Physics 3900 Experimental Physics I - Winter 2025
14:00 - 17:00 Monday & Wednesday (Section 1)
14:00 - 17:00 Tuesday & Thursday (Section 2)
Room C4044

Prerequisites: at least two of PHYS 2053, 2820, 2055, 2750

Instructors
Dr. Murray Wilson murray.wilson@mun.ca (Section 1)
Dr. Todd Andrews tandrews@mun.ca (Section 2)

Lab Instructor
Dr. Liqiu Men lmen@mun.ca

Overview and Learning Objectives: In this course you will work closely with instructors to deeply investigate specific projects of your choice in areas of physics such as optics, materials science, spectroscopy, fluid dynamics, and modern physics. Through this work, you will learn and demonstrate laboratory skills, documentation methods, data and error analysis, and strengthen your oral and written communication skills.

Course Materials:
Electronic lab notebooks will be prepared and submitted through LabArchives (paid subscription required). Other necessary materials will be provided through Brightspace.

Course Delivery:
This course will be delivered as in person laboratory sessions.

Grading Scheme:
- 80%, Laboratory Notebooks. 4 notebooks, one per experiment, worth 20% each.
- 20% Scientific paper + oral presentation on one chosen experiment.
  - 4% for oral presentation (April 2/7 Section 1, April 1/3 Section 2)
  - 2% for paper draft (Due March 21)
  - 2% for peer review of other students paper drafts (March 26/31 Section 1, March 25/27 Section 2)
  - 12% for final paper (Due April 9)

Laboratory Experiments
Each student will complete 4 different experiments during the term. Data collection and analysis will take place in four 3-hour class periods for each experiment. During this time, students are expected to accurately document their measurements and analysis using the electronic notebooks, which must be

finalized prior the start of the next lab period following the end of each experiment, and submitted for grading.

Each student will complete the Diffraction Grating experiment. Students will then, in consultation with course instructors, select and complete three experiments from the following list:
Optics: Far-field diffraction, Optical interferometry, Polarization
Fluids: Vortex streets, Internal waves, Contact angle
Materials Physics: Nuclear magnetic resonance, Infrared spectroscopy, Thermal properties of metals
Non-linear physics: Chaos
Modern Physics: Speed of Light

Scientific Paper:
Each student will select one of their experiments on which to complete a journal-style scientific paper and give an oral presentation. For the scientific paper, a complete draft must be submitted by March 21st, which will be critiqued by the course instructor. Students will also circulate their drafts for peer review by all other students in their section during specific lab period (March 26th/31st, or 25th/27th). These peer reviews will be submitted both to the student who wrote the draft, and to the course instructors for grading. After these review activities, students are expected to finalize their paper, and submit it for grading by April 11th. Oral presentations will be given on April 2nd/7th or 1st/3rd.

Important Dates
Tuesday January 7th - Lecture period begins
February 24th to February 28th – Winter break, no class
Tuesday March 4th – Last day to drop course without academic prejudice
Wednesday April 9th – Lecture Period Ends

Course Disruptions
In the case of a class disruption or cancellation, and in the case of revisions to evaluation methods, students registered in the course shall be notified via Brightspace. Any necessary revisions to the evaluation methods resulting from such disruptions will be made in consultation with the students registered in this course. If a student demonstrates that they would be disadvantaged by the change, then, as per 6.7.4 of the University Calendar, accommodations will be made.

Students are expected to abide by the student code of conduct (https://www.mun.ca/student/media/production/memorial/administrative/student-life/files/supports-services/respect/Student_Code_of_Conduct_May_11_2017.pdf) and academic misconduct guidelines in Section 6.12 of the university regulations (https://www.mun.ca/regoff/calendar/sectionNo=REGS-0748) as set out by Memorial University.

Memorial University of Newfoundland is committed to supporting inclusive education based on the principles of equity, accessibility and collaboration. Accommodations are provided within the scope of the University Policies for the Accommodations for Students with Disabilities (http://www.mun.ca/policy/site/policy.php?id=239). Students who may need an academic accommodation are asked to initiate the request with the Glenn Roy Blundon Centre (http://www.mun.ca/blundon) at the earliest opportunity.

The instructor reserves the right to restrict the use of electronic devices in the classroom if such use, by the discretion of the instructor, is deemed deleterious to the experience of other students.

Original work is expected to be submitted in this course. The use of artificial intelligence tools to generate assignment submissions is not permitted.