

CMPE2150 Syllabus

Practical Electronics

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14 Jan 2026

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Instructors

Semester	Section	Instructor	Contact	Office Hours
Fall 2025	A01, A02	AJ Armstrong	aja@nait.ca	Thursday Tutorial in WC216

Instruction

This is a course building on the electronics theory you learned in earlier courses with an interest in applying it to real circuits in typical applications. In particular, we will focus on using data sheets to investigate components and how to design a circuit to properly and effectively use particular techniques and components. An additional focus will be proper use of bread-boarding and bench test equipment in the design and evaluation of circuits. A later unit will explore Computer-Aided Design and Manufacture (CAD/CAM) to lay out and prepare a printed circuit board (PCB) for production.

Much of your work will be self-driven. While your instructor will introduce topics and new theory, you will be expected to do reading and research, testing your understanding with self-assessment exercises. Most class time will be spent working on the practical exercise, with your instructor assisting you in practicing, developing, and assessing your skills.

Evaluation

As it is a course focusing on practical skills, evaluation in CMPE2150 will be via practical exercises (Labs and Projects) which will typically have a design component followed by implementation or simulation of a design with measurement and testing of the finished product.

Marks will be assigned according to the following category weightings. Unless otherwise specified, assignments in a given category will have equal weight.

Category	Weight	Notes
Self-Assessment Activities (SAs)	10%	Generally performed on the student's own time at the beginning of each topic. Typically marked automatically.
Laboratory Exercises (Labs)	20%	One per topic. Checked-off in class by your instructor.
Electronics Projects (Projects)	45%	One per major unit. Checked off in-class by your instructor on a scheduled day. NB: You must complete all projects successfully to pass the course.
PCB Design Project (PCB)	25%	A major project with several steps designing a PCB. Submitted to your instructor for grading. NB: All components of this project must be completed successfully to pass the course.

Equipment

Because of the nature of this course, we will use elements from nearly all of the kits that you have purchased for the program. In particular, you will be expected to have all of the following, which are available in the NAIT bookstore. You should already have most of them from your first year studies. Items labelled "Home" do not need to be brought to the lab, but you may do so:

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| <ul style="list-style-type: none"> • ETC Component Kit • CNT Year 1 Kit • CNT Electronics Bench Equipment Kit (Home) • CNT Electronics DC Power Kit (Home) • CNT 9S12XDP512 Micro Kit (Later in Course) | <ul style="list-style-type: none"> • CNT Year 2 Kit • Approved Multimeter (Home) • Dual Breadboard • CSA-Rated Safety Glasses • Approved Calculator |
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Schedule

The following schedule is proposed. As always, this will be subject to change to fit operational realities. Changes to the schedule will be announced in class and on course channels as soon as known.

Week	Topic	Assignments/Notes
2	Introduction IO Configuration	<i>No class due to late start in week 1.</i>
3	Semiconductor Biasing	<i>Year 2 Kit Review</i> Lab 1: Bus Communication
4	Circuit Isolation Thermal Management	Lab 2: Circuit Isolation
5	Relays and SSRs	Project 1: Semiconductor Interfacing
6	AC Power Controllers	Lab 3: AC Controllers
R	Reading Break	<i>No Classes</i>
7	SCRs and Triacs	
8	Demo and Analysis: TRIAC Fader	Lab 4: SCR Circuits
9	Actuators	Project 2: TRIAC Fader
10	Permanent Magnet DC Motors	Lab 5: Solenoids and PMDC Motors
11	Servo Motors	Lab 6: Servo Control
12	Steppers Feedback Motor Control	Lab 7: Stepper Control
13	PCB Schematic Capture	Project 3: Feedback Motor Control <i>Lose one day to Easter</i>
14	PCB Layout Fundamentals	PCB Project 1 <i>Lose one day to Easter</i>
15	PCB Layout Tips and Techniques	PCB Project 2
16	PCB Manifests and Manufacturing Files	PCB Project 3

Policies

- Labs are no longer available for credit after the due date for the following Lab unless an extension is given by the instructor.
- Projects that are completed after the due date will receive a marks penalty of 20% per class period late unless an extension is given by the instructor.
- Safety glasses must be worn at all times in the Lab if anyone is using bench equipment.
- Promptness and preparation lead to success. Attendance will be monitored.