

Welcome to Introduction to Experimental Physics!

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Office Hours: TBA

Section TA: TBA

Learning physics can be challenging enough on its own. As an instructor, my aim is to create a classroom environment that allows all students to be successful. I intend to make the experience in this class as fair and respectful as possible and welcome feedback and advice as to how I might improve class culture and *your* experience in it. In particular, my goal is to help you all build skills that will translate regardless of your next course or career and to set you up for success throughout the class to gain those skills and meet my expectations.

Course Goals:

- How to take raw data and **collaborate** with other students
- How to develop **a good judgment** for estimating uncertainties and spot physically unreasonable results
- How to extract physically relevant quantities from raw data. In particular, how to use software and programming languages (e.g. **Mathematica**, **Python** but not Excel) to perform data analysis
- How to tell whether or not an experiment was successful, i.e. if results are compatible with expectations within uncertainties
- How to present data and the corresponding results in a **brief, clear and understandable way**
- How to write up lab reports according to the standard of an **internationally recognized scientific journal**
- Appreciation of how abstract physics concepts learned on books actually apply to the everyday world

5 Competencies of Evaluation:

- Communication and organization of scientific thinking
- Data visualization
- Sophisticated analysis of data
- Discussion, justification and argument of implication of results on the model
- Narrative flow and context of discussion

Course Structure:

- Each week, there will be a **1-hour lecture** (Mondays, 2:40pm-3:40pm, in Pupin 428)
- Each week, there will be a **3-hour lab section**
- The course assignments consist of **lab reports each week**.
- You will be expected to come to labs having read the lab manual.

<i>Lab. Schedule for Experimental Physics 1494 Fall 2022</i>	
<i>Week of:</i>	<i>Scheduled Labs:</i>
Sep. 19	Velocity, Acceleration and g
Sep. 26	Projectile Motion and Conservation of Energy
Oct. 3	Magnetic Fields
Oct. 10	e/m of the Electron
Oct. 17	Polarization/Interference
Oct. 24	Interferometer
Oct. 31	The Spectrum of Hydrogen Atom
Nov. 7	Election Week
Nov. 14	Capacitance & the Oscilloscope
Nov. 21	Thanksgiving Week
Nov. 28	AC Circuits
Dec. 5	Beta-Gamma Rays
<i>Note: LAB. ROOM ASSIGNMENTS ARE POSTED EACH WEEK ON THE 5th FLOOR BULLETIN BOARD</i>	

Lab Reports:

- The lab report structure should include:
 - Title, Including name of group members and date, (Abstract optional)
 - Introduction
 - Method
 - Results and Analysis
 - Conclusion
 - References
- You must hand in **your own unique lab report. Plagiarism or cheating of any kind will be taken seriously.** Academic Integrity will be strictly enforced.
 - Please be aware that course policy requires us to make use of the Courseworks plagiarism checker.
- Your report should be typed.

Grading:

- 90% **Lab Reports**
- 10% **In-lab discussions** (showing up to lab sessions, ability to apply prior knowledge, ability to work with other students, etc.). This will be defined at the discretion of your lab TA at the start of the course.
- Grades will be determined based on acquisition of defined competencies and according to a rubric. Lab participation and in-class performance will be included to determine final grade.

Absence Policy:

- There are **no make-up labs**.
- You are allowed **3 absences**:
 - **2 excused** absences
 - **1 unexcused** absence: receive a score of zero.
- Missing **more than 3 labs** will result in a **failing grade**.
- **If you know you will miss a lab, please reach out to your lab TA as early as possible.**

Academic & Non-Academic Resources:

- **The Physics Lab Resources Website:**
<https://physics.columbia.edu/content/undergraduate-resources>
 - This contains useful information such as example lab reports, lab manuals, lab schedule, info on error analysis and more.
- **Disability Services Office Site:** <https://health.columbia.edu/getting-care/register-disability-services>
 - If you require accommodations in this class, please register with the Disability Services office and make an appointment to meet with me so that appropriate arrangements can be made.
- **Counseling & Psychological Services (CPS):**
<https://health.columbia.edu/content/counseling-and-psychological-services>
 - If there are academic or non-academic issues that are impacting your ability to learn in my class, please feel free to make an appointment to meet with me at your discretion so that we can work to improve your classroom experience.