

**University of Wyoming**  
**PHYS 1210 Section 02**  
**Engineering Physics I, 4 credits**  
**Spring semester 2025**

## **Class times and locations**

MWF 2:10 AM–3:00 PM, from 21 Jan 2025 to 5 May 2025  
Aven Nelson Building Room 212. Exams on Thursday evenings in CR 133.

### ***Laboratory***

All labs are in STEM 185.

Section 10: M 3:10–5:00 PM. TA: Adekunle Ojelabi

Section 20: M 5:10–7:00 PM. TA: Sami Alheeh

### ***Discussion***

Section 20: T 2:10–3:00 PM, EN 1044. TA: Caleb Eastlund

Section 21: T 3:10–4:00 PM, BUS 211. TA: James Quennon

## **Instructor**

Richard Barrans, Ph.D., M.Ed., Assistant Lecturer, Physics and Astronomy

PS 116, no phone in office, rbarrans@uwoyo.edu.

Office Hours: M 3:10–4:10 PM, T 1–2 PM; W 12–1 PM; F 10–11 AM

## **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.

## **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.

## **University Studies Program**

This course fulfills the Physical and Natural World (PN) requirement of the 2015 University Studies Program. Physical and Natural World (PN) courses will help students understand the fundamental concepts of scientific and quantitative inquiry and develop the ability to understand the fundamental concepts of scientific and quantitative inquiry and develop the ability to understand the relevance of scientific, technological, and quantitative skills to contemporary society. Physical and Natural World (PN) courses will also develop and promote critical and creative thinking skills through active learning, inquiry of pressing issues, and individual and collaborative processing of ideas.

## Student learning outcomes

### *Physics & Natural World Student Learning Outcomes*

- 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.

### *Physics & Natural World Critical & Creative Thinking Student Learning Outcomes*

- 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.
- Analyze one's own and others' assumptions and evaluate the relevance of context when presenting a position.

### *Engineering Physics 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. Available via WyoCourses through StartRight+. Chapter readings from the textbook are given in the schedule.

## General requirements and expectations for the course

### *Lecture*

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.

## ***Discussion***

In discussion section, you will work physics problems under the guidance of a teaching assistant. This provides an opportunity to practice problem-solving with immediate expert feedback—a valuable learning activity! Discussion attendance is not required, but it is encouraged.

## ***Lab***

Participation in each laboratory is essential for the successful completion of this course. Laboratory participation is required. To receive credit for a lab, you must participate in gathering the data and submit a lab report explaining what you did, what you observed, and what it means.

## ***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.) The deadline for each homework will be indicated, typically right before the class at which the next homework is assigned. Please check and be mindful of the submission deadlines; they typically won't be at midnight.

## ***Internet***

Course information and lecture outlines will be accessible through WyoCourses. Supplemental materials, such as lecture slide shows, worksheets, and labs, can also be accessed directly at my website, [www.barransclass.com](http://www