

# PHY405H1 S

## Electronics Lab

### Winter 2025 Syllabus

#### Course Meetings

##### PHY405H1 S

Section	Day & Time	Delivery Mode & Location
LEC0101	Thursday, 2:00 PM - 3:00 PM	In Person: SS 1073
PRA0101	Monday, 2:00 PM - 5:00 PM	In Person: MP 238
PRA0201	Friday, 2:00 PM - 5:00 PM	In Person: MP 238

Refer to ACORN for the most up-to-date information about the location of the course meetings.

#### Course Contacts

**Course Website:** <https://www.physics.utoronto.ca/apl/405/>

**Instructor:** Ziqing Hong

**Email:** [ziqing.hong@utoronto.ca](mailto:ziqing.hong@utoronto.ca)

**Phone:** 4169786404

**Office Hours and Location:** During lab hours

#### Course Overview

Electrical circuits, networks and devices are all-pervasive in the modern world. This laboratory course is an introduction to the world of electronics. Students will learn the joys and perils of electronics, by designing, constructing and debugging circuits and devices. The course will cover topics ranging from filters and operational amplifiers to micro-controllers, and will introduce students to concepts such as impedance, transfer functions, feedback and noise.

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**Prerequisites:** PHY224H1, PHY250H1. Note that PHY405H1 may be taken in third or fourth year.

**Corequisites:** None

**Exclusions:** None

**Recommended Preparation:** None

Credit Value: 0.5

## Marking Scheme

Assessment	Percent	Details	Due Date
Lab S	10%		2025-01-17,2025-01-20
Lab 1	10%		2025-01-24,2025-01-27
Lab 2	10%		2025-01-31,2025-02-03
Lab 3	10%		2025-02-07,2025-02-10
Lab 4	10%		2025-02-14,2025-02-24
Lab 5	10%		2025-02-28,2025-03-03
Lab 6	10%		2025-03-07,2025-03-10
Lab 7	10%		2025-03-14,2025-03-17
Lab 8	10%		2025-03-21,2025-03-24
Lab P	10%		2025-04-04

- 10 lab reports, including Lab S, Lab 1-8, and lab P, 10 % each
- The lowest grade from Lab 1-8 will be replaced by the average of the rest of Lab 1-8
- Lab reports are due a week following the lab **noon** on the date specified.
  - Any due date that falls during Reading Week is shifted to a week later.
- Lab P is due on the last day of term.
- Lab S is marked entirely on the report. Students normally work individually on the simulations and submits their own lab report and some short videos.
- In-Lab Exercises 1-8 marks are based 30% on in-lab work and 70% on the report.
  - Students normally work in pairs on these lab exercises, but each submits their own lab report, and keeps their own lab notebooks.
- The micro-project (Lab P) is marked on the basis of an individual report and a short team video.
- In-lab work marks are based on
  - (10%) Attendance at the regular lab sessions.
    - Contact the Instructor if you miss a lab because you are ill or have valid reasons. In such cases we will make accommodations.
  - (10%) In lab execution
    - This includes equal sharing between members of a pair - both students are expected take turns stuffing breadboards, making measurements, and recording work and data.
    - You do not lose marks for not getting things working first time.

- (10%) Proper documentation in your lab notebooks and associated computer files.
  - Although you are only required to turn in lab reports, not your lab notebooks, the Instructor or TA may ask at any time ask to see your notebook and associated computer files.
  - You can only use data that you take, documented in your lab notebook, in your lab report. Using data taken by others, including your lab partner while you're absent, is considered a violation of Academic Integrity.
  - If you cannot properly document the work that is the basis for a report you have submitted, you may receive zero for that report, or even more severe sanctions if the Instructor believes there has been a violation of the University of Toronto Academic Code.

### **Late Assessment Submissions Policy**

Late assignments will be penalized 10% of the assignment value per calendar day, unless medical or similar accommodations are required or if prior arrangement has been made with the course Instructor. The lowest grade from Lab 1-8 will be replaced by the average of the rest of Lab 1-8. Students are expected to manage their own time. Busy with other classes and/or exams will not be considered a legitimate reason to ask for extensions on assignments. Please refer to "Specific Medical Circumstances" and "Accommodation for Personal Reasons" should you need accommodations.

