PHYS 1210 Section 02
Engineering Physics I, 4 credits
University of Wyoming, Spring 2024

Class Times and Locations

MWF 11:00 AM–12:40 PM, from 17 Jan 2024 to 10 May 2024
Enzi STEM Building Room 195 (Studio Physics)

Instructor

Richard Barrans, Ph.D., M.Ed., Assistant Lecturer, Physics and Astronomy
rbarrans@uwyo.edu. PS 116, no phone in office,
Office Hours: M 2:10–3:10 PM, W 9:00–10:00 AM, TR 11:00 AM–noon

Teaching Assistants

Theodora Zastrocky, PS 122, tzastroc@uwyo.edu. Office hours: W 1–2 PM, PS 122.

Srujan Dandu, sdandu@uwyo.edu. Office hours: TR noon–1 PM, PS 109.

Course Description

Welcome to introductory physics for engineers and scientists! This course is an introduction to the fundamental processes in our universe, including mechanics, waves, and gravity. You will gain physical intuition and problem solving ability which will allow you to explain and predict what goes on in the world. Physics I is the foundation supporting disciplines as diverse as astronomy, biology, chemistry, engineering, geology, medicine, and meteorology.

Enrollment Restrictions

Students must have received a grade of C or higher in MATH 2200 (Calculus I) and have completed or be currently taking MATH 2205 (Calculus II). Students receiving credit for PHYS 1210 cannot receive credit for PHYS 1050, 1110 or 1310. Physics and Astronomy majors are encouraged to enroll in this section.

Student Learning Outcomes

- Explain and predict how interactions between objects affect their motion.
- Use principles of conservation to predict how objects behave.
- Construct and apply mathematical models to describe and explain physical phenomena.
- Understand the principles of the scientific method.
- 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 limitations 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. Chapter readings from the textbook are given in the schedule.

Required Examinations, Assignments, and Activities

Homeworks and labs will be assigned approximately weekly. Quizzes will be administered approximately bi-weekly, and there will be group work in most class meetings.

Required Participation Outside of Class Meetings

Quizzes are scheduled for Thursday evenings 5:10–7:00 PM. Thursday evenings are reserved for Calculus exams as well; the Physics and Math departments schedule exams to avoid conflicts. Let me know as soon as possible of any conflicts you encounter. Missed standards must be made up on your own time, optimally during my office hours.

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**
Standards	55%
Labs	20%
Final	10%
Homework	10%
Classwork	5%

I am not 100% confident that I have properly set up the weighting of the different items on Wyocourses, so beware of any overall in-progress 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.

Standards

Standards are specific skills that I recognize as proxies for mastery of the course content. The list of standards can be viewed from the WyoCourses shell. When you take a quiz, I will judge from your performance whether or not you mastered the standards assessed on that particular quiz. If you mastered a standard, great! That increases your tally of mastered standards. If you didn't, you can try again.

Standards Revisions and Retesting: To retest on a missed standard, you must first revise all the questions you got wrong on that standard, explaining how and why you answered as you did, how you should have approached the problem, and the missing insight that would have steered you right. If the revision is satisfactory, you may retest on the standard at the next opportunity. If not, you may correct and re-submit your revision, but it may delay your chance to retest.

Status of Standards: I record four possible scores that any standard can have: "S" for satisfied, "E" for eligible to retest, "N" for tested and not satisfied, and "R" for needing only a good revision to satisfy. Unfortunately, I have not found a way to record these scores on Canvas, so all I can show there is if a standard is satisfied or not.

If your score on a standard is "N," you need to revise it to be eligible to retest; a good revision will change the "N" to an "E." If your score on a standard is "R," you need to revise it to satisfy the standard; a good revision will change the "R" to an "S." If your revision reveals that your mastery of the standard was less than I initially thought, I may require retesting before I count the standard as satisfied. An inadequate revision may change an "R" to an "N."

Habitual tardiness (missing deadlines) in revising standards may cause you to forfeit your opportunity to revise and retest.

Attendance and Absence Policy

Attendance is expected in class sections. Attendance is not graded and I will not explicitly take attendance; however, classwork cannot be made up without a valid excuse.

Course Components

Integrated Lecture/Lab

Monday, Wednesday, and Friday 11:00 AM–12:40 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 MasteringPhysics, and are accessed directly through WyoCourses. Students are encouraged to work together, but expected to learn how to do the problems on their own. (After all, that's how you learn, which is the point.) Homework will consist of approximately ten problems each week. One assignment worth

eight points will be administered through Mastering Physics, and another worth two points is written and turned in on paper or uploaded to WyoCourses.

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.

Quizzes

Quizzes are your first opportunity to satisfy course standards. Quizzes will be returned with feedback, and a list of standards covered indicating if they were satisfied. They won't receive numeric grades.

Final Exam

The final exam will be administered at the time designated by the registrar. It will principally address course content that wasn't covered in quizzes.

Partial credit: One negative aspect of the multiple-choice format is its "all-or-nothing" nature. For this course's final exam, 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.

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

Tentative Schedule

Week of	M	W	F	Notes, Dates
Jan 15	**No Class** MLK/Equality Day	1.1–4 Physics, quantities, units 2.1–4 Position, velocity, and acceleration	Lab 1: Graphs of motion	
Jan 22	2.5–6 Straight-line kinematics	Lab 2: Equations of motion	1.7–10 Vectors 3.1–2 Kinematic vectors	HW 0 due 1/24
Jan 29	3.3 Projectiles	3:4–5 Uniform circular motion, relative velocity	Lab 3: Launcher	HW 1 due 1/31; Quiz 2/1
Feb 5	4:1–4, 4.6 Newton's laws 5.1 Statics	Lab 4: Force table	5.2–3 Forces and dynamics	HW 2 due 2/7
Feb 12	5.4 Centripetal forces	Lab 5: Hanging weight	6.1–4 Work and power	HW 3 due 2/14; Quiz 2/15
Feb 19	**Break**	7.1-7.2 Potential energy	Lab 6: Work-energy theorem	HW 4 due 2/21
Feb 26	7.3–7.5 Mechanical energy, energy diagrams	Lab 7: Friction	8.1–8.3 Impulse and momentum	HW 5 due 2/28; Quiz 2/29
Mar 4	8.4–8.5 Collisions, center of mass	9.1–9.3 Rotational kinematics	Lab 8: Pendulum Challenge	HW 6 due 3/6
Mar 11	**Spring Break**			
Mar 18	Lab 9: Collisions	9.4 Rotational energy	9.5–9.6 Calculating moments of inertia	Quiz 3/21
Mar 25	10.1–10.6 Torque and angular momentum	Lab 10: Torque and moment of inertia	11.3 Static torques 14.1–3 Oscillations	HW 7 due 3/27
Apr 1	14.5–7 Pendulums, damped oscillations	Lab 11: Hooke's law	15.1–3 Describing waves	HW 8 due 4/3; Quiz 4/4
Apr 8	15.4–7 Wave details	16.1–3 Sound waves	Lab12: Waves	HW 9 due 4/10
Apr 15	16.4–7 Combining waves	16.8–9 Moving sources 12.1–2 Fluid pressure	**Break**	HW 10 due 4/17
Apr 22	12.3–5 Buoyancy and fluid flow	13.1–13.3 Newtonian gravity	Lab 13: Ramp roll	HW 11 due 4/24; Quiz 4/25
Apr 29	13.4–13.5 Orbital dynamics			HW 12 due 5/1
May 6	Final Exam May 6 10:15–12:15			**Finals Week**