

Physics 201 – Applied Principles of Physics I – Spring 2022

Course Instructor: Mick Veum

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(Note that the Lab Instructor is Prof. Brad Hinaus)

Office Hours for Mick Veum: B207 SCI

Tues, Thurs 9:00 to 10:50 a.m.

(or by appointment)

These are for your benefit. Use them!!

Course Description and Objectives: Physics 201 serves as an introduction to “classical mechanics” and is aimed at students with majors in Natural Resources. In a nutshell, classical mechanics is the study of how forces influence the motion of objects as predicted and explained by the laws of Isaac Newton, among other scientists. The subject is far too vast to fit into a single semester of study, let alone a single paragraph. We will focus on *kinematics* (the study of motion) and *dynamics* (the study of how forces affect motion), which will then allow us to apply those principles to the physics of *fluids*. The topics will not significantly vary from those included in a typical high-school physics class, **BUT the intensity will be greater.** Physics is a way of thinking and an approach to problem-solving as much as it is a body of knowledge. We won't simply strive to memorize the “facts.” We will also strive to become proficient at thinking like a physicist. Rather than just regurgitating information, you will continually apply your knowledge to new situations in order to solve unique problems.

One of the challenges of studying physics is to understand the language. Many of the terms and phrases, such as force and power, are used in everyday conversation, often interchangeably and incompatibly with the strict physics usage. In physics, such words have specific and unambiguous meanings, and it is a task in and of itself to learn to use the words correctly. We will strive to become proficient in the use of physics vocabulary. In addition, it is often said that mathematics is the language of physics. We will continually use mathematics as a tool for describing physical situations. Therefore, in order to succeed in this class, it will be necessary to become skilled in communicating physical ideas through both prose and mathematical expressions.

Physics in the Broader Context of a Well-Rounded Education: In addition to the objective of studying physics in and of itself, physics will be a vehicle to expand perspectives and develop thinking skills. There will be aspects of this course common to all courses at UWSP. Emphasis will be placed on the following:

Verbal and Written Communication: Herein, the entire evaluation of your performance lies. To receive credit, you must convey your ideas. Without effective communication, thoughts, no matter how profound, wither and die.

Abstract Reasoning: Physics is a beautiful union between lofty, abstract thinking and concrete, mundane observation. Your ability to use such reasoning will be encouraged through concept-based questions.

Quantitative Analysis: In the end, no physical theory is useful if it cannot numerically predict or interpret a specific situation. Thus, the quantitative nature of physics will be a significant component of all aspects of this course.

Decision Making: Part of the inherent richness of physics is that for any given problem, there are numerous appropriate approaches, each with its own merits and drawbacks. You will rarely be specifically told how to approach homework problems, exam problems, or labs. Instead, the onus will be on you to decide your approach.

Historical Consciousness: There are no ivory towers. No subject is an island. As with any discipline, one must always take into account the historical and societal setting in which the knowledge was created. The text includes some historical allusions, and I will do my best to provide such information as the material is presented.

Text: Physics, 5th Edition by James S. Walker.

Lab Manual: There is nothing to pick up at the bookstore for lab. We will provide materials and information during the semester. *Lab meetings will begin in the second week of classes.*

Calculator: You will need a basic scientific calculator that is portable for use both in and out of class sessions. The calculator need not be a fancy graphing calculator, but it must be capable of calculating basic trig, exponential, and logarithmic functions. Since cell phone use is not allowed during class (see below), a cell phone cannot serve as your in-class calculator.

Cell Phone Use: The use of cell phones is not allowed during class sessions. Cell phones must be turned off and put away during all class sessions.

Tentative Course Schedule (subject to change): The material of this course will draw strongly from the text, covering chapters 1-3, 5-8, and 15. We will do some jumping between chapters as shown below. More detailed information will be provided as the semester progresses.

Week	Mon Date	Lecture Subjects	Chapters	HW Number	Lab Number
1	1/24/22	Syllabus, unit conversion, motion in 1-D	1, 2	No HW due	No lab meeting
2	1/31/22	Motion in 1-D	2	1	1
3	2/7/22	Free fall	2	2	2
4	2/14/22	Vectors	3	3	3
5	2/21/22	Force, mass, and acceleration	5	4 (Not due)	Exam 1 during lab
6	2/28/22	Newton's 1 st and 2 nd laws	5, 6	No HW assigned	4
7	3/7/22	Applying Newton's laws	6	5	5
8	3/14/22	Newton's 3 rd law, force as a vector	6, 5	6	6
N/A	3/21/22	Spring Break!!!!!!!!!!!!!!!!!!!!			
9	3/28/22	More on applying Newton's laws: friction, inclined planes, pulleys, circular motion	6	7	7
10	4/4/22	Work, kinetic energy	7	8 (Not due)	Exam 2 during lab
11	4/11/22	Power, potential energy	7, 8	No HW assigned	8
12	4/18/22	Conservation of energy	8	9	9
13	4/25/22	Intro to fluids	15	10	10
14	5/2/22	Buoyancy in fluids	15	11	11
15	5/9/22	Fluid flow	15	12 (Not due)	No lab meeting

Grade Evaluation: Your grade will be computed based upon your performance in three areas: homework, labs, and examinations (*see below*).

