232 + PHY232L: Fundamentals of Electronics

Fall 2017, 4+1 credits

TTH 11:30-1:00

TH 1:30-4:30

**Instructor:** Dr. Mariel Meier

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**Office hours:** MWF 9:00AM-10:00AM, T 1:30PM-4:30PM

**Textbook (required):** *Electronics with Discrete Components* by Galvez (ISBN: 978-0-470-88968-8)

**Notebook (required):** 5x5 Quad Ruled, no spiral bound or perforated pages **OR** a digital lab notebook (OneNote or SciNote)

**Circuit Diagramming Program (recommended):** You will be expected to create circuit diagrams and simulate simple circuits. To do so you will need access to software like CircuitLab or PartSim.

**Prerequisite:** PHY102L **AND** (PHY102 **OR** PHY202)

## OBJECTIVES OF THE COURSE

This course is a one semester introduction to digital and analog electronics. The focus of the course is on practical application of theory and measurement techniques that will prepare students for laboratory research. Due to the nature of the content in this course, the lab and lecture components will share a grade. That is, there is no separation between work done in lecture time and in lab time. My hope and intent is that in this class you will develop skills to troubleshoot and solve problems (of the real-world sort, not the textbook sort).

## COURSE REQUIREMENTS

1. *Attendance and Class Participation* – Be an active participant in class. Asking and answering questions is an integral part of learning. If you miss class, you may miss an important piece of information. You are expected to do the readings **before** they are discussed in class. The classroom experience will be much more successful and productive if you are prepared for class. Missed labs must be made up on your own time.
2. *Homework* – Homework problems will be assigned no more than once a week. Homework assignments will be handed out in class and will be available on Moodle. Homework is always due at the start of lecture on the specified due date. You are encouraged to work collaboratively on homework. **No late homework will be accepted.**

3. *Lab Notebook* - Learning to keep a good notebook is critical to any scientific profession. The most important aspect of your notebook is completeness. Record all of your measurements, sketches, etc. in your notebook. Do not write on scraps of paper or loose note sheets. Neatness and organization are important, but the ability to keep a neat and organized notebook on the fly develops only with practice. Completeness is critical. When you leave the lab, your notebook should contain enough information that you could write up the lab even if you lost all memory of having done it.

In most labs, your lab notebook should include a sketch of the circuit, showing where the measurements were taken and a table of the raw measurements. For measurements using the oscilloscopes it is vital that you include the settings required to convert these raw numbers into voltage, time, frequency, or phase as is required by your experiment.

The top of each page must include the date and the lab being performed. Never remove ANY pages from your lab notebook. If you mess up your notes or a table, simply cross it out and move to the next page. Do not obliterate the mistake, it may turn out that it was correct in the first place. Many great discoveries were initially thought to be mistakes.

Note that you are welcome and encouraged to keep a digital lab notebook instead of a handwritten lab notebook. If you choose this route, you must have a device with you in the lab (laptop or tablet) for keeping notes.

You will not be submitting formal lab reports in this lab – all analysis should be completed in the lab notebook. The lab notebook will be collected several times during the semester for feedback and grading.

4. *Lab Project* - The semester will culminate in a design project. Specifications of the design project will be given midway through the semester.
5. *Exams* – There will be two midterm exams during the semester. Each exam will include a written component and a practical component.

**Dropping the Course:** The course may be dropped with a grade of W through Monday, October 23<sup>rd</sup> (provided that the student's work to that point has been of passing quality). After this date the grade of W will be assigned only in the case of withdrawal from the University or prolonged illness. **If you drop the lecture portion of the class, you must also drop the lab (and vice versa).**

**Academic Honesty:** As students and faculty at Oglethorpe University we are members of a society of scholars with all the opportunities as well as obligations attached to such a designation. We therefore agree to govern ourselves accordingly. The use of any information, not provided by the instructor, during an exam will be considered cheating. In such a case the student(s) will be referred to the Honor Council for a hearing and possible disciplinary action. It is the duty of

anyone witnessing behavior in violation of the University Honor Code to report the violation. See Section 10 of the 2014-2016 [Bulletin](#) for further information.

