

## Physics 201 – Applied Principles of Physics I – Spring 2023

**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. I like to say, “It’s not what you know. It’s what you show.”

*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. I will rely heavily on the text for homework.

**Lab Manual:** There is nothing to pick up at the bookstore for lab. Professor Hinaus is the instructor for the lab portion of the course. He 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.

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

### **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 that are fair game for the exams. 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.
- **For each graded assignment only two of the 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 have to turn in your homework. I will provide solutions in advance for you to use in preparing for the exam.
- **Problems will be accepted late with a 25% deduction per day that it is late. Additionally, the 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.**

**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 BOTH THE LAB AND THE HOMEWORK!! IT WILL ALSO PREPARE YOU FOR EXAMS!!**

**Examinations:** There will be two midterm examinations of two hours each and a non-cumulative 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 20 (Week 5), location TBA  
Exam 2 ..... During lab in the week of April 3 (Week 10), location TBA  
Exam 3 (final)..... Thurs. **May 18**, 10:15-12:15 p.m. in the regular 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.

<b>A</b>	93.33 – 100 %
<b>A-</b>	90 – 93.32 %
<b>B+</b>	86.67 – 89.99 %
<b>B</b>	83.33 – 86.66 %
<b>B-</b>	80 – 83.33 %
<b>C+</b>	76.67 – 79.99 %
<b>C</b>	73.33 – 76.66 %
<b>C-</b>	70 – 73.33 %
<b>D+</b>	66.67 – 69.99 %
<b>D</b>	60 – 66.66 %
<b>F</b>	<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.* Remember that you are allotted one drop grade for lab and one for homework. Use those wisely. Make-up exams will only be administered in the case of an excused absence. 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 the exam. **Excused absences should be approved with documenting materials prior to the date of absence.** Unexcused absences will result in a grade of zero. If there are any extenuating circumstances that will require absences, please see your instructor ASAP.

**Canvas and E-mail:** I will primarily use Canvas to post class materials, collect homework, and make announcements. I will add be adding items as the course 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. If for some reason you don’t receive full credit for your summary (a rare event), you may keep submitting new articles until you have full 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.

**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	Homework	Lab Number	Discussion Number
1	01/23/23	Syllabus, unit conversion, motion in 1-D (velocity)	1, 2	<i>HW 1 is assigned</i>	No lab meeting	Syllabus Video
2	01/30/23	Motion in 1-D (acceleration)	2	HW 1 due	1	1
3	02/06/23	Free fall (gravity)	2	HW 2 due	2	2
4	02/13/23	Force, mass, and acceleration	5	HW 3 due	3	3
5	02/20/23	Vectors	3	HW 4 <u>not</u> due, but fair game for Exam #1	<b>Exam 1 during lab</b>	No disc. meeting
6	02/27/23	Newton's 1 <sup>st</sup> and 2 <sup>nd</sup> laws	5, 6	<i>HW 5 is assigned</i>	4	4
7	03/06/23	Applying Newton's laws	6	HW 5 due	5	5
8	03/13/23	Newton's 3 <sup>rd</sup> law, force as a vector	6, 5	HW 6 due	6	6
N/A	03/20/23	Spring Break!!!!!!!!!!!!!!!	XXXXX	XXXXXXX	XXXXXXX	XXXXXX
9	03/27/23	More on applying Newton's laws: friction, inclined planes, pulleys, circular motion	6	HW 7 <u>not</u> due, but fair game for Exam #2 Happy Spring Break!!!	7	7
10	04/03/23	Work, kinetic energy	7	HW 8 <u>not</u> due, but fair game for Exam #2	<b>Exam 2 during lab</b>	No disc. meeting
11	04/10/23	Power, potential energy	7, 8	<i>HW 9 is assigned</i>	8	8
12	04/17/23	Conservation of energy	8	HW 9 due	9	9
13	04/24/23	Intro to fluids	15	HW 10 due	10	10
14	05/01/23	Buoyancy in fluids	15	HW 11 due	11	11
15	05/08/23	Fluid flow	15	HW 12 <u>not</u> due, but fair game for final exam	No lab meeting	12
<b>Final Exam on Thursday, May 18, 10:15 AM – 12:15 PM, A113 SCI (Lecture Room)</b> <b>Have a Great Summer!!!</b>						