



## COURSE OUTLINE

### 1. **Course:** PHYS 597, Senior Physics Laboratory - Fall 2023

Lecture 01 : W 12:00 - 12:50 in SA 219

<b>Instructor</b>	<b>Email</b>	<b>Phone</b>	<b>Office</b>	<b>Hours</b>
Dr Michael Wieser	<a href="mailto:mwieser@ucalgary.ca">mwieser@ucalgary.ca</a>	403 220-3641	SB 131	Office hours can be scheduled by contacting Michael Wieser at <a href="mailto:mwieser@ucalgary.ca">mwieser@ucalgary.ca</a>

To account for any necessary transition to remote learning for the current semester, courses with in-person lectures, labs, or tutorials may be shifted to remote delivery for a certain period of time. In addition, adjustments may be made to the modality and format of assessments and deadlines, as well as to other course components and/or requirements, so that all coursework tasks are in line with the necessary and evolving health precautions for all involved (students and staff).

#### **In Person Delivery Details:**

Laboratory and lecture sessions will be held in-person.

#### **Course Site:**

D2L: PHYS 597 L01-(Fall 2023)-Senior Physics Laboratory

**Note:** Students must use their U of C account for all course correspondence.

#### **Equity Diversity & Inclusion:**

The University of Calgary is committed to creating an equitable, diverse and inclusive campus, and condemns harm and discrimination of any form. We value all persons regardless of their race, gender, ethnicity, age, LGBTQIA2S+ identity and expression, disability, religion, spirituality, and socioeconomic status. The Faculty of Science strives to extend these values in every aspect of our courses, research, and teachings to better promote academic excellence and foster belonging for all.

The Physics and Astronomy EDI Committee acknowledges there are persistent barriers that prevent such accessibility and hinder our progress towards EDI. Our representatives (faculty, postdocs, graduate and undergraduate students) are committed to addressing any concerns and work towards proactive solutions that enact necessary change within the department. To submit anonymous questions, comments or concerns regarding EDI related issues, please reach out to our Associate Head EDI, Claudia Gomes da Rocha ([claudia.gomesdarocho@ucalgary.ca](mailto:claudia.gomesdarocho@ucalgary.ca))

### 2. **Requisites:**

See section [3.5.C](#) in the Faculty of Science section of the online Calendar.

#### **Prerequisite(s):**

Physics 497.

### 3. **Grading:**

The University policy on grading and related matters is described in [F.1](#) and [F.2](#) of the online University Calendar.

In determining the overall grade in the course the following weights will be used:

Course Component	Weight	Due Date (duration for exams)	Modality for exams	Location for exams
Laboratory Notes	10%	Ongoing		
Oral Presentation	10%	Ongoing		
Lab #1 - Introduction	5%	Sep 22 2023		
Lab #1 - Data and Figures	5%	Oct 06 2023		
Lab #1 - Draft Report	10%	Oct 13 2023		
Lab #1 - Final Report	20%	Oct 20 2023		
Lab #2 - Introduction	5%	Oct 27 2023		
Lab #2 - Data and Figures	5%	Nov 10 2023		
Lab #2 - Draft Report	10%	Nov 24 2023		
Lab #2 - Final Report	20%	Dec 01 2023		

Each piece of work (reports, assignments, quizzes, midterm exam(s) or final examination) submitted by the student will be assigned a grade. The student's grade for each component listed above will be combined with the indicated weights to produce an overall percentage for the course, which will be used to determine the course letter grade.

The conversion between a percentage grade and letter grade is as follows.

	A+	A	A-	B+	B	B-	C+	C	C-	D+	D
<b>Minimum % Required</b>	95 %	90 %	85 %	80%	75%	70 %	65 %	60%	55%	50 %	45 %

The University of Calgary offers a [flexible grade option](#), Credit Granted (CG) to support student's breadth of learning and student wellness. Faculty units may have additional requirements or restrictions for the use of the CG grade at the faculty, degree or program level. To see the full list of Faculty of Science courses where CG is not eligible, please visit the following website: <https://science.ucalgary.ca/current-students/undergraduate/program-advising/flexible-grading-option-cg-grade>

#### 4. Missed Components Of Term Work:

In the event that a student legitimately fails to submit any online or in-person assessment on time (e.g. due to illness, domestic affliction, etc...), please contact the course coordinator, or the course instructor if this course does not have a coordinator to arrange for a re-adjustment of a submission date, or possible exemption and reweighing of components. Absences not reported within 48 hours will not be accommodated. Students may be asked to provide supporting documentation ([Section M.1](#)) for an excused absence, See [FAQ](#).