Homework: Roughly ten homework problems will be assigned on a weekly basis and will be submitted for grading (There will also be roughly ten suggested conceptual questions for you to consider). I will use Canvas for homework submission. The total score on your homework assignments will count toward 12% of your final grade in the class. **Only two of the assigned problems will be graded. The graded problems will be chosen at random after the due date.** Solutions to the homework assignments will be provided after the due date. While I encourage you to discuss homework problems with your classmates, your final write-up should be **your own** work, should be written in **your own** words, should represent **your own** understanding of the material, and should **not** be shared directly with other students. If you have any questions as to what constitutes acceptable collaboration, please see me. Copying the solution from the internet is also not acceptable. **In order to earn full credit for a homework problem, you must show your work and include explanations of your approach. Being able to effectively communicate the solution to a problem is an important course objective.** On the weeks with an exam, you will not turn in your homework. I will provide solutions for you to use in preparing for the exam. **Problems will not be accepted late, but your assignment with the lowest score will not count toward your semester grade. The drop-grade is intended to allow for unforeseen circumstances such as an illness. It is highly recommended that you reserve your drop-grade for such a purpose.**

Laboratory: There will be eleven graded laboratory sessions during the semester. Each session will be of equal weight, and labs will contribute to 13% of your semester grade. *One lab score is dropped.* This drop-grade is intended to allow for unforeseen circumstances such as an illness. It is highly recommended that you reserve your drop-grade for such a purpose. I should note that **THE EASIEST WAY BUILD POINTS TOWARD YOUR SEMESTER GRADE IS THROUGH LAB AND HOMEWORK BECAUSE THAT IS WHEN YOU CAN GET HELP WITH THE ASSIGNMENT. SET A GOAL TO DO WHAT IT TAKES TO ACE LAB AND HOMEWORK!! IT WILL ALSO PREPARE YOU FOR EXAMS!!**

Examinations: There will be two midterm examinations of two hours each and a final of two hours. Each will be worth 25% of your final grade (see “Grade Calculation” below).

Exam Schedule:

Exam 1 During lab in the week of February 21 (Week 5), location TBA
 Exam 2 During lab in the week of April 4 (Week 10), location TBA
 Exam 3 (final)..... Tues. **May 17**, 12:15-2:15 p.m. in lecture room

Semester Grade Calculation:

Homework	12 %
Labs	13 %
Exams (3 @ 25% each)	75 %
Total	100 % (Interesting how math can work sometimes)

Your grades on individual assignments will be posted periodically on Canvas (updated every 2-3 weeks). If you have any questions on the grades posted, please contact me immediately so any errors can be corrected. The scale for the final semester grade is shown to the right.

A	93-100%
A-	90-92.99%
B+	87-89.99%
B	83-86.99%
B-	80-82.99%
C+	77-79.99%
C	73-76.99%
C-	70-72.99%
D+	67-69.99%
D	60-66.99%
F	<60%

Attendance: Attendance will not be kept for discussion sessions or lectures. *Attendance to labs and exams is mandatory and students are responsible for all material discussed and announcements made during any scheduled class meeting.* Make-up work will only be accepted in the case of excused absences. Excused absences include death in the immediate family, illness with a note from the appropriate health care professional, religious observance, an event in which you officially represent the University of Wisconsin – Stevens Point and the event directly conflicts with an exam or lab. **Excused absences must be approved with documenting materials prior to the date of absence.** Unexcused absences from a lab or exam will result in a grade of zero.

In the case of a potential conflict between class and religious observances, University of Wisconsin policy requires the student to notify the instructor within the first two weeks of class in order to expect that accommodations be made. If there is any possibility that you will miss a lab or exam due to religious observances, please notify me of the specific dates that will be missed within the first two weeks of class.

Canvas and E-mail: I will primarily use Canvas to post class materials, collect homework, and make announcements. I will set up a module each week with relevant information for the week. I will add things as the week progresses, so it is helpful to check the Canvas site regularly. Once we establish a routine, things will go smoothly. In case I need to contact you personally outside of class, I will use email. If you're not already in the habit of frequently checking Canvas or your e-mail, it will be useful to develop that habit. Email is a very reliable way to contact me outside of class.

Extra Credit: It is possible for you to earn up to 1% of extra credit applied toward your semester grade. To do so, find an article in the news that is related to the material in class. Write a one-page summary of the article and submit it to Canvas. Each article will be worth a total of 10 points. If for some reason you don't receive full credit for your summary, you can keep submitting new articles until you have a total of 10 points of extra credit. I will be rigidly adhering to the grading scale shown above, so I strongly encourage you to take advantage of this opportunity. 1% is enough to raise a person's semester grade if she or he is at the border. All extra credit assignments must be received no later than the last day of classes. I will set up an assignment on Canvas for this.