

University of Wyoming
PHYS 1220 Section 02
Engineering Physics II, 4 credits

Class Times and Locations

MWF 12:00–1:40, 28 from 28 Aug 2023 to 8 Dec 2023
Enzi STEM Building Room 195 (Studio Physics)

Instructor

Richard Barrans, Ph.D., M.Ed., Assistant Lecturer, Physics and Astronomy
PS 116, no phone in office, rbarrans@uwyo.edu.
Office Hours: MW 2:00–3:00 PM, T 12:30–1:30 PM, R 10:00–11:00 AM

Teaching Assistant

Steffanie Peterson, PS 212, speter65@uwyo.edu. Office Hour: TBA

Chase Smith, PS 115, csmit151@uwyo.edu. Office hour T 1–2.

Enrollment Restrictions

Students must have received a grade of C or higher in MATH 2200 (Calculus I) and MATH 2205 (Calculus II) and have completed or be currently taking MATH 2210 (Calculus III). Students receiving credit for PHYS 1220 cannot receive credit for PHYS 1050, 1120 or 1320. Prior completion of PHYS 1210 or equivalent is expected. Physics and Astronomy majors are encouraged to enroll in this section.

Course Description

Welcome to introductory physics for engineers and scientists! This course is an introduction to thermodynamics, electricity, and magnetism. You will observe, study, model, explain, and predict the specific forces that influence matter and the principles determining how they behave. Thermodynamics is fundamental to understanding how and why physical systems change over time, and how they can be harnessed to achieve desired results. Electricity and magnetism are the most accessible of the fundamental forces affecting matter, explaining most of the materials and phenomena surrounding us.

Student Learning Outcomes

- Explain and predict the transfer of energy between systems.
- Model, describe, and explain the electromagnetic interactions of matter.
- Construct and apply mathematical models to describe and explain physical phenomena.
- Understand the principles of the scientific method.
- Formulate and test ideas through analysis and interpretation of the data.
- Use quantitative data analysis as the basis for making critical judgements and drawing conclusions.

- Separate facts from inferences and relevant from irrelevant information, and explain the limitations of information.
- Evaluate the credibility, accuracy, and reliability of conclusions drawn from information.
- Communicate ideas in writing using appropriate documentation.

Required Materials

Textbook: Mastering Physics with Pearson eText Access Code (18 weeks) for University Physics with Modern Physics, 15th Edition, by Young and Freedman, published by Pearson Addison Wesley. The Inclusive Access eText can be purchased directly by selecting it in the WyoCourses course shell.

Required Examinations, Assignments, and Activities

Homeworks and labs will be assigned approximately weekly. There will be group work in every class.

Required Participation Outside of Class Meetings

Mid-term examinations are scheduled for Thursday evenings 5:10–7:00 PM. Thursday evenings are reserved for Calculus exams as well, so we try to schedule exams to avoid conflicts. Let me know as soon as possible of any conflicts you encounter.

Grading

The final grade will be determined from cumulative points attained. Grading will be on a standard scale (90's = A, 80's = B, 70's = C, 60's = D, < 60% = F). The different components of the course comprise the following fractions of the semester grade:

Item	Percent
Exams	55%
Labs	20%
Homework	15%
Classwork	10%

I am not yet sure how Wyocourses allows weighting of different types of graded student work, so beware of any overall in-process grades reported therein.

A note about grades: Your grade in this course reflects only your performance over a 15-week period on a limited set of evaluations. It does not reflect your worth as a person or what I think of you. Because of the limited scope of this course, your grade is not a prediction of your future success or an evaluation of your potential as a scientist or engineer. In short, do not cause yourself (or your instructor) anxiety by making more of your grade than it really is.

Attendance and Absence Policy

Attendance is expected in class sections, and I will take attendance. There is no explicit grade for attendance; however, classwork cannot be made up without a valid excuse.

Course Components

Integrated Lecture/Lab

Monday, Wednesday, and Friday 12:00–1:40 PM, Enzi STEM Building, room 195.

Since ideas and definitions from the text will be used freely in class, it is necessary for you to read and study the assigned chapters before class. I will avoid presenting the exact examples in your text. Instead, class meetings are for addressing the difficult points in the text as well as for helping to place the readings “in the big picture.” The more actively engaged you are in class, the better you will learn and perform. Hence, there will be frequent conceptual questions posed in class—questions that you will be expected to discuss with your neighbors.

Participation in each laboratory is essential for the successful completion of this course. Laboratory participation is required.

Homework

The assignments will be posted on-line via the MasteringPhysics website below. Students are encouraged to work together, but each student must submit their own work. Homeworks will consist of approximately 10 problems each week. Eight will be answered and graded online, and two will be turned in on paper, or, better yet, submitted to WyoCourses to be graded. The deadline for each homework will be indicated; typically the on-line questions would need to be answered by 10:00 a.m. the following Wednesday, and written problems are due at the start of lecture on that day.