If an excused absence is approved, options for how the missed assessment is dealt with is at the discretion of the coordinator or course instructor. Some options such as an exemption and pro-rating among the components of the course may not be a viable option based on the design of this course.

The due dates for the **Introduction**, **Preliminary Data and Figures**, **Draft Report**, and **Final Report** are listed in the table above. Work submitted within the first 24 hours past the deadline will be assessed a 50 % penalty, and work submitted after 48 hours of the deadline will receive a grade of zero, although feedback will still be provided. However, you have 72 hours (in 24-hour units) of extension available to you through the semester that may be used at any time for any reason for any of the four components listed above. Work submitted within the extension will not receive any late penalty. After the extension, the penalties will apply as described above. To receive an extension, you must submit your request 24 hours before the original due date.

#### 5. Scheduled Out-of-Class Activities:

There are no scheduled out of class activities for this course.

#### 6. Course Materials:

Recommended Textbook(s):

Les Kirkup and Bob Frenkel, *An Introduction to Uncertainty in Measurement* Cambridge.

Note that the recommended textbook in this course may be accessed via the Cambridge University Press website free of charge through the University of Calgary Library

<https://www.cambridge.org/core/books/an-introduction-to-uncertainty-in-measurement/3A67822AC6DAED5A8AC265057285AB0A#>

In order to successfully engage in their learning experiences at the University of Calgary, students taking online, remote and blended courses are required to have reliable access to the following technology:

- A computer with a supported operating system, as well as the latest security, and malware updates;
- A current and updated web browser;
- Webcam/Camera (built-in or external);
- Microphone and speaker (built-in or external), or headset with microphone;
- Current antivirus and/or firewall software enabled;
- Stable internet connection.

For more information please refer to the UofC [ELearning](#) online website.

#### 7. **Examination Policy:**

There are no examinations in this course.

Students should also read the Calendar, [Section G](#), on Examinations.

#### 8. **Approved Mandatory And Optional Course Supplemental Fees:**

There are no mandatory or optional course supplemental fees for this course.

#### 9. **Writing Across The Curriculum Statement:**

For all components of the course, in any written work, the quality of the student's writing (language, spelling, grammar, presentation etc.) can be a factor in the evaluation of the work. See also [Section E.2](#) of the University Calendar.

#### 10. **Human Studies Statement:**

Students will not participate as subjects or researchers in human studies.

See also [Section E.5](#) of the University Calendar.

#### 11. **Reappraisal Of Grades:**

A student wishing a reappraisal, should first attempt to review the graded work with the Course coordinator/instructor or department offering the course. Students with sufficient academic grounds may request a reappraisal. Non-academic grounds are not relevant for grade reappraisals. Students should be aware that the grade being reappraised may be raised, lowered or remain the same. See [Section I.3](#) of the University Calendar.

- Term Work:** The student should present their rationale as effectively and as fully as possible to the Course coordinator/instructor within **ten business days** of either being notified about the mark, or of the item's return to the class. If the student is not satisfied with the outcome, the student shall submit the Reappraisal of Graded Term work [form](#) to the department in which the course is offered within 2 business days of receiving the decision from the instructor. The Department will arrange for a reappraisal of the work within the next ten business days. The reappraisal will only be considered if the student provides a detailed rationale that outlines where and for what reason an error is suspected. See sections [I.1](#) and [I.2](#) of the University Calendar
- Final Exam:** The student shall submit the request to Enrolment Services. See [Section I.3](#) of the University Calendar.

#### 12. **Other Important Information For Students:**

- Mental Health** The University of Calgary recognizes the pivotal role that student mental health plays in physical health, social connectedness and academic success, and aspires to create a caring and supportive campus community where individuals can freely talk about mental health and receive supports when needed. We encourage you to explore the mental health resources available throughout the university community, such as counselling, self-help resources, peer support or skills-building available through the SU Wellness Centre (Room 370, MacEwan Student Centre, [Mental Health Services Website](#)) and the Campus Mental Health Strategy website ([Mental Health](#)).
- SU Wellness Services:** For more information, see their [website](#) or call [403-210-9355](#).
- Sexual Violence:** The Sexual Violence Support Advocate, Carla Bertsch, can provide confidential support and information regarding sexual violence to all members of the university community. Carla can be reached by email ([syva@ucalgary.ca](mailto:syva@ucalgary.ca)) or phone at [403-220-2208](#). The complete University of Calgary policy on sexual violence can be viewed [here](#).
- Student Ombuds Office:** A safe place for all students of the University of Calgary to discuss student related issues, interpersonal conflict, academic and non-academic concerns, and many other problems.