### **Course Schedule**

<b>Lecture</b>	<b>Date</b>	<b>Topic(s) Covered</b>
Week 1	Jan. 9	Introduction
Week 2	Jan. 16	Basic Physics of Resistors, Capacitors, and Inductors
Week 3	Jan. 23	R, L, C, Computer Control
Week 4	Jan. 30	Design, Diodes
Week 5	Feb. 6	Op Amps
Week 6	Feb. 13	Analog Meets Digital: Arduinos
Week 7	Feb. 27	Transistors
Week 8	Mar. 6	"Fast" Pulses, Digitization, "High" Voltage
Week 9	Mar. 13	Fun and Projects
Week 10	Mar. 20	Noise modeling / Projects Q&A

## **Policies & Statements**

### **Plagiarism Detection Tool**

Normally, students will be required to submit their course essays to the University's plagiarism detection tool for a review of textual similarity and detection of possible plagiarism. In doing so, students will allow their essays to be included as source documents in the tool's reference database, where they will be used solely for the purpose of detecting plagiarism. The terms that apply to the University's use of this tool are described on the Centre for Teaching Support & Innovation web site (<https://uoft.me/pdt-faq>).

### **Religious Accommodations**

As a student at the University of Toronto, you are part of a diverse community that welcomes and includes students and faculty from a wide range of cultural and religious traditions. For my part, I will make every reasonable effort to avoid scheduling tests, examinations, or other compulsory activities on religious holy days not captured by statutory holidays. Further to University Policy, if you anticipate being absent from class or missing a major course activity (such as a test or in-class assignment) due to a religious observance, please let me know as early in the course as possible, and with sufficient notice (at least two to three weeks), so that we can work together to make alternate arrangements.

### **Students with Disabilities or Accommodation Requirements**

Students with diverse learning styles and needs are welcome in this course. If you have an acute or ongoing disability issue or accommodation need, you should register with Accessibility Services (AS) at the beginning of the academic year by visiting <https://studentlife.utoronto.ca/departments/accessibility-services/>. Without registration, you will not be able to verify your situation with your instructors, and instructors will not be advised about your accommodation needs. AS will assess your situation, develop an accommodation plan with you, and support you in requesting accommodation for your course work. Remember that the process of accommodation is private: AS will not share details of your needs or condition with any instructor, and your instructors will not reveal that you are registered with AS.

### **Academic Integrity**

All suspected cases of academic dishonesty will be investigated following procedures outlined in the [Code of Behaviour on Academic Matters](https://governingcouncil.utoronto.ca/secretariat/policies/code-behaviour-academic-matters-july-1-2019) (<https://governingcouncil.utoronto.ca/secretariat/policies/code-behaviour-academic-matters-july-1-2019>). If you have questions or concerns about what constitutes appropriate academic behaviour or appropriate research and citation methods, please reach out to me. Note that you are expected to seek out additional information on academic integrity from me or from other

institutional resources. For example, to learn more about how to cite and use source material appropriately and for other writing support, see the U of T writing support website at <http://www.writing.utoronto.ca>. Consult the Code of Behaviour on Academic Matters for a complete outline of the University's policy and expectations. For more information, please see [A&S Student Academic Integrity \(https://www.artsci.utoronto.ca/current/academic-advising-and-support/student-academic-integrity\)](https://www.artsci.utoronto.ca/current/academic-advising-and-support/student-academic-integrity) and the [University of Toronto Website on Academic Integrity \(https://www.academicintegrity.utoronto.ca\)](https://www.academicintegrity.utoronto.ca).

### **Specific Medical Circumstances**

If you become ill and it affects your ability to do your academic work, consult me right away. Normally, I will ask you for documentation in support of your specific medical circumstances. This documentation can be an Absence Declaration (via ACORN) or the University's Verification of Student Illness or Injury (VOI) form. The VOI indicates the impact and severity of the illness, while protecting your privacy about the details of the nature of the illness. If you cannot submit a VOI due to limits on terms of use, you can submit a different form (like a letter from a doctor), as long as it is an original document, and it contains the same information as the VOI (including dates, academic impact, practitioner's signature, phone and registration number). For more information on the VOI, please see <http://www.illnessverification.utoronto.ca>. For information on Absence Declaration Tool for A&S students, please see <https://www.artsci.utoronto.ca/absence>. If you get a concussion, break your hand, or suffer some other acute injury, you should register with Accessibility Services as soon as possible.

