

PHYS-2803-001 / ACS-2803-001: Physical Computing

University of Winnipeg — Fall 2025

Instructor Information

Name: George Dyck
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Office Hours: By Appointment

Class Information

Lectures: Tue. & Thu., 10:00 am – 11:15 am
(Room 2L14)
Laboratories: Fri., 2:30 pm – 5:00 pm
(Room 2L14)

Course Description

This course is a hands-on introduction to the world of physical computing. We'll start with the fundamentals of electric circuits and then dive into using the Arduino microcontroller platform. You'll learn how to build circuits, write code, and create interactive projects that can sense and respond to the physical world. This course is designed for students of all experience levels, from beginners to those with prior coding experience.

Important Dates

Date	Event
Sep. 2	First lecture
Sep. 12	First lab
Oct. 12 – 18	Reading Week
tbd Oct.	Midterm test
Nov. 12	Final day to withdraw
Nov. 28	Last lab
Dec. 2	Last lecture
tbd Dec.	Final exam

Grade Scale

Letter Grade	Percentage Range
A+	90% – 100%
A	87% – 89%
A-	80% – 83%
B+	74% – 79%
B	67% – 73%
C+	61% – 66%
C	53% – 60%
D	50% – 52%
F	0% – 49%

Required Materials

- Physical Computing Course Pack

Note that the above are guidelines and that final grades shall be approved by the Department Review Committee and may be subject to change.

Evaluation Scheme

Your final grade will be composed of the following components:

- Assignments (30%):** There will be 10 assignments throughout the term. These will range from circuit analysis problems in the first half of the course to Arduino problems in the second.
- Laboratories (30%):** Labs are hands-on sessions where you'll work with a partner to build and test circuits and Arduino projects. Attendance is mandatory. Simple reports will be required.
- Formal Lab Report (10%):** You will submit one detailed, typed lab report to demonstrate technical writing competency.
- Midterm Test (10%):** This in-class test will cover the first half of the course, focusing on circuit fundamentals. Calculators are permitted.
- Final Exam (20%):** Similar format to the midterm, but content will cover entire class.

Course Schedule (14 Weeks)

Part 1: Circuit Fundamentals (Weeks 1-7)

This half of the course focuses on the foundational knowledge of electronics.

- **Topics:** Circuit fundamentals; Measuring voltage, current, and resistance; Resistors, capacitors, and LEDs; Digital logic and basic circuit applications.
- **Midterm Test:** To be held in late October.

Part 2: Introduction to Arduino (Weeks 8-14)

We'll transition to the Arduino platform, applying your circuit knowledge to create interactive projects.

- **Topics:** Microcontroller fundamentals and the Arduino platform; Programming concepts; Digital and analog I/O; Working with sensors and servo motors; Building projects like an obstacle-avoiding car.

Class Structure

Each class will be a mix of lectures and hands-on demonstrations. I'll introduce a concept, and then we'll work through a practical example together. Labs are a organized time for you to work with your lab partner on the week's concepts.

Assignments, lectures, will be available on Nexus, and this is also where you will be submitting your completed work for grading.

Academic Integrity

You are expected to take academic integrity very seriously and be mindful of your own activities and the requests/offers you may receive from others. In addition to the guidelines in the Academic Calendar (Regulations and Policies, Subsection 8a), for all assessment items in this course, the following are considered academic misconduct:

- Copying from another student's work and submitting it as your own (group or collaborative work approved by the instructor is not considered cheating).
- Uploading the assignment questions on file-sharing websites (such as Chegg.com, quizlet, ChatGPT, or any other 'Help' sites) in order to receive help or solutions.
- Copying from any sources, including, but not limited to: the Internet; any AI tools, online calculators and graphing tools; assignments or tests/exams from previous years or from other courses; solutions provided by a third party (purchased or otherwise).
- Asking questions from another student or any unauthorized person during the exams and tests, including, but not limited to: the in-person exams, take-home exams, or remote exams.
- Talking or communicating with other student(s), during the exams/tests (in-person or on Zoom), in any language, for any reason or purpose.
- Using or having in one's possession any unauthorized sources and devices during the tests and exams.

- Soliciting and obtaining solutions to the assignments, tests, and exams via any means of communication (e.g., e-mail, text, phone call, social media chats, etc.).
- Providing test or exam questions and/or solutions to another student, uploading them to a filesharing website, or otherwise sharing them outside the course.

It is your responsibility to know the policies and guidelines, and to be aware of the academic misconduct procedures. Anybody involved in the process could be charged with academic misconduct. For more information, please see the Academic Calendar, Regulations and Policies, Subsection 8a. <https://uwinnipeg.ca/academics/calendar/docs/regulationsandpolicies.pdf>.

University of Winnipeg Regulations and Policies

Course Outline changes: A permitted or necessary change in mode of delivery may require adjustments to important aspects of course outlines, like class schedule and the number, nature, and weighting of assignments and/or exams.

Communication: Students have the responsibility to regularly check their University of Winnipeg email addresses to ensure timely receipt of correspondence.

Regulations, Policies, and Academic Integrity: Students are encouraged to familiarize themselves with the Regulations and Policies in the University Academic Calendar. Particular attention should be given to subsections 8 (Student Discipline), 9 (Senate Appeals), and 10 (Grade Appeals). Please be mindful of the importance of maintaining academic integrity and the potential consequences of engaging in plagiarism, cheating, and other forms of academic misconduct. Even unintentional plagiarism is a form of academic misconduct. Similarly, uploading essays and other assignments to essay vendor or trader sites (filesharing sites that are known providers of essays for use by others who submit them to instructors as their own work) is a form of misconduct, as it involves aiding and abetting plagiarism. An updated and expanded U of Winnipeg library site outlining principles of Academic Integrity can be found at <https://library.uwinnipeg.ca/use-the-library/help-with-research/academic-integrity.html>.

Academic Integrity and AI Text-generating Tools Cont.: The use of AI tools in this course is prohibited. This includes all forms of generative AI, like ChatGPT, Claude, Gemini, etc., as well as AI writing and paraphrasing tools, such as Grammarly, Quillbot, etc. If you are unsure if the use of a specific technology is permitted, ask the instructor prior to using the tool for coursework. Suspected misuse of AI may result in a report to the Senate Academic Standards and Misconduct Committee.

Sexual Violence and Human Rights Advisor (SVHRA): Students who have experienced Sexual Violence can access support from the SVHRA. The SVHRA receives disclosures and can support students with on and off-campus reporting. In collaboration with the Sexual Violence Response Team (SVRT), the SVHRA also provides fast-track referrals to Student Wellness, academic accommodations, security support, and other on and off campus supports. The SVHRA and SVRT operate within a confidential, survivor-centered, and trauma-informed framework. Disclosures may be made in-person, email, by text, by phone, or Zoom/Teams. 5Ri55, 5th Floor (Rice Centre) 204.230.6660 –

call or text (confidential line)

Copyright and Intellectual Property: Course materials are the property of the instructor who developed them. Examples of such materials are course outlines, assignment descriptions, lecture notes, test questions, and presentation slides—irrespective of format. Students who upload these materials to filesharing sites, or in any other way share these materials with others outside the class without prior permission of the instructor/presenter, are in violation of copyright law and University policy. Students must also seek prior permission of the instructor/presenter before, for example, photographing, recording, or taking screenshots of slides, presentations, lectures, and notes on the board. Students found to be in violation of an instructor's intellectual property rights could face serious consequences pursuant to the Academic Misconduct or Non-Academic Misconduct Policy; such consequences could possibly involve legal sanction under the Copyright Policy <https://www.uwinnipeg.ca/policies/docs/policies/copyright-policy.pdf>

Respectful Learning Environment: Students are expected to conduct themselves in a respectful manner on campus and in the learning environment irrespective of platform being used. Behaviour, communication, or acts that are inconsistent with a number of UW policies could be considered non-academic misconduct. See the Respectful Working and Learning Environment Policy and Procedures and Acceptable Use of Information Technology Policy.

Holy Day Exemptions: Students may choose not to attend classes or write examinations on holy days of their religion, but they must notify their instructors at least two weeks in advance. Instructors will then provide opportunity for students to make up work or examinations without penalty. A list of religious holidays can be found in the 2025-26 Undergraduate Academic Calendar: <https://www.uwinnipeg.ca/academics/calendar/docs/important-notes.pdf>

Accessibility Services: Students with documented disabilities, temporary or chronic medical conditions, requiring academic accommodations are encouraged to contact Accessibility Services (AS) at 204-786-9771 or <https://www.uwinnipeg.ca/accessibility-services/> to discuss appropriate options. All information about a student's disability or medical condition remains confidential.

University Closures:

Date	Holiday
Monday, September 1, 2025	Labour Day
Tuesday, September 30, 2025	Truth and Reconciliation Day
Monday, October 13, 2025	Thanksgiving
Tuesday, November 11, 2025	Remembrance Day
Thursday, December 25, 2025	Christmas Day
Friday, December 26, 2025	Boxing Day
Thursday, January 1, 2026	New Year's Day
Monday, February 16, 2026	Louis Riel Day
Friday, April 3, 2026	Good Friday
Sunday, April 5, 2026	Easter Sunday