

WINTHROP UNIVERSITY
PHYS 212 Course Syllabus
Department of Chemistry, Physics, Geology and the Environment

Semester: Spring 2026 **Course:** PHYS 212 - Physics with Calculus I

Credit hours: 4 **Pre-requisite:** A grade of C or better in MATH 201

Co-requisite: [PHYS 212L](#)

Lecture: MWF 11:00-12:15 Section 002, SIMS 209

Professor: Dr. Fatima Z. Amir

Office: 203, SIMS, **Office Hours:** W 1-3, or by appointment.

Phone: 323 4935, E-mail: amirf@winthrop.edu

Textbook: Giancoli- Physics for Scientists and Engineers with Modern Physics, 4th Edition, Pearson.

Laboratory: Students need to register for one of the lab sections, [PHYS 212L](#).
Physics laboratory will start on Jan. 26.

Course Description:

The PHYS 211-212 sequence covers the major branches of classical physics: PHYS 211 deals mostly with mechanics and wave motion while PHYS 212 covers thermodynamics, electromagnetism, and optics. The course emphasizes on understanding of fundamental physics concepts and principles as well as the development of conceptual and analytical problem solving skills by using physics concepts, principles, and mathematics in the solution of various interesting and challenging real world problems. This course should also help you review and master your algebra, trigonometry, and enable you to appreciate your calculus by putting it to work in physics.

Course Objectives:

- Develop an understanding of physics' role as the most basic of the sciences.
- Demonstrate an understanding of the history of scientific discovery.
- Learn the introductory physics concepts associated with electricity, magnetism and optics.
- Gain an understanding of physics' role in technology and in everyday life and to discuss the strengths and limitations of science.
- Learn how to design and carry out introductory physics experiments.
- Learn how to use computers for data collection & analysis and graphing.
- Draw conclusions for the experiments and write laboratory reports.

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General Education Requirements: PHYS 212 and the co-requisite PHYS 212L together fulfill four hours of general education requirement for natural sciences. Listed below are the seven fundamental student's learning outcomes for natural science courses as well as examples of how they will be fulfilled in PHYS 212 and 212L.

Students will be:

1. Conversant with a few fundamental concepts from among the three main areas of natural science, including earth, life, and physical sciences. (*e.g., electricity and magnetism, and optics*)
2. Able to apply the scientific methodologies of inquiry. (*e.g., experiments and investigations in the PHYS 212L laboratory*)
3. Able to discuss the strengths and limitations of science. (*e.g., experimental error and analysis in the PHYS 212L laboratory*)
4. Able to demonstrate an understanding of the history of scientific discovery. (*e.g., topics and devices are introduced with historical perspectives*)
5. Able to discuss the social and ethical contexts within which science operates. (*e.g., environmental and health hazards of new devices and materials and sharing of knowledge*)
6. Able to communicate about scientific subjects including (lab courses only) the defense of conclusions based on one's own observations. (*e.g., PHYS 212L laboratory reports*)
7. Able to discuss the application of scientific knowledge to the social sciences and to non-scientific disciplines. (*e.g., application of technology in everyday life*)

University-Level Competency: Physics with calculus I introduces students to the role of scientific reasoning in solving introductory physics problems using calculus (e.g. describing motion and calculating force, forces involved in circular motions, how automobile air bags reduce injury during a collision, rocket motion where the mass changes with time, and describing wave motion). They will apply the scientific methodologies of inquiry during the laboratory, PHYS 211L, and write well-reasoned conclusions. They will also be introduced to the history of scientific discovery (e.g., topics and devices are introduced with historical perspectives) and learn that the theories in physics evolve into laws after continuous re-evaluations and arguments. In addition, they will see how the scientific advances made in a laboratory transform into useful technological devices (e.g., the development of the transistor from vacuum tube to silicon chip).

Attendance: Although roll is not formally taken in class, I strongly recommend regular attendance. The course has a significant component of interactive learning, and the activities done in class reinforce the material discussed. If there is a reason that you must miss class, please talk

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with me to make arrangements to cover the material. The attendance policy described in the Winthrop University undergraduate catalog will be followed.

Students with Disabilities/Need of Accommodations for Access: Winthrop University is committed to providing access to education. If you have a condition which may adversely impact your ability to access academics and/or campus life, and you require specific accommodations to complete this course, contact the Office of Accessibility (OA) at 803-323-3290, or, accessibility@winthrop.edu. Please inform me as early as possible, once you have your official notice of accommodations from the Office of Accessibility.

Academic Dishonesty/Plagiarism: Collaboration on assignments is welcome, but please keep in mind that your final, turned-in work should be your own and not copied. However, no form of cheating/plagiarism will be tolerated in this class. If anyone is suspected of academic dishonesty, I will privately speak with them in an attempt to reach a solution to whatever the problem is. If anyone is without doubt determined to be cheating on a given assignment/test and no resolution can be offered, *negative credit will be given*. In extreme cases, the Department and/or College administration will become involved. The policy on student academic misconduct is outlined in the “**Student Conduct Code Academic Misconduct Policy**” in the online *Student Handbook*: (<http://www2.winthrop.edu/studentaffairs/handbook/StudentHandbook.pdf>)

No use of generative AI tools permitted: In this course every element of the class assignments must be fully prepared by the student. The use of any generative AI tools for any part of your work will be treated as plagiarism. If you have questions, please contact me

Course Communication:

1. Be sure to check your Winthrop email account daily, as I may send out course related announcements that will come **only** to Winthrop email addresses.
2. If you email me, please be sure to use your Winthrop email account I will respond to email within 24 hours except from Saturday morning through Sunday afternoon when my response may be slower.

Class Policy:

Recitation: There will be one-hour recitation on Friday during class time.

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Quizzes: Every Friday during recitation, there will also be group quizzes, the group quizzes will be 25-45 minutes long and there will be 4 to 5 problems on the chapter covered during the week.

Homework: You will be assigned problems every week. These are no take home exams. You are encouraged to work the problems with your classmates as long as there is contribution from each one of you.

Homework problems **are due on the dates indicated on the class calendar.** Your work is due on time, with the exception of reasonable **documented** excuses. **Late work will be docked 50% of face value and 100% after solutions have been posted. If I notice that the homework is copied from the solutions manual, it will not be graded, and the 5% homework's grade will be added to the exams grade.**

For any questions regarding assignment or any topics covered in class, you are encouraged to come for help during office hours. If you cannot make office hours, please email me, and I can meet you any time that works for you.

Exam Policy: **There are four in class exams that are 75 minutes' duration.** Notes and your book are not allowed during the exam. All relevant equations and physical constants will be provided. If you are going to miss a test, you **must notify me in advance (preferably one week) so alternate arrangements can be made. If you miss a test and your absence is not excused, a grade of zero points must be assessed for that particular piece of work.** You must take all four in-class exams in order to pass the course.

Syllabus change policy: The instructor will make changes to this syllabus as deemed necessary for the progression of the course.

Grading:

Homework 5%

Four in Class exams 15% each

Quizzes 10%

Lab 25%

The letter grade will be assigned as follows:

100% - 93% = A; 92.9% - 89% = A- ; 88.9% - 86% = B+; 85.9% - 80% = B; 79.9% - 76% = B-
75.9%-73% = C+ ; 72.9% - 67% = C ; 66.9% - 64% = C-; 63.9%-60% = D; 59.9%- 0% = F