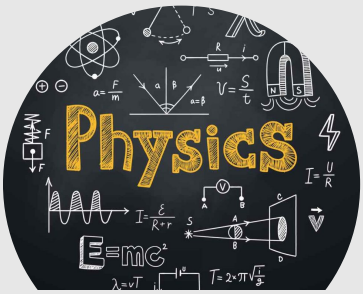

Gen. Physics II

Physics 123

Instructor Info

Paul Nakroshis
Office Hrs: By Appointment
Science 224
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Course Info

Pre-Req: MAT 152
Mon, Wed, & Thu
09:00-11.30
Science 165

Phy 116 Lab Info –

Tuesday
09:00 - 12:30
Sci C277

University of Southern Maine Summer 2025

Overview

Physics 123 is a calculus-based introductory physics course that focuses on electricity and magnetism, and optics. Because this is the second semester of general physics, I assume that everyone is familiar with differential and integral calculus, so the general mathematical level of this course will be more rigorous than in physics 121. I expect you to attend class, read the textbook (or any calculus based physics text you would like), and most importantly, *work carefully through each homework problem assigned, or as many as possible :-)*. I cannot emphasize enough the importance of struggling with each homework question, and to come and see me for help.

You must have passed Physics 121 with a C or better (or its equivalent) in order to enroll in Physics 123. This is a difficult class that will require you to work hard to succeed. As a summer course, you should expect to spend at several hours per day on homework in this class.

Material

Required Texts

Randall D. Knight *Physics for Scientists and Engineers; 5th Edition.*

Grading Scheme

200 pts	Homework: Collected at end of term
200 pts	Exam 1: 5 Jun 2025
200 pts	Exam 2: 18 Jun 2025
200 pts	Exam 3: 3 Jul 2025
200 pts	Quizzes: 22 May, 29 May, 12 Jun, 26 Jun

Grades will follow the standard scale: A = 930-1000; A- = 900-929; B+ = 870-899; B = 830-869; B- = 800-829; C+ = 770-799; C = 730-769; C- = 700-729; D = 600-609; F <60.

Attendance/Participation

I expect that all of you will attend class and actively participate; if you are late to class or miss a class when a test is given, you will not be given a makeup exam and will receive a zero. NO EXCEPTIONS except in documented extenuating circumstances. At the end of the semester, I will pro-rate your lowest exam score by replacing it with the average of all three hour exam scores.

Learning Objectives

- Build and demonstrate a conceptual understanding of the topics in the course.
- Be able to solve problems and explain your reasoning by appealing to the relevant physical concepts.
- Be able to write excellent homework solutions that lead the reader through your solution; homework problems should include a statement of questions and your solution including figures and text.
- Demonstrate your quantitative and qualitative understanding on quizzes and exams.

FAQs

How do I do well in this course?

Several things come to mind: (1.) Put away all your electronic devices in class. (2.) Take detailed neatly written handwritten notes. (3.) Work as many homework problems as possible, and write detailed solutions with English (of French) explanations in a homework notebook.

What does a *good* homework solution look like?

Imagine you are a student at another university who is stuck on the problem and write a solution in a conversational fashion explaining—using complete sentences and figures—how to think about and work through the problem. Your homework notebook should read like your ideal homework solution manual.

Isn't that too much work?

It is more work than simply scribbling equations down. But learning physics means being able to think clearly and be able to explain the solution to a problem. My goal is to help you build a structure in your mind about how the physics we study works, and for you to be able to explain that understanding.

Do I need a fancy calculator for this course?

No. You can buy a Casio fx-115ES Plus 2nd Edition online for $17.39. Any scientific calculator will likely suffice, and a graphing calculator is not necessary. As with any calculator, you need to know how to use it :-)

Make-up Policy

Make-up quizzes and exams will only be allowed for students who have a substantiated excuse approved by the instructor *well before the due date*. Leaving a phone message or sending an e-mail or text without confirmation is not acceptable.

Diversity and Inclusivity Statement

I consider this classroom to be a place where you will be treated with respect, and I welcome individuals of all ages, backgrounds, beliefs, ethnicities, genders, gender identities, gender expressions, national origins, religious affiliations, sexual orientations, ability - and other visible and non-visible differences. All members of this class are expected to contribute to a respectful, welcoming and inclusive environment for every other member of the class.