For the written exercises: As in “real life,” you should give credit to any sources or people you find helpful. For example, if you work on a problem in a group, the names of all the other members in that group should be given. To receive full credit, your homework must be legible and the logic must be easy to follow. No credit will be given for incomplete work or incorrect units and **late homework will not be accepted**. Neither faxed nor e-mailed homework will be accepted. Please staple loose sheets together. Trim ragged edges on pages taken from spiral-bound notebooks.

The most important part is explaining how to approach and solve the problem. Credit for a numerical problem is apportioned into ten points:

- 2 for a diagram,
- 2 for identifying the physical principles applying to the situation,
- 3 for matching the quantities in the problem to the quantities in the formulas (correctly setting up the problem),
- 2 for solving the solution symbolically, and
- 1 for the correct answer.

MasteringPhysics.com advice and information:

- “Inclusive access” to the textbook is available with purchase of MasteringPhysics through WyoCourses. I will provide you with registration information when I manage to set up the course account on Mastering Physics.

- Never use the browser’s “back” button. Use the links provided.
- You will be able to submit each answer repeatedly, and full credit can be earned even on the final attempt (however, no credit will be awarded if you do not initially answer correctly on a two-part multiple-choice problem; partial credit only will be awarded if you initially answer wrong on a three-part multiple-choice problem, etc). Please hit “submit” after answering each question. Selecting “submit problem” will result in the problem being graded. Selecting “submit problem” voids the option of additional attempts!
- Some problems have multiple components, so be sure to answer each portion.
- Many problems have hints to help you along the way. You will not be penalized for looking at the hints, and sometimes bonus credit (3%) will be awarded if you answer correctly without peeking at the hints. Either way, you win. Note that this possible bonus credit will be an extremely tiny fraction of your overall course grade, so please don't agonize over the choice.
- Parameters may be randomized! Your friend’s question may have different numbers!
- There is a 2% tolerance for answers; e.g. you can be off by, say, 1.8% and receive full credit.
- Solutions to the homework problems will be posted to WyoCourses.

Entering formulas in Mastering Physics:

Sometimes Mastering Physics will ask you to enter algebraic formulas as your answers. Here is a chart on how to convert common formulas into Mastering Physics symbolic language. Also, be sure to do homework #0 where you get to practice this.

<i>Formula</i>	<i>Mastering Physics Coding</i>
$1/2 a_x t^2$	1/2 a_x t^2 or 1/2 * a_x * t^2
$\mu_s / (F_1 + F_2)^2$	mu_s / (F_1 + F_2)^2
$\sqrt{a^2 + b^2}$	sqrt(a^2 + b^2)
$v_0^2 + a \Delta t$	v_0^2 + a Delta t
3×10^8	3 * 10^8

Exams

Homeworks will contain mostly quantitative problems. Class meetings will provide you with largely conceptual, multiple-choice questions and complex, ill-defined problems requiring collaborative effort. The exams will contain both quantitative and conceptual problems, and have both multiple-choice and written formats. The exams will be closed book and closed notes. You may use a calculator. A formula sheet will be provided. **No make up exams will be given without advance arrangement.** If you have a conflict with an exam time, make prior arrangements with the instructor.

Partial credit: One negative aspect of the multiple-choice format is its “all-or-nothing” nature. For this course’s exams and quizzes, you may obtain partial credit on a multiple-choice problem by opting to select two of the possible answers. For example, if you answer both A and C on a 4 point question that has the possible choices of A, B, C, and D, you will earn 2 points if either answer A or C is the correct solution.

All examinations are required and none of the scores will be dropped or replaced. The exams will be held at the following times, and cover the following chapters in Young & Freedman:

Internet

Course information and lecture outlines will be accessible through WyoCourses.

Student Conduct

Students are expected to respect others’ opinions and abilities, and to help each other during group work activities. Those who repeatedly disrupt the class or interfere with other students’ opportunity to learn will be asked to leave the class. If you have a cell phone or any other personal audio equipment, ensure that it does not make noise during class. No unauthorized video or audio recording during class is allowed to protect the privacy of your fellow students. If you require recording for accommodation of disabilities, work with Disability Support Services and me to accommodate your needs.

Diversity

The University of Wyoming values an educational environment that is diverse, equitable, and inclusive. The diversity that students and faculty bring to class, including age, country of origin, culture, disability, economic class, ethnicity, gender identity, immigration status, linguistic, political affiliation, race, religion, sexual orientation, veteran status, worldview, and other social and cultural diversity is valued, respected, and considered a resource for learning.

Disability Support

The University of Wyoming is committed to providing equitable access to learning opportunities for all students. If you have a disability, including but not limited to physical, learning, sensory or psychological disabilities, and would like to request accommodations in this course due to your disability, please register with and provide documentation of your disability as soon as possible to Disability Support Services (DSS), Room 128 Knight Hall. You may also contact DSS at (307) 766-3073 or udss@uwyo.edu. It is in the student’s best interest to request accommodations within the first week of classes, understanding that accommodations are not retroactive. Visit the DSS website for more information at: www.uwyo.edu/udss. Once UDSS informs me of the accommodations appropriate for you, I will implement them.