## GRADING POLICY

### Grading scale:

A.....90-100	(A-....90-93)
B.....80-90	(B-....80-83,B+....87-90)
C.....70-80	(C-....70-73,C+....77-80)
D.....60-70	(D+....67-70)
F.....0-60	

Note that Incomplete (I) is given only under the rarest of circumstances. Refer to section 5.20.2 of the 2014-2016 [Bulletin](#) for a summary of requirements.

*Your grade will be computed as follows:*

Homework	20%
Lab Notebook	30%
Midterm exams (2 exams equal weight)	30%
Lab Project	20%

## QUESTIONS & CONCERNS

If at any time you feel that you are falling behind the material, please email me. There are many ways we can work to help better understand the concepts and ideas. It is my goal to make the material as accessible as possible. I welcome and encourage feedback, in order to make the class run as smoothly and efficiently as possible.

## EXPECTATIONS

Students should be prepared to question, learn and complete assignments in a timely and professional manner. You should expect to spend at least **12-15 hours per week** on the coursework, including reading the textbook, working homework problems, working on the final project and studying for exams. You are expected to be courteous and respectful in all written or verbal communications. In return I will work to provide a respect filled environment in which every student can learn. I will also give you timely and professional feedback (including graded assignments) and assistance in their learning.

There is a zero tolerance policy for any form of academic dishonesty in this course. Disciplinary action will be taken against any student found guilty of academic dishonesty such as cheating or plagiarism. **If your words match those of others, I will assume you copied rather than composing the answers yourself.** The penalty for being dishonest in this way is far greater than simply getting a wrong answer. Those committing academic dishonesty will be subject to disciplinary action up to and including failing the assignment, failing the course, and/or expulsion from the course or college.

**Course Schedule PHY232** *(These dates are tentative and subject to change)*

<b>Tuesday</b>		<b>Thursday (incl. lab)</b>	
<b>8/22</b>	Intro & Review	<b>8/24</b>	Review Lab 1: DC Basics
<b>8/29</b>	HW 1 Due Binary & Digital	<b>8/31</b>	Binary & Digital Lab 2: AC Basics
<b>9/5</b>	HW 2 Due Logic Basics	<b>9/7</b>	Logic Basics Lab 3: Arithmetic
<b>9/12</b>	HW 3 Due Sequential Logic	<b>9/14</b>	Sequential Logic Lab 4: Clocks
<b>9/19</b>	HW 4 Due Digital I/O	<b>9/21</b>	<b>Exam 1</b>
<b>9/26</b>	AC Circuits	<b>9/28</b>	AC Circuits Lab 5: Transients
<b>10/3</b>	HW 5 Due AC Filters	<b>10/5</b>	AC Filters Lab 6: Filters
<b>10/10</b>	HW 6 Due Diodes	<b>10/12</b>	Diodes Lab 7: Optical Comm.
<b>10/17</b>	<b>No Class – Fall Break</b>	<b>10/19</b>	Arduino Basics
<b>10/24</b>	HW 7 Due Transistors	<b>10/26</b>	Transistors Lab 8: Transistors
<b>10/31</b>	HW 8 Due Op Amps	<b>11/2</b>	Op Amps Lab 9: Op Amps I
<b>11/7</b>	Op Amps <b>Project Proposal Due</b>	<b>11/9</b>	Op Amps Lab 10: Op Amps II
<b>11/14</b>	HW 9 Due Project Time	<b>11/16</b>	<b>Exam 2</b>
<b>11/21</b>	Digital-Analog	<b>11/23</b>	<b>No Class - Thanksgiving</b>
<b>11/28</b>	Digital-Analog	<b>11/30</b>	Project Time
<b>12/5</b>	Project Time	<b>12/7</b>	<b>Final Presentations</b>

**Important Dates**

August 28 – last day to add or drop a course

September 4<sup>th</sup> – Labor Day

October 16-17 – Fall Break

October 23 - last day to withdraw

November 22-24 - Thanksgiving Break

December 8 - Last day of classes