e. **Student Union Information:** [SU contact](#), Email your SU Science Reps: [science1@su.ucalgary.ca](mailto:science1@su.ucalgary.ca), [science2@su.ucalgary.ca](mailto:science2@su.ucalgary.ca), [science3@su.ucalgary.ca](mailto:science3@su.ucalgary.ca),

f. **Academic Accommodation Policy:**

It is the student's responsibility to request academic accommodations according to the University policies and procedures listed below. The student accommodation policy can be found at: <https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Student-Accommodation-Policy.pdf>

Students needing an accommodation because of a disability or medical condition should communicate this need to Student Accessibility Services in accordance with the Procedure for Accommodations for Students with Disabilities: <https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Accommodation-for-Students-with-Disabilities-Procedure.pdf>.

Students needing an accommodation in relation to their coursework or to fulfil requirements for a graduate degree, based on a Protected Ground other than Disability, should communicate this need, by filling out the [Request for Academic Accommodation Form](#) and sending it to Dr. David Feder by email [phas.ahugrd@ucalgary.ca](mailto:phas.ahugrd@ucalgary.ca) preferably 10 business days before the due date of an assessment or scheduled absence.

g. **Misconduct:** Academic integrity is the foundation of the development and acquisition of knowledge and is based on values of honesty, trust, responsibility, and respect. We expect members of our community to act with integrity. Research integrity, ethics, and principles of conduct are key to academic integrity. Members of our campus community are required to abide by our institutional [Code of Conduct](#) and promote academic integrity in upholding the University of Calgary's reputation of excellence. Some examples of academic misconduct include but are not limited to: posting course material to online platforms or file sharing without the course instructor's consent; submitting or presenting work as if it were the student's own work; submitting or presenting work in one course which has also been submitted in another course without the instructor's permission; borrowing experimental values from others without the instructor's approval; falsification/fabrication of experimental values in a report. Please read the following to inform yourself more on academic integrity:

[Student Handbook on Academic Integrity](#)  
[Student Academic Misconduct Policy](#) and [Procedure](#)  
[Faculty of Science Academic Misconduct Process](#)  
[Research Integrity Policy](#)

Additional information is available on the [Student Success Centre Academic Integrity page](#)

h. **Copyright of Course Materials:** All course materials (including those posted on the course D2L site, a course website, or used in any teaching activity such as (but not limited to) examinations, quizzes, assignments, laboratory manuals, lecture slides or lecture materials and other course notes) are protected by law. These materials are for the sole use of students registered in this course and must not be redistributed. Sharing these materials with anyone else would be a breach of the terms and conditions governing student access to D2L, as well as a violation of the copyright in these materials, and may be pursued as a case of student academic or [non-academic misconduct](#), in addition to any other remedies available at law.

i. **Freedom of Information and Privacy:** This course is conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIP). Students should identify themselves on all written work by placing their name on the front page and their ID number on each subsequent page. For more information, see [Legal Services](#) website.

j. **Surveys:** At the University of Calgary, feedback through the Universal Student Ratings of Instruction ([USRI](#)) survey and the Faculty of Science Teaching Feedback form provides valuable information to help with evaluating instruction, enhancing learning and teaching, and selecting courses. Your responses make a difference - please participate in these surveys.

Students taking PHYS 597 are expected to have prior knowledge in:

- General physics and mathematics within the scope of standard college physics course.
- Basic methods and tools of experimental physics
- Data processing and presentation (basic statistical methods, error analysis, scientific graphics software.
- Scientific writing
- Making public presentations with slides

## Tentative Course and Lecture Schedule Fall 2023

Week	Topic	Date
1	Introduction to the course	06-Sept
2	How to Communicate Ideas Effectively - Writing Reports/Talks	13-Sept
3	How to write the Abstract and Introduction	20-Sept
4	Uncertainty Analysis and Reporting	27-Sept
5	Uncertainty Analysis and Reporting	04-Oct
6	Uncertainty Analysis and Reporting	11-Oct
7	How to prepare Figures, Conclusions, and References	18-Oct
8	Peer Review and Publishing	25-Oct
9	Ethics in Science	01-Nov
10	Meeting with PHAS Alumni	08-Nov
11	Reading Break - No lectures	15-Nov
12	Oral Presentations x3	22-Nov
13	Oral Presentations x3	29-Nov
14	Oral Presentations x3	06-Dec

