



PHYS 136.02

Introduction to Experimental Physics II

| Leslie Wade <i>Associate Professor of Physics</i> | |
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| Class meetings: | RBH 105 Tuesdays 1:10-4:00 PM |
| Email: | wadel@kenyon.edu |
| Office hours: | RBH 210 M: 11-noon W: 11-11:30 AM, 2-3 PM R: 1-2 PM |

DISCLAIMER: Changes to this syllabus and/or assignments are possible and will be announced in class, on Moodle, and/or over email.

COURSE DESCRIPTION

This laboratory course meets one afternoon each week and is organized around weekly experiments that explore the phenomena of wave phenomena, geometrical and physical optics, elementary quantum theory, atomic physics, X-rays, radioactivity, nuclear physics and thermodynamics. Lectures cover the theory and instrumentation required to understand each experiment. Students will continue to develop skills in computer-assisted graphical and statistical analysis of data as well as the analysis of experimental uncertainty. This course does not count toward the physics major. Prerequisite: concurrent enrollment in PHYS 135. Offered every fall.

COURSE OBJECTIVES

This course is a co-requisite of PHYS 135. This course will:

1. Expand upon, complement, and quantify the material presented in PHYS 135
2. Provide practice in the science of measurement, especially in the quantification of uncertainty in measured and derived results

3. Provide practice in the art of quantitatively recording measurements: procedures, data, results, observations

COURSE MATERIALS

Each student is required to purchase one large brown quadrille-ruled laboratory notebook and a PHYS 136 lab manual from the college bookstore. Other sizes or forms of notebooks are not acceptable.

GRADING SCHEME

The grades assigned in this course will be determined using a weighted average of a student's scores on the following activities:

10% - Written answers to pre-lab questions for each experiment

65% - Record of student's experimental work and its analysis, as contained in student's laboratory notebook or as demonstrated on post-lab quizzes accompanied by lab notebook checkouts

25% - Final exam

LETTER GRADE DISTRIBUTION

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|-------------|----|-------------|----|-------------|----|
| >= 93.00 | A | 80.00-82.99 | B- | 67.00-69.99 | D+ |
| 90.00-92.99 | A- | 77.00-79.99 | C+ | 63.00-66.99 | D |
| 87.00-89.99 | B+ | 73.00-76.99 | C | 60.00-62.99 | D- |
| 83.00-86.99 | B | 70.00-72.99 | C- | <= 59.99 | F |

Final grades are subject to scaling at the end of the semester according to the professor's discretion. However, they can only be scaled up in the favor of the student. For instance, if a student's final grade without scaling is an 80%, the student will not receive a letter grade lower than a B-. However, that student might receive a higher grade if the professor deems it appropriate to scale the final grade. (Note: Scaling is not guaranteed and should not be expected.)

ATTENDANCE

Attendance at all laboratory meetings is required. However, extraordinary circumstances sometimes arise. If a student knows that he/she will have a conflict with one of the assigned lab meetings, the instructor must be contacted in advance to see if there is some way in which the work can be made up, preferably by participating in the experiment during one of the other scheduled lab sections that week. In general, this is the only option for making up missed work.

Unexcused absences from lab or experiments not rescheduled and completed will result in a grade of zero for that week's work. Permission to miss and make up a laboratory will be given only in the most extraordinary circumstances and for College approved events, but students must make such a request before the intended absence. Students must make up any excused lab within one week; after that time students will earn a zero (no credit) for the lab, even if it is excused.

Students should not be late to scheduled lab periods.

LATE WORK

Extensions on laboratory reports will be given only in the most extraordinary circumstances, and students must make such requests before the day of the deadline. No extensions or make up labs will be granted on or after the day of deadline. Late work will result in a 10% grade point deduction per day.

LAB PARTNERS

Students may choose anyone in the class to work with as a partner. Students should be sure to share responsibilities equally and take turns with different aspects of the lab process. If a student likes to take charge of experiments, make sure that student allows his/her partner to take leading roles as well; swap responsibilities. The instructor reserves the right to assign specific tasks to particular students.

PRE-LAB QUESTIONS

Answers to pre-lab questions must be handed in at the beginning of lab for credit to be

awarded. Once lab has begun, it is too late to hand in pre-lab work. If a student arrives after lab has begun, his/her pre-lab questions will not be accepted for credit.

LAB NOTEBOOKS AND QUIZZES

Students must perform all experiments. Students are expected to stay until the end of the lab period at 4:00 PM to work on their lab write-ups in their lab books. If write-ups are completed and checked out by the instructor early, then post-lab quizzes may be taken and students may leave before 4:00 PM.

The first two lab notebooks will be graded, so the completed lab books must be scanned (using the *Genius Scan* App on one's phone or a real scanner) and submitted through Moodle no later than 4:00 PM on the Wednesday after performing the lab.

Beginning in week three, post-lab quizzes will be given and graded instead of lab notebooks. Post-lab quizzes will begin no later than 3:40 PM and handed in no later than 4:00 PM. If lab notebooks are completed and checked before 3:40 PM, then the quiz may then be taken. (Students may use only their calculators, lab notebooks, and lab manuals on the quiz.)

FINAL EXAM

A written exam will be given during finals week on Monday, May 8th from 6:30-8:30 PM in the lab room (RBH 105). The exam will be based entirely on information in the lab manual and in a student's well-kept lab notebook. Students may use their lab manuals and notebooks during the exam.

ACADEMIC HONESTY

Everyone can learn from the ideas, interpretations, struggles, and even mistakes of one's classmates. In lab, students are expected to work together, explain things to each other, argue, and even compare answers. BUT each student must hand in only that work which reflects his/her own personal understanding of the experiment and its interpretation; else the offending student is plagiarizing. For example, if one is looking at a copy of someone else's work (another student's, the professor's, or the lab handout writer's) while writing his/her lab notebook entry or other written assignment, that is plagiarism. Don't do it! A student should keep working until he/she understands the material well

enough to write his/her own explanations independently of such crutches. Doing so is not only the honest approach, it also prepares students for performing well on individual assessments, such as the final exam.

ACCESSIBILITIES ACCOMMODATIONS

A student with a disability who thinks he or she may need an accommodation to access a campus program, activity, or service should contact Erin Salva in Student Accessibility and Support Services (SASS) at salvae@kenyon.edu to discuss specific needs. Advance notice is required to review documentation, evaluate accommodation requests and provide notice or arrangements for any accommodation.

TITLE IX RESPONSIBILITIES

As a member of the Kenyon College faculty, I am concerned about the well-being and development of students, and am available to discuss any concerns. However, know that faculty members are legally obligated to share certain information with the College's Civil Rights & Title IX coordinator. This is to ensure the student's safety and welfare is being addressed. These disclosures include, but are not limited to: reports of discrimination or harassment due to a protected characteristic, sexual harassment, sexual assault, relational/domestic violence, and stalking. For confidential support, contact the following resources: The Health and Counseling Center, Sexual Misconduct Advisors (SMAs), and the College chaplain.