

## Physics 204 – College Physics II – Fall 2020

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**Office Hours:** On Zoom

Tuesday, Thursday, Friday 10:00 to 10:50 am  
(or by appointment)

**These are for your benefit. Use them!!**

**Course Overview:** Physics 204 is the second semester of an introduction to physics aimed at a variety of majors, including biochemistry, pre-medicine, health science, and secondary education. To varying degrees, we will study *electric forces and energy, circuits, magnetism, light & optics, and atomic & nuclear physics*. 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 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.

This course satisfies the learning outcomes for the Natural Science component of the General Education Program. Upon completing this course students should be able to:

- Explain major concepts, methods, or theories in the natural sciences to investigate the physical world.
- Interpret information, solve problems, and make decisions by applying natural science concepts, methods, and quantitative techniques.
- Describe the relevance of aspects of the natural sciences to their lives and society.

**Tentative Course Outline (subject to change):** The material of this course will mostly follow that of the text, covering roughly one chapter per week. We will skip some chapters as shown below. I will not assign lab activities on the weeks with an exam nor during the week of Thanksgiving. Each week you will be provided much more detail than is shown in this rough outline of our schedule.

Week	Monday Date	Subjects	Chapters	Lab Number
1	8/31/20	Syllabus, Electric Charge and Forces, and Fields	19	1
2	9/7/20	Electric Fields and Potential	19, 20	2
3	9/14/20	Electric Potential Energy	20	No Lab (Exam 1 on 9/18)
4	9/21/20	Electric Current and DC Circuits	21	3
5	9/28/20	Magnetism	22	4
6	10/5/20	Magnetic Flux and Induction	23	No Lab (Exam 2 on 10/9)
7	10/12/20	AC Circuits and Capacitors	24	5
8	10/19/20	Electromagnetic Waves	25	6
9	10/26/20	Reflection and Refraction of Light	26	No Lab (Exam 3 on 10/30)
10	11/2/20	Lenses and Mirrors: Ray Tracing	26	7
11	11/9/20	Optical Instruments	27	8
12	11/16/20	Interference and Diffraction of Light	28	No Lab (Exam 4 on 11/20)
13	11/23/20	Atomic Physics	31	No Lab (Thanksgiving)
14	11/30/20	Atomic Physics	31	9
15	12/7/20	Nuclear Physics	32	10
16	12/14/20	Finals Week	N/A	Final on 12/17

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

**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.

**Canvas:** Course materials and activities will be organized and posted on Canvas. I will be breaking things up into “modules” where each module corresponds to a class session. I will provide details as we go. Once we establish a routine, things will go smoothly. Never hesitate to ask for clarification with any part of the course. You will need to get in the habit of checking Canvas regularly (at least daily is recommended).

**Lectures:** Lectures will be live on Zoom, but I will also be recording and posting links to the lectures on Canvas. Attendance is encouraged but not required. An office hour will immediately follow each lecture, and so I will just keep the Zoom session going. Days of the exams will be an exception. On occasion, I might prerecord and post a lecture in advance. On those days, I will be available on Zoom for office hours during the lecture time.

**Discussion:** The “discussions” will be used for me to demonstrate problem solving. This part of the course will be asynchronous (not live). I will provide you a few practice problems, and I will prerecord myself solving the problems. You are encouraged to try solving the problems before watching the video solutions, but you should do what works best for your learning style. This approach models how I would have run face-to-face discussion sessions if we were not in a pandemic.

**Labs:** Labs will also be virtual and asynchronous. We will be trying out a cool product called Pivot Interactives that provides us access to a library of online, interactive physics labs and supporting materials. Much more detail will be given on Canvas with each of the lab modules. While you will turn in your own work, you are allowed to work with your classmates if that is a possibility for you. This will be my first time using Pivot Interactives, and I am really excited to give these a try.

There will be ten graded lab assignments during the semester. Each will be of equal weight, and labs will contribute to 21% of your semester grade. **Be warned:** Since this course satisfies a lab requirement, it is necessary to pass the lab portion alone in order to pass the course. In other words, if your lab average is below 60% you fail the course regardless of your exam averages. There are no lab assignments during the weeks of exams nor during the week of Thanksgiving.

**Exams:** Exams will be open-book and open-notes. Exams will be administered during lectures on select Fridays. The exams will be written to take 50 minutes, but you will be provided an additional 30 minutes to handle the uploading of files on Canvas. I will accommodate alternate times in the case of schedule conflicts. You will be on your honor not to collaborate with anyone while taking the exams.

There will be a total of five examinations. Four of them will be the 50-minute exams given during the scheduled lecture time. The fifth exam will be administered during the scheduled final examination period. The final will have two parts. One part will be similar in format to the previous four exams, testing you on material since Exam 4. There will also be a second part that is cumulative for the semester. It too will be in the same format as previous exams. Much more info will follow on Canvas.

**Homework:** At each lecture, I will assign roughly three practice problems and three conceptual questions. These will not be collected, but they will be chosen to prepare you for the exams. Solutions will be provided. It will be important to work regularly on homework so you don't fall behind.

**Practice Assignments:** You may already know how to submit assignments on Canvas, but we will do two practice runs so that exams go smoothly. These will be the easiest points to earn all semester.

**Exam Schedule:**

Exam 1 ..... Fri. Sep 18, during lecture  
Exam 2 ..... Fri. Oct 9, during lecture  
Exam 3 ..... Fri. Oct 30, during lecture  
Exam 4 ..... Fri. Nov 20, during lecture  
Exam 5 (final) ..... Thurs. Dec 17, 2:45 to 4:45 pm

**Semester Grade Calculation:**

Labs 21 %  
Midterm Exams (4 @ 13% each) 52 %  
Final Exam (13% for each part) 26%  
Two Practice Assignments (0.5% each) 1 %  
Total 100 % (Crazy how that works)

Your grades on labs and exams 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>	93-101%
<b>A-</b>	90-92.99%
<b>B+</b>	87-89.99%
<b>B</b>	83-86.99%
<b>B-</b>	80-82.99%
<b>C+</b>	77-79.99%
<b>C</b>	73-76.99%
<b>C-</b>	70-72.99%
<b>D+</b>	67-69.99%
<b>D</b>	60-66.99%
<b>F</b>	<60%

**E-mail:** I will use email to send out all sorts of important class-related information, and I will also be posting those announcements on Canvas. **Email is the most reliable way of getting in touch with me outside of class. When you have questions or concerns, shoot me an email message.** If you're not already in the habit of frequently checking your e-mail, it will be useful to develop that habit.

**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 turn it in to me with a link to the article. 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 your semester grade if you are at the border between two grades. All extra credit assignments must be received no later than the last day of classes.

**MCAT Preparation:** Because a significant number of students take this course to prepare for the MCAT, the topics covered will be geared towards those that appear on the MCAT. Although I will strive to keep the MCAT in mind as I tailor this course (after all, I like to brag about my students who go on to professional school), bear in mind that I will not do so at the expense of UWSP's mission.