Academic Dishonesty Policy

Academic honesty develops respect between faculty and students, ensures fair and effective grading, and creates an environment that fosters learning. Although I encourage you to study

with other students, any assignments, exams, and lab submissions must represent your OWN work.

Academic dishonesty will not be tolerated in this class. Cases of academic dishonesty will be treated in accordance with UW Regulation 2-114. The penalties for academic dishonesty can include, at my discretion, an “F” on an exam, an “F” on the class component exercise, and/or an “F” in the entire course. Academic dishonesty means anything that represents someone else’s ideas as your own without attribution. It is intellectual theft – stealing - and includes (but is not limited to) unapproved assistance on examinations, plagiarism (use of any amount of another person’s writings, blog posts, publications, and other materials without attributing that material to that person with citations), or fabrication of referenced information. Facilitation of another person’s academic dishonesty is also considered academic dishonesty and will be treated identically.

Students are permitted to use advanced automated artificial intelligence or machine learning tools on assignments in this course only if instructor permission is declared in advance. Unless given permission to use those tools, students are expected to complete each assignment without substantive assistance from others, including automated tools.

Physics is fun. Involvement in a case of academic dishonesty is not fun.

Duty to Report

UW faculty are committed to supporting students and upholding the University’s non-discrimination policy. Under Title IX, discrimination based upon sex and gender is prohibited. If you experience an incident of sex- or gender-based discrimination, we encourage you to report it. While you may talk to a faculty member, understand that as a "Responsible Employee" of the University, the faculty member MUST report information you share about the incident to the university’s Title IX Coordinator (you may choose whether you or anyone involved is identified by name). If you would like to speak with someone who may be able to afford you privacy or confidentiality, there are people who can meet with you. Faculty can help direct you or you may find info about UW policy and resources at <http://www.uwyo.edu/reportit>.

You do not have to go through the experience alone. Assistance and resources are available, and you are not required to make a formal complaint or participate in an investigation to access them.

Disclaimer

Information in the syllabus was, to the best knowledge of the instructor, correct when distributed at the beginning of the term. The instructor, however, reserves the right, acting within the policies and procedures of the University of Wyoming, to make changes in the course content, schedule, or instructional techniques during the term. If any changes to the syllabus become necessary, students will be notified in class and on WyoCourses.

Student Resources:

- DISABILITY SUPPORT SERVICES: udss@uwyo.edu, 766-3073, 128 Knight Hall, www.uwyo.edu/udss
- COUNSELING CENTER: uccstaff@uwyo.edu, 766-2187, 766-8989 (After hours), 341 Knight Hall, www.uwyo.edu/ucc
- ACADEMIC AFFAIRS: 766-4286, 312 Old Main, www.uwyo.edu/acadaffairs
- DEAN OF STUDENTS OFFICE: dos@uwyo.edu, 766-3296, 128 Knight Hall, www.uwyo.edu/dos
- UW POLICE DEPARTMENT: uwpd@uwyo.edu, 766-5179, 1426 E Flint St, www.uwyo.edu/uwpd
- STUDENT CODE OF CONDUCT WEBSITE: www.uwyo.edu/dos/conduct

Schedule

The following schedule was planned from the 13th edition of the textbook, which is the most recent one I could access at the start of the term. If the chapter locations of the topics are different in the current edition, I will correct the schedule and re-publish it.

Tentative Schedule

Week of	M	W	F	Formal Lab	Notes
Aug 28	Intro, 17.1–3	17.4–17.6	17.7		HW 0 due 9/1
Sep 4	No Class	18.1–18.3		Specific Heat Capacity	HW 1 due 9/8
Sep 11	18.4, 18.6	Practice	19.1–19.3		HW 2 due 9/15
Sep 18	19.4–19.8	20.5, 20.7		Ideal Gas Law	HW 3 due 9/22
Sep 25	20.1–20.4	Practice			HW 4 due 9/29
Oct 2	Review	21.1		Measuring Charge	Exam 1: Oct 5
Oct 9	21.2–21.5	21.6	22.1–22.5		HW 5 due 10/13
Oct 16	Practice	23.1–23.5	24.1–24.6		HW 6 due 10/20
Oct 23	25.1–25.5	26.1–26.3		Capacitance	HW 7 due 10/27
Oct 30	26.4	27.1–27.3		Resistivity	HW 8 due 11/3
Nov 6	27.4–27.7	Practice		RC Circuits	Exam 2: Nov 9
Nov 13	28.1–28.4	28.5		Magnetic Field	HW 9 due 11/17
Nov 20	28.6–28.7	No Class	No Class		
Nov 27	29.1–29.4	30.1–30.4		Electromagnetic Induction	HW 10 due 12/1
Dec 4	30.5, 31.5–31.6	32.1			
Dec 11	Cumulative Final Exam Friday Dec 15, 10:15 AM–12:15 PM				