Task	Date
Lecture Start	Wed September 6
Lab Selections due	Wed September 13
Lab Assignments handed out	Fri September 15
Experiment #1 Start	Mon September 18
Experiment #1 <b>Introduction Due</b>	<b>Fri September 22</b>
Experiment #1 <b>Preliminary Data and Figures Due</b>	<b>Fri October 6</b>
Experiment #1 <b>Draft Report Due</b>	<b>Fri October 13</b>
Experiment #1 Writing Workshop	October 16 - October 20
Experiment #1 <b>Final Report Due</b>	<b>Fri October 20</b>
Experiment #2 Start	Mon October 23
Experiment #2 <b>Introduction Due</b>	<b>Fri October 27</b>
Experiment #2 <b>Preliminary Data and Figures Due</b>	<b>Fri November 10</b>
Experiment #2 <b>Draft Report Due</b>	<b>Fri November 24</b>
Experiment #2 Writing Workshop	November 27 - December 1
Experiment #2 <b>Final Report Due</b>	<b>Fri December 1</b>
Oral Presentations	November 22, 29, and December 6

#### Lectures:

There is one lecture per week on Wednesdays from 12:00 to 12:50. The lectures are in person and will not be recorded.

#### On Campus Experiments:

This semester, you will select two experiments to work on. The list of experiments is provided below. You will work with a laboratory partner and you and your partner should submit a list of at least three experiments that are of interest by September 13. I will let you know your two assigned experiments by September 15. Documents, including operating manuals and background information for the experiments, will be available on-line via the course D2L website, which should be "live" by the end of the first week of September.

The first deliverable for each experiment is an introduction section that should describe the **goals** and **motivation** for the experiment along with some concise background information and references. The introduction document should be two pages in length (single spaced) and include at least 3 carefully chosen peer-reviewed references.

The next submission includes examples of data tables and figures/plots that you will use in the final report. Here, it is important to show what data will form the foundation for your laboratory report as well as the uncertainty calculations supporting the interpretation of the results.

A draft report for the experiment is due next. This should be an almost complete report so we can provide feedback for your final report. Essentially, the report should include the clearly articulated goal and motivation for the paper, background literature review, description of the experiment, results (figures, plots, data tables), discussion, conclusion, and references. The report should be 10 pages in length (single spaced) including text, figures, and references.

There is one week scheduled for you to work on the written component of the experiment. This will be the opportunity to check in with us on the writing and organization of the final report, keeping in mind the feedback you received from your draft reports and initial data and plot submissions.

The final report is due on October 20<sup>th</sup> for Experiment #1 and December 2<sup>nd</sup> for Experiment #2.

**Oral Presentations:**

Group oral presentations are scheduled during class time from November 22 to December 6. These will be done in person. The topic of the oral presentation should be developed around one of the experiments. The presentation should be ten minutes in length.

**Lab Notebooks:**

An electronic on-line laboratory notebook should be maintained by you to summarize the progress/data/insights for the measurement and on-campus experiments. At least two entries per week (or more depending on the work done) should be submitted. The notebook will record progress, notes on background material, observations and data from the experiment itself, and any data analysis that is performed for the experiment. Feedback will be provided on a weekly basis to help ensure that you are on track. The communication around the notebook will serve as a virtual check-in between you, the TAs, and myself throughout the semester.

**Late Submissions:**

The due dates for the **Introduction, Preliminary Data and Figures, Draft Report, and Final Report** are listed in the table above. Work submitted within the first 24 hours past the deadline will be assessed a 50 % penalty and work submitted after 48 hours of the deadline will receive a grade of zero, although feedback will still be provided. However, you have 72 hours (in 24-hour units) of extension available to you through the semester that may be used at any time for any reason for any of the four components listed above. Work submitted within the extension will not receive any late penalty. After the extension, the penalties will apply as described above. To receive an extension, you must submit your request 24 hours before the original due date.

**Course Outcomes:**

- Improve physics knowledge
- Learn the work of experimental physicists
- Improve technical skills
- Improve computer data processing skills and maintaining lab records
- “Metascience”
- Reading a research article
- Writing articles
- Reporting your findings at a conference, becoming an independent scientist
- Independent thinking
- Literature review
- Problem solving and problem finding

Electronically Approved - Aug 24 2023 22:43

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**Department Approval**