

**PHYS 102**  
**Electricity & Magnetism (with Lab)**  
**Summer 2022**

**Purpose and Objectives of the Course:**

This course serves as a calculus-based introduction to electricity and magnetism. You will learn about how matter becomes charged, and about the physical interactions between charges as described by Maxwell's Equations. Applications to basic circuit elements in both DC and AC circuits will also be addressed:

- Learn the basic principles of physics.
- Be able to apply these principles to realistic situations.
- Develop the logic and critical thinking skills that will benefit students in their future professional pursuits.

**Note:** All times stated for this class, including meeting times and due dates for assignments and exams, are in Central Daylight Time (CDT).

**Instructor:** Michael T. Cone  
**E-mail:** [michael.t.cone@rice.edu](mailto:michael.t.cone@rice.edu)

**Weekly Zoom Meetings:** 10:30 am - 12:05 pm MTWR (see below for details)  
**Lecture Location:** Online

**Office Hours on Zoom:** Mon., Tues. and Thurs. 1:00 pm – 3:00 pm  
(Additional times by appointment)

**Laboratory Schedule:** There will be eight online laboratory experiments. We will discuss the schedule and due dates for the labs during the live meeting on the first day of class. See the third page of the syllabus for more details on the labs.

**Textbook:** Physics for Scientists and Engineers, 10th edition, by Serway and Jewett. ISBN-13: **978-1337553278**  
(You will need to purchase a package deal for the textbook that includes a WebAssign online homework subscription. The easiest/cheapest option is to subscribe to Cengage Unlimited: 4-month option), <https://www.cengage.com/>.  
Note: We will discuss textbook and WebAssign purchase options on the first day of class. (This is the same text used for Physics 101)

**Online Homework:** WebAssign, Class Key: **rice 3834 6982**

**Calculator:** Any calculator with logarithms and trigonometric functions

**Grading Policy:**

The final course grade will be calculated using the grading breakdown listed below.

<b>Grade Breakdown:</b>	Participation	10%
	Laboratory	15%
	Online Homework	15%
	Pledged Homework	15%
	Midterm Exam	20%
	Final Exam (Comprehensive)	25%

**Grade Cut Offs (tentative):**

<u>Percent Score</u>	<u>Letter Grade</u>
<b>90</b>	<b>A-</b>
<b>80</b>	<b>B-</b>
<b>70</b>	<b>C-</b>
<b>60</b>	<b>D-</b>
<b>&lt; 60</b>	<b>F</b>

*Note:* These cutoffs represent the minimum grade that you are guaranteed assuming your course grade is greater than or equal to the percentages listed above.

**Lecture Schedule for Physics 102, Summer 2022**

<b>Week/(Date)</b>	<b>Topics</b>	<b>Textbook Chapters</b>
<b>7/04*</b>	Charge, Electric Fields, Gauss's Law <small>*Note: July 4<sup>th</sup> is a holiday (no classes)</small>	22, 23
<b>7/11</b>	Electric Potential, Capacitance and Dielectrics,	24, 25
<b>7/18</b>	Current and Resistance, Direct-Current Circuits	26, 27
<b>(7/21)</b>	<b>Midterm Exam (100 minutes, Online)</b>	<b>Covers chapters 22 – 27</b>
<b>7/25</b>	Magnetic Fields, Sources of the Magnetic Field	28, 29
<b>8/01</b>	Faraday's Law, Inductance	30, 31
<b>8/08</b>	Alternating-Current Circuits, Maxwell's Equations	32
<b>(8/11)</b>	<b>Final Exam (Three hours, Online)</b>	<b>Comprehensive</b>

## **Laboratory Schedule for Physics 102, Summer 2022**

Meeting location: Online Using Pivot Interactives (See details below)

<b>Lab #</b>	<b>Online Laboratory Experiment</b>
<b>1</b>	Error & Uncertainty/Electrostatic Phenomena
<b>2</b>	Electric Field Mapping
<b>3</b>	Circuits and Resistivity
<b>4</b>	Analyzing RC Circuits
<b>5</b>	Deflection of Electrons
<b>6</b>	Ampere's Law
<b>7</b>	Electromagnetic Induction
<b>8</b>	RLC Circuits

### **Coursework Details**

#### **General Format of the Class**

This class will be a mixture of asynchronous (pre-recorded) lecture material and live discussion meetings (given via Zoom). The pre-recorded lecture videos and the Zoom meeting information will be available through the course Canvas page. The live discussion meetings will be held during the scheduled class time and will also be recorded, with the links will be posted on the course Canvas page after each session. Any needed schedule updates will be posted on Canvas.

The pre-recorded lectures will cover basic course content as well as examples and demos. The live discussion meetings will focus on conceptual questions, and more challenging example problems. Students are expected to participate in the discussion meetings, and this participation will account for 10% of the overall course grade. If you are unable to attend the live discussion meetings, then you should contact me so we can discuss how to handle the participation aspect of the course.

#### **Online Laboratory (15%)**

The laboratory component for this course will be fully online and will be administered via Pivot Interactives (<https://www.pivotinteractives.com/>). All students will be required to purchase a 1-term Pivot Interactives account so they can access and complete the lab assignments. We will discuss details on signing up for Pivot Interactives and the online lab schedule during the live Zoom meeting on the first day of class.

The labs will be composed of videos of experimental setups, provided data, simulations and activities to be performed online. The goal of the labs is to develop experimental and analytic skills, as well as the ability to analyze data and determine uncertainty. Performing the online laboratory experiments is very important and missing a laboratory assignment is a prescription for loss of credit.

## Online Homework (15%)

Regular online homework assignments will be posted on the WebAssign website <https://www.webassign.net>. If you do not already have access to the WebAssign website, you will need to purchase an access code in order to gain access to the online homework sets and to submit homework (with Cengage Unlimited your code will be good for both PHYS 101 and PHYS 102). To get access to the online homework for this course, you will also need the Class Key: **rice 3834 6982**.

The homework problems are selected to help you prepare for the pledged problems and exams. You are encouraged to discuss these problems with fellow students and the course instructor, but you need to work out the final answers for yourself.

## Pledged Homework (15%)

Weekly pledged homework sets will be also be administered via WebAssign. These will be timed assignments and students will have a time window within which to complete the assignment. These problems are intended to give you some experience in working, **completely on your own**, problems that you may not have seen before and that are typical of those that will appear on exams. **In working on the pledged homework problems, you may consult your own notes, problem solutions I have posted, your own textbook, and a calculator; all other resources are banned.** Late submissions will not be accepted.

## Midterm Exam (20%)

The midterm exam will be a 100-minute online exam administered via WebAssign. It will be made available on Thursday, July 21<sup>st</sup> and students will have a time window (~12 hours) within which to complete the exam. The midterm exam will test you on materials covered during the first half of the course. For both the midterm and the final exam, **you may consult your own notes, problem solutions I have posted, your own textbook, and a calculator; all other resources are banned.**

## Final Exam (25%)

The final exam will be a 3-hour online exam administered via WebAssign. It will be made available on the last day of class. Like the midterm exam, students will have a time window (~12 hours) within which to complete the exam. The final is comprehensive but it will emphasize the material covered since the midterm exam.

## Note on Grading

Significant portions of both the pledged homework and the exams will be structured in a manner that simulates partial credit. Additional details regarding the administration, structure, grading and timelines for homework, pledged homework and exams will be discussed on the first day of class. You are always welcome to consult with me if you have questions regarding grading.

## Re-grading Policy

If you feel that your work was not correctly graded, please direct your instructor's attention to the specific issues by means of an email. Submit your email as soon as possible, and no later than one

week after work was completed. I will review the grading of the part to which you direct my attention, and possibly the rest of the assignment or exam.

### **Make-ups**

Make-ups for missed pledged problems, exams or laboratories will be given at the discretion of the instructor. You can be excused without penalty or be allowed a delayed make-up on pledged problems or exams if one of the following two conditions is met:

1. You are on official university business and you notify me well beforehand.
2. You have a serious reason beyond your control, such as your own illness or a death in your family, and you get word to me immediately. As soon as possible, notify the instructor in writing or by email.

### **General Policies**

#### **The Honor code**

We expect you to uphold the ideals set out by the honor council for Rice University students. More information can be found at <http://honor.rice.edu/>

#### **Students with Disabilities**

Any student with a documented disability seeking academic adjustments or accommodations is requested to speak with the instructor during the first week of class. All such discussions will remain as confidential as possible. Students with disabilities are encouraged to also contact Disability Support Services in the Allen Center (email: [adarice@rice.edu](mailto:adarice@rice.edu), phone: 713-348-5841) during the first week of class so that timely and appropriate arrangements may be made.

#### **Diversity and Inclusion**

Historically, people of color, women, and other groups have been underrepresented in physics and astronomy. This lack of diversity has likely led to missed opportunities for exploration and discovery. While the field is now more inclusive, it is important to understand that our history impacts the current state of our field. The questions that we choose to ask in science are influenced by who is included in the scientific endeavor.

We all bring different experiences to this class. As participants in this class, both the instructor and the students should strive to honor the diversity of the class. In this class, you have a right to define your identity, but no student is ever presumed to speak on behalf of any group or anyone other than themselves. You have the right to be called by your pronouns and the name you wish. If there are aspects of this course that act as barriers to your inclusion in course content, please contact the instructor privately.

### **Standard Disclaimers**

The instructor has the authority to rule on any point not covered in this syllabus. The syllabus is subject to change at the discretion of the instructor. Students will be notified before any changes take effect.