Accommodations for Students with Disabilities

The university is committed to providing students with documented disabilities equal access to all university programs and services. If you already have approved accommodations through the USM Disability Services Center, please fill out a Semester Request Form on Accommodate to share your accommodations letter with me. If you need to request accommodations based on a disability, please submit a Student Accommodations Request through the Disability Services Center. Timely notification is essential. The Disability Services Center can be reached at 207-780-4706 or dsc-usm@maine.edu.

Academic Integrity

The University Code of Academic Integrity is central to the ideals of this course. Students are expected to be independently familiar with the Code and to recognize that their work in the course is to be their own original work that truthfully represents the time and effort applied. If you cheat on an exam or a quiz, you will be given a grade of F for the course. In addition—since many of you will also concurrently enroll in the laboratory course (Physics 116), you should know that the same rules of academic integrity apply. Plagarism is unacceptable and will result in a failure for the course.

Assessment and Exam rules

Your grade for this course will be determined by your score on 3 exams, homework & quizzes. To do well on these exams, you will have to work through many homework problems; homework assignments are listed at the end of this syllabus.

Exams will consist of conceptual and quantitative questions (perhaps with multiple parts) where you have to show and explain your reasoning. Partial credit will obviously be awarded when possible. Due to the pace of summer school, there will be no comprehensive final.

You MUST take every exam. If you do not take an exam, it will count as a zero. No makeup exams will be given unless they are extremely extenuating circumstances or you have pre-arranged due to a conflict (forgetting that there was an exam doesn't count as an extenuating circumstance). I will, however, replace your lowest exam score with the average of your three exam scores.

You may have one letter or A4 sized paper with crib notes and you may use a scientific or graphing calculator. No cell phones or web enabled devices may be on or at your desk during the exam. Before taking the exam, you may take a bathroom break, but once the exam has begun, you may not leave until finished.

Class Schedule

Part 1: Electrostatics, Current & Resistance

Week 1	Ch 22 and 23	Electric Charges & Forces; The electric field.
	Exercises & Problems:	Ch 22: 5, 13, 17, 19, 29, 35, 39, 45, 67, 79
		Ch 23: 1, 9 , 15, 25, 29, 45, 49, 53, 69
	QUIZ #1	Thursday 22 May at end of class
Week 2	Ch 24 & 25	Gauss' Law and Electrostatic Potential
	Exercises & Problems:	Ch 24: 3, 7, 9, 11, 21, 25, 37, 47, 57*, 59*
		Ch 25: 1, 5, 7, 11, 13, 17, 23, 31, 35, 37, 41, 55, 73, 82
	QUIZ #2	Thursday 29 May at end of class
Week 3	Ch 26 & 27	Potential & Field, Current & Resistance
	Exercises & Problems:	Ch 26: 1, 11, 17, *21*, 25, 27, 33, 35, 39, 43, 57, 80
		Ch 27: 1, 9, 13, 25, 27, 33, 49, 73
	EXAM #1	Thursday 5 Jun at end of class

Part 2: DC Circuits & Magnetism

Week 4	Ch 28 & 29	DC Circuits & The Magnetic Field
	Exercises & Problems:	Ch 28: 1, 3, 5, 7, 13, 17, 21, 27, 31, 33, 37, 53, 65
		Ch 29: 1, 13, 21, 27, 35, 39, 43, 59, 79
	Quiz #3	Thursday 12 Jun at end of class
Week 5	Ch 30, 31 & 32	Electromagnetic Induction & Electromagnetic Fields & Waves
	Exercises & Problems:	Ch 30: 5, 7, 9, 11, 13, 19, 37, 41, 47
		Ch 31: 11, 13, 17, 23, 57, 58
	EXAM #2	Thursday 19 Jun at end of class

Part 3: Optics

Week 6	Ch 33	Wave Optics & Geometric Optics
	Exercises & Problems:	Ch 33: 1, 3, 7, 9, 11, 19, 21, 31, 47, 59, 65
		Ch 34: 1, 5, 7, 9, 11, 13, 16
	Quiz #4	Thursday 26 Jun at end of class
Week 7	Ch 34 & 35	Geometrical Optics & Optical Instruments
	Exercises & Problems:	Ch 34: 21, 25, 27, 31, 33, 37, 39, 41, 55, 65, 75
		Ch 35: 1, 3, 9, 15, 25, 27
	EXAM #3	Thursday 3 Jul at end of class