

University of Ottawa

Department of Physics

PHY2104 Introduction to Circuit Theory and Electronics Winter 2016

Professor: Dr. Vincent Tabard-Cossa (tcossa@uOttawa.ca) Office MCD 338J

(Please include PHY2104 in subject line and include your FULL NAME and student number when communicating with us)

Course website: <https://uottawa.blackboard.com/> (only registered students have access). You can also send me an email through the course website. Just click on "email the prof".

Overview:

Review of basic circuit elements. Kirchhoff's laws and analysis techniques: nodal, mesh, Thévenin and Norton equivalents, maximum power transfer theorem. Basic concepts of semiconductor physics, diodes, bipolar and field effect transistors. Operational amplifiers and their application, signal conversion. RC, RL and RLC circuits, alternating current circuit analysis, phasors, frequency response, Bode plots, filters. Noise sources, grounding problems, impedance mismatch.

Prerequisites: (PHY1121, PHY1122) or ((PHY1321 or 1331), PHY1322). The courses PHY2104, PHY2904, PHY2906 cannot be combined for credit.

Laboratory Coordinator: Dr. Yazid Braik (ybraik@uottawa.ca)

Teaching Assistants: (please contact your TAs by email for questions or to schedule a meeting)

- Zachary Roelen (zroel034@uottawa.ca)
- Martin Charron (mchar243@uottawa.ca)
- Philipp Karau (pkara031@uottawa.ca)
- Radin Tahvildari (rtahvild@uottawa.ca)

Lectures: Thursdays 10:00-11:30 Room: CBY B202

Laboratory Sessions (one of these days, depending on your section):

Note these are mandatory

Monday/Tuesday/Wednesday 14:30-17:30 MacDonald Physics (MCD) Room #231

- Experiment #1: January 18-20
- Experiment #2: January 25-27
- Experiment #3: February 8-10
- Experiment #4: February 29 - March 2
- Experiment #5: March 14-16
- Experiment #6: March 29-30 and April 4

Laboratory Experiments:

The main emphasis of this course will be on the laboratory sessions. There will be 6 mandatory laboratory experiments throughout the semester. During each 3-hour laboratory session, you will be guided through experiments. The experimental procedures will be available to you before the actual laboratory sessions. You will be required to read the lab protocol related to the experiment **BEFORE** showing up to the laboratory session. **There will be an easy and short (~5 minutes) quiz at the start, to ensure you've read it.** The lab protocols will include a summary of the main theoretical concepts to be used in the lab.

The laboratory manual will also include a detailed guide to the experimental procedures along with questions that you will need to address and submitted in a "POST-LAB" report. You will be required to hand in this report for evaluation no later than 1 week after the laboratory session. **ONE REPORT PER PERSON**, even if you work in groups of two.

For each experiment, you will be using the National Instruments ELVIS II+ platform. This state-of-the-art platform integrates all the tools necessary to put together circuits, power them and analyze their performance. The platform interfaces directly with the computer allowing you to control your circuits via a computer interface.

Course Structure:

There will be a single 80 minutes lecture per week and 3-hour laboratory sessions throughout the semester. There will be a total of 6 mandatory laboratory sessions throughout the semester, so you will not have labs every week.

Office Hours:

My office is located in MCD 338J. Given that the students in this course are from different programs and have different schedules, I have found that it's impossible to schedule office hours that fit everybody's schedule! Instead of scheduling specific office hours, please EMAIL me with your questions or to schedule a meeting time. Please include PHY2104 in the subject line of your email, as well as your full name and student number to help me identify your messages. I find this approach much better for accommodating your schedules instead of just setting pre-scheduled office hours. I actually try to respond to your emails very quickly, usually within 24 hours. If you do not get a reply within 48 hours, please feel free to email me again. I get tons of emails so your message might slip through my filters! But if you do not include the course code in the subject and your name in the message, don't expect a reply.

Textbook:

The lectures and experiments will be based on the following textbook:

"Circuits" by Fawwaz T. Ulaby and Michel M. Maharbiz; 1st, 2nd or 3rd Edition; NTS Press (available at the [main campus bookstore](#) and [online](#))

You are required to obtain a copy of this textbook. Given that we will only have one lecture per week, I will not be able to cover all the material from this book, and certainly not in as much detail. This is why it will be important for you to have access to the textbook, which will complement the lectures.

Other optional textbooks:

- Principles and Applications of Electrical Engineering by Giorgio Rizzoni (McGrawHill)
- Electric Circuits by Nilsson and Riedel (Prentice Hall)
- Introduction to Electric Circuits by Dorf and Svoboda (Wiley)
- The Art of Electronics by Horowitz and Hill (Cambridge University Press)

Grading:

- Laboratory/experiments (6): 50% [5% LAB PARTICIPATION, 5% PRE-LAB QUIZ, 40% LAB REPORT]
- Assignments (8 or less – very short): 20%
- Final Exam: 30% (note: no mid-term exam!)

Attendance:

In accordance with Faculty regulations, those who do not attend at least 80% of the lectures may be denied permission to write the final exam and will receive a grade of ABS (equivalent to an "F"). If you are not able to attend your regular laboratory session for any reason, you must arrange to reschedule the experiment.

University Policies:

Plagiarism and academic fraud will not be tolerated. You should note that a person copied from will be reprimanded just like the person doing the copying according to the University's regulations.

Please note that discussions are encouraged. Discussing assignment problems with your classmates does not imply plagiarism, as long as the discussion is conceptual and done verbally. But sharing your solutions, even verbally, constitutes plagiarism.

Please refer to uOttawa official policy on academic fraud for details.

http://www.uottawa.ca/academic/info/regist/crs/0305/home_5_ENG.htm