

COURSE OUTLINE

PHYS 229: Introduction to Experimental Physics, A01 (12859) Fall 2026

Lectures: (10-10:50am, Monday & Thursday)



We acknowledge and respect the Lək̓ʷəŋən (Songhees and Esquimalt) Peoples on whose territory the university stands, and the Lək̓ʷəŋən and W̓SÁNEĆ Peoples whose historical relationships with the land continue to this day.

COURSE DESCRIPTION

Physics 229 is a broad introduction to a broad subject: experimental physics. The material for this course will be split into two parts: **electronics** (about 2/3 of the course) and **data analysis** (about 1/3 of the course). As this is a course in experimental physics, a large portion of your work will be in the lab. This course should be thought of more as a lab with a lecture supplement rather than a lecture with a lab supplement.

PREREQUISITES & COREQUISITES

Must have Math 101 AND either (Phys 110 & Phys 111) or (Phys 120 & Phys 130)

CONTACT INFORMATION

Instructor: Andrew MacRae

Email: macrae@uvic.ca

Office: Elliott 113

Office Hours: Thursdays 1:15pm-2:30pm or upon request

COURSE MATERIALS

There is no official textbook for this course but there is an official set of course notes available to you at no cost on Brightspace. The Lab manual is required and can be purchased at the UVic bookstore. The cost of your lab manual includes a soldering project that will be distributed to you in the lab.

LEARNING OUTCOMES

Upon completion of this course, students should be able to:

- Construct a physical circuit on a breadboard from a schematic
- Debug/Troubleshoot malfunctioning electronic instrumentation



- Identify methods of measuring a physical parameter, using electronic instrumentation
- Correctly identify and report statistical and systematic uncertainties

EVALUATION

Laboratory Work	35%
Assignments	10%
Weekly Quizzes	5%
Midterm Exam (Oct. 29, 2026)	15%
Final Exam (Date TBD)	35%

Note:

- *You must pass (i.e. score >50%) the lab component to pass the course.*
- *If you receive a higher grade on your final than on your midterm, the final exam will count for both (i.e. your midterm will be worth 0% and your final will be worth 50%)*

COURSE POLICIES

Late/Missed Assignments or Exams

There will be a 10% penalty for late assignments up to 4 days, after which the solutions will be posted and your work will not be graded.

Academic Integrity

UVic's Policy on Academic Integrity is found at uvic.ca/calendar/future/undergrad/index.php#/home. It is every student's responsibility to be aware of this policy, including policies on cheating, plagiarism, unauthorized use of an editor, multiple submission, and aiding others to cheat. If you have any questions or doubts, please talk to me. For more information, see uvic.ca/learningandteaching/cac.

Use of AI

We live in a world where powerful AI tools like large language models (LLMs) are widely available. Like many tools, they are a double-edged blade, i.e. they can either accelerate or hinder your learning. You are in this class to understand physics. Not to memorize facts or perform computations but to really understand it in your gut so you see not only how it works, but why it must be this way. You are free to use LLMs to gather information but you must **at all times** understand what you have written and be able to justify it. If you rely on AI to produce answers you don't understand, you're undermining your own education (and this won't help on an exam!)

COURSE CALENDAR AND OUTLINE

UVic Important Dates: uvic.ca/calendar/dates/

Last day to add courses: September 25, 2026

Last day to drop a course without penalty of failure: October 31, 2026

Final Exam Period: December 10 – December 23, 2026

Tentative Timeline

Week 1: Introduction. Fundamental quantities of electronics (1 lecture only, **start of classes**)
 Week 2: Resistors and Ohm's law. Intro to circuits & Kirchhoff's Laws.
 Week 3: Thévenin and Norton equivalent circuits, Real vs. Ideal sources. Voltage dividers.
 Week 4: AC circuits, Complex representation of circuit elements, resistance/reactance.
 Week 5: Filters, frequency domain, and Bode Plots.
 Week 6: Principles of amplification. (1 lecture only **Thanksgiving**).
 Week 7: Introduction to transistors, op amps.
 Week 8: More op-amp circuits. (1 lecture only **Midterm Exam, Thursday Oct 29**).
 Week 9: More transistor designs. Digital devices, Binary numbers.
 Week 10: More on digital Logic, (1 lecture only **reading break**).
 Week 11: Analog to digital conversion and Nyquist. Intro to the theory of measurement.
 Week 12: Error propagation. Counting rule. Intro to statistics.
 Week 13: Probability distributions, the error function, and statistical significance.
 Week 14: Models and curve fitting. (1 lecture only, **end of classes**)

CHANGES DUE TO UNFORESEEN CIRCUMSTANCES

The above schedule, policies, procedures, and assignments in this course are subject to change in the event of extenuating circumstances. In the event of significant changes, a revised outline will be posted/circulated.

