

P429A Course Outline

Course Web page (Brightspace): <https://bright.uvic.ca/d2l/home/427102>

Submit completed reports in PDF format via “Assignments” in Brightspace Shell

Course Instructors :

Andrew MacRae	(macrae@uvic.ca),	Elliott 113
Mike Roney	(mroney@uvic.ca),	Elliott 209
Geoffrey Steeves	(gsteeves@uvic.ca),	Elliott 116
Devika Chithrani	(devikac@uvic.ca),	Elliott 107

Lab TA:

Sterling von Dehn (sterlingvondehn@gmail.com)

Scheduled Lab Times:

Officially the lab is open Mondays 2:30 – 5:30 pm, however the lab will also be open periodically through the week. If you need to get into the lab, just ask Andrew or Sterling.

The lab is normally spread across several rooms*:

Course Description:

Introduction to research, with several research-oriented experiments and with instruction on experimental techniques and theory of measurement.

Course Prerequisites:

Normally open only to fourth year Honours students.

Timeline

September 14th, 2026	Introduction to Course. Choose First Experiment.
September 28th, 2026	Status Update Due for Exp 1
October 5th, 2026	(Tentative) Experimental Uncertainty Lecture.
October 12th, 2026	No class - Lab open Thursday
October 26th, 2026	1st report due. Second experiment started.
November 9th, 2026	Reading Week, no class
November 12th, 2026	Status Update Due for Exp 2
December 7th, 2026	Oral report session 1
December 10th, 2026	Experiment 2 Report Due
Dec 8th 2026-Jan 5th 2027	Winter Break
January 11th, 2027	Start experiment 3
January 25th, 2027	Status Update Due for Exp 3
February 8th, 2027	Experiment 3 Report Due , Start Experiment 4
February 22nd, 2027	Reading Week, no classes

March 1st, 2027
March 29th, 2027
April 5th, 2027

Status Update Due for Exp 4
Oral Report Session 2
Experiment 4 Report Due

This is an experimental physics course. All labs/experiments are hands-on and there is no provision for strictly theoretical or computational projects. P429A is a full year course and it runs from September to April.

Students will be required to complete 4 experiments throughout the year. These can be chosen from a wide selection of subjects spanning across atomic, quantum and classical optical, solid-state, and nuclear physics, microscopy, fluid dynamics, and geophysics. The regular experiments are expected to take roughly 6 weeks, including the write up. After 1 or 2 weeks (see timeline) the student must submit a short progress update explaining their progress so far along with an in-lab demonstration to the instructor. This is worth 5% of your grade for the report.

All labs have to be completed in order to pass the course and there will be a 10% penalty per week for late submissions. Because of the extended time allotted to complete the experiments, this rule will be strictly enforced, barring special circumstances.

Reports will follow the Physical Review style (4 pages) for experiments. It is recommended that students use *LaTeX* to typeset their experiments, as this is the current convention among all major journals.

Upon completion of each lab, each student will participate in a one-on-one interview with one of the course instructors to go over the experiment and the report.

Overall marking distribution is as follows:

84% Lab work (4 reports, see above)
16% Oral Presentations

Practical Exercise

The practical exercise requires completion during the first half of the course. Failure to complete the exercises will result in a deduction of 10% off of your final mark. The oral presentation component will be worth 16% of the course grade. It will consist of two sessions, each worth 8%. The sessions will consist of a 12 minute presentation (10 minute talk + 2 minutes for questions). It is expected that all students attend all presentations and participate by posing questions to the speaker - a grade for participation is assigned.

If a submitted lab does not meet the standard for a 4th year honours course you may be asked to revise and resubmit it. Also, a report can be improved and the marker can invite the student to resubmit at the time of the oral defense.

Experimental Report Grading Scheme (Total: 100 marks)

STATUS UPDATE [5 Marks total]

- Students will submit a short (less than one page) summary of their understanding of the work completed, work to be done, and current roadblocks.
- Students demonstrate experimental progress to instructor.

REPORT [75 Marks Total]

Abstract [5 marks]

- Clearly written summary of the report!
- State the main objective, conclusions and give important results

Body: [45 marks]

- **Introduction** (5 marks): Provide context, relevant references, and the goals of the work.
- **Theory** (10 marks): Inclusion and explanation of appropriate theory underlying the work
- **Experimental Details** (10 Marks): Describe the materials, experimental design and method.
- **Results and analysis** (15 Marks): presentation of results in a clear and logical manner. The results presented should be convincing. The significance of various uncertainties should be considered and presented in a quantitative manner.
- **Discussion and conclusions** (5 marks): Results should be considered in the context of existing knowledge. Future experiments, and improvements to the experimental design can be made.

Figures: [15 marks]

- Clear, logical, and thoughtfully presented data.
- Appropriate choice of axes
- Readable graphs
- Self-contained figure caption
- Logical fits to data (not just connect the dots)
- Clear and helpful diagrams (No penalty for clear, handwritten figures)

Exceptional Work: [10 marks]

- This is for the students who demonstrate work above and beyond the minimum requirements!

ORAL DEFENSE [20 marks total]

- Assigned after meeting / interview with student and examine their lab notes.