### **Accommodation for Personal Reasons**

There may be times when you are unable to complete course work on time due to non-medical reasons. If you have concerns, speak to me or to an advisor in your College Registrar's office; they can help you to decide if you want to request an extension or other forms of academic consideration. They may be able to email your instructors directly to provide a College Registrar's letter of support and connect you with other helpful resources on campus.

### **Quercus Info (if using)**

This Course uses the University's learning management system, Quercus, to post information about the course. This includes posting readings and other materials required to complete class activities and course assignments, as well as sharing important announcements and updates. New information and resources will be posted regularly as we move through the term. To access the course website, go to the U of T Quercus log-in page at <https://q.utoronto.ca>. SPECIAL NOTE ABOUT GRADES POSTED ONLINE: Please also note that any grades posted are for your information only, so you can view and track your progress through the course. No grades are considered official, including any posted in Quercus at any point in the term, until they have been formally approved and posted on ACORN at the end of the course. Please contact me as soon as possible if you think there is an error in any grade posted on Quercus.

### **Attendance**

You are expected to attend all lectures and tutorials in person.

## Assignment Submission Method

All homework needs to be scanned/typeset as pdfs and submitted through Quercus. DO NOT submit homework via email to either me or the TA.

## Online Communication

All communications should be directed to my email listed above, with the keyword PHY357 included in the title, from your mail.utoronto.ca address. I will endeavor to respond ASAP on weekdays and weekends, usually within 2 business days.

Students are expected to check their emails and the Quercus Inbox regularly, at least every other day. Course announcements will be sent via Quercus Inbox.

We will also use Piazza for discussions. You can access it through the course website or the Quercus front page. The system is highly catered to getting you help fast and efficiently from classmates, the TAs, and the instructors.

To ensure that everyone has a good experience, when posting on Piazza make sure that

- you do not post repeated questions – make a quick search first to make sure no one posted a similar question before
- the language of the course is English
- this is a professional setting and your writing should reflect that – it's not a text message: don't use emojis and abbreviations
- you are respectful of others, and abide by the University Code of Conduct
- the reader has all the information to understand the question – don't just quote the problem number from the textbook
- you don't post an image from the textbook – they are not searchable and often hard to read

## Harassment/Discrimination

You are expected to follow the University of Toronto [Code of Conduct](#) and the policies linked therein. No harassment or discrimination is tolerated in this class.

## Course Materials, including lecture notes

Course materials are provided for the exclusive use of enrolled students. These materials should not be reposted, shared, put in the public domain, or otherwise distributed without the explicit permission of the instructor. These materials belong to your instructor, the University, and/or other sources depending on the specific facts of each situation and are protected by copyright. Students violating these policies will be subject to disciplinary actions under the Code of Student Conduct.

## Cell Phones and Laptop Usage

Technology can support student learning, but it can also become a distraction. Research indicates that multi-tasking during class time can have a negative impact on learning. Out of

respect for your fellow students in this class, please refrain from using laptops or mobile phones for purposes unrelated to the class. Do not display any material on a laptop which may be distracting or offensive to your fellow students.

### **Privacy/FIPPA Statement**

Personal information is collected pursuant to section 2(14) of the University of Toronto Act, 1971 and at all times it will be protected in accordance with the Freedom of Information and Protection of Privacy Act. Please note that this course requires presentations of one's work to the group. For more information, please refer to <http://www.utoronto.ca/privacy>.

### **Mental Health and Well-Being**

Your mental health is important. Throughout university life, there are many experiences that can impact your mental health and well-being. As a University of Toronto student, you can access free mental health and wellbeing services at Health & Wellness (<https://studentlife.utoronto.ca/departments/health-wellness/>) such as same day counselling, brief counselling, medical care, skill-building workshops, and drop-in peer support. You can also meet with a Wellness Navigation Advisor who can connect you with other campus and community services and support. Call the mental health clinic at 416-978-8030 ext. 5 to book an appointment or visit <https://uoft.me/mentalhealthcare> to learn about the services available to you.

You can also visit your College Registrar to learn about the resources and supports available: <https://www.artsci.utoronto.ca/current/academic-advising-and-support/college-registrars-offices>

If you're in distress, you can access immediate support: <https://uoft.me/feelingdistressed>

### **Equity, Diversity and Inclusion**

The University of Toronto is committed to equity, human rights and respect for diversity. All members of the learning environment in this course should strive to create an atmosphere of mutual respect where all members of our community can express themselves, engage with each other, and respect one another's differences. U of T does not condone discrimination or harassment against any persons or communities.