UVIC GRADING SYSTEM – UNDERGRADUATE

As per the [Academic Calendar](#):

Grade	Grade Point Value	Grade Scale	Description
A+	9	90 – 100%	Exceptional, outstanding and excellent performance. Normally achieved by a minority of students. These grades indicate a student who is self-initiating, exceeds expectation and has an insightful grasp of the subject matter.
A	8	85 – 89%	
A-	7	80 – 84%	
B+	6	77 – 79%	Very good, good and solid performance. Normally achieved by the largest number of students. These grades indicate a good grasp of the subject matter or excellent grasp in one area balanced with satisfactory grasp in the other area.
B	5	73 – 76%	
B-	4	70 – 72%	
C+	3	65 – 69%	Satisfactory, or minimally satisfactory. These grades indicate a satisfactory performance and knowledge of the subject matter.
C	2	60 – 64%	
D	1	50 – 59%	Marginal Performance. A student receiving this grade demonstrated a superficial grasp of the subject matter.
F	0	0 – 49%	Unsatisfactory performance. Wrote final examination and completed course requirements; no supplemental.
N	0	0 – 49%	Did not write examination or complete course requirements by the end of term or session; no supplemental.



COURSE FEEDBACK

I value your feedback on this course. Towards the end of term, as in all other courses at UVic, you will have the opportunity to complete an anonymous **Course Evaluation Survey (CES)** regarding your learning experience. The survey is important for providing feedback to me regarding the course and my teaching, as well as to help the department improve the overall program for students in the future. The survey is accessed online and can be done on your laptop, tablet, or mobile device. I will remind you and provide you with more detailed information nearer the time, but please be thinking about this important activity during the course.



APPENDICES

DEPARTMENT OF PHYSICS AND ASTRONOMY INFORMATION

- Department Website: uvic.ca/science/physics/index.php
 - Department General Office: physgen@uvic.ca
 - Department Undergraduate Advisor: phast_advising@uvic.ca
 - Department Graduate Advisor: sarae@uvic.ca
 - Department Graduate Program Assistant: physgrad@uvic.ca
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UNIVERSITY STATEMENTS & POLICIES

- Academic Calendar: [Information for All Students](#)
 - [Creating a respectful, inclusive, and productive learning environment](#)
 - [Accommodation of Religious Observance](#)
 - [Accommodation and Access for Students with Disabilities](#)
 - [Student Conduct](#)
 - [Non-academic Student Misconduct](#)
 - [Accessibility](#)
 - [Diversity / EDI](#)
 - [Equity Statement](#)
 - [Sexualized Violence Prevention and Response](#)
 - [Discrimination and Harassment Policy](#)
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STUDENT RESOURCES

POSITIVITY AND SAFETY

The University of Victoria is committed to promoting, providing, and protecting a positive and safe learning and working environment for all its members.

[Student Groups & Resources](#)

ACADEMIC RESOURCES

UVic Library - *UVic Library offers many services and resources for undergraduate and graduate students.*

uvic.ca/students/academics/library-services

Learning Resources - *UVic Learn Anywhere is the primary learning resource for students that offers many learning workshops and resources to help students with academics and learning strategies.*

onlineacademiccommunity.uvic.ca/uviclearn/

Centre for Academic Communication - *Offers online and in-person one-on-one tutorials, workshops, and more.*

uvic.ca/learningandteaching/cac

Math & Stats Assistance Centre - *Offers drop-in, face-to-face tutoring and a friendly, collaborative study space for 100- and 200-level math and stats courses.*

uvic.ca/science/math-statistics/current-students/undergraduate/msac

MENTAL HEALTH & WELLNESS

A note to remind you to take care of yourself. Do your best to maintain a healthy lifestyle this semester by eating well, exercising, getting enough sleep, and taking some time to relax. This will help you achieve your goals and cope with stress. All of us benefit from support during times of struggle. You are not alone.

SEOS Mental Health & Wellness Contact - *Dr. Fraass is a faculty member who can act as a sympathetic ear and (more importantly) provide guidance about: how to access the multitude of University support services, and which are useful in different circumstances. Andy can be found by dropping by his office or lab (Bob Wright A431, B409). He is also available via email for questions or to arrange a time to have a chat.*

andyfraass@uvic.ca

Student Wellness Centre - *Our team of practitioners offers a variety of services to support students' mental, physical, and spiritual health.*

uvic.ca/student-wellness

Counselling Services - *Counselling Services can help you make the most of your university experience. They offer free professional, confidential, inclusive support to currently registered UVic students.*

uvic.ca/student-wellness

Health Services - *University Health Services (UHS) provides a full-service primary health clinic for students and coordinates healthy student and campus initiatives.*

uvic.ca/student-wellness

ACCESSIBILITY

Students with diverse learning styles and needs are welcome in this course. In particular, if you have a documented disability or health consideration that may require accommodations, please feel free to approach me and/or the Centre for Accessible Learning (CAL) as soon as possible.

Centre for Accessible Learning - *The CAL staff are available by appointment to assess specific needs, provide referrals and arrange appropriate accommodations. The sooner you let us know your needs the quicker we can assist you in achieving your learning goals in this course.*

uvic.ca/accessible-learning

ADVISING

For academic advising-related questions, students in the School of Earth and Ocean Sciences are also encouraged to meet with the SEOS Undergraduate Advisor (seosadvisor@uvic.ca) as well as an academic advisor in the Academic Advising Centre early in their studies to help map out a plan to declare a major and complete university program requirements.

Academic Advising Centre - *Academic advice and support is currently available by phone, email and virtual or in-person appointments.* uvic.ca/services/advising

Ombudsperson - *The ombuds office is an independent, impartial, and confidential resource for undergraduate and graduate students and other members of the University of Victoria community. The ombudsperson helps resolve student problems or disputes fairly.* uvicombudsperson.ca

ACADEMIC CONCESSION

You can request an academic concession if your course requirements are affected by unexpected and unavoidable circumstances, or conflicting responsibilities. Concession requests can be for an in-course extension, deferral, withdrawal under extenuating circumstances, or an aegrotat. Please speak to an advisor at the Academic Advising Centre if you have questions on how requesting a concession will affect your academic program.

Undergraduate Academic Concessions - uvic.ca/students/academics/academic-concessions-accommodations

EQUITY AND HUMAN RIGHTS AT UVIC

EQHR is a resource for students, staff, and faculty who have experienced sexualized violence, discrimination, and/or harassment and are looking for informal and/or formal resolution options as well as advice, coaching, and/or education. We are available for confidential consultations so that you can ask questions and learn your options.

EQHR – By email at eqhr01@uvic.ca or in-person (Sedgewick C115). uvic.ca/equity

Sexualized Violence Resource Office – *If you have been directly or indirectly impacted by sexualized violence, reach out to the SVRO for information, advice, and resolution options (restorative and disciplinary) as well as support options and referrals. The SVRO is both survivor-centred and trauma-informed in their approach. You can reach us by phone at 250-721-8021 or by email at eqhr01@uvic.ca to book either an in-person (Sedgewick C119) or online appointment.* uvic.ca/sexualizedviolence



RESOURCES FOR INTERNATIONAL STUDENTS

International Centre for Students - *The primary office supporting international students on campus at the university-wide level.* uvic.ca/international-experiences

UVic Global Community Initiative - *Provides various supportive programming, including a Mentorship Program and Conversation Partner Program.* uvic.ca/international-experiences/get-involved/uvic-global-community

RESOURCES FOR INDIGENOUS STUDENTS

Indigenous Student Support - *UVic offers holistic services to Indigenous students throughout their academic journey.* uvic.ca/students/info-for/indigenous-students

Elders in Residence - *The Office of Indigenous Academic and Community Engagement (IACE) has the privilege of assembling a group of Elders from local communities to guide students, staff, faculty, and administration in Indigenous ways of knowing and being.* uvic.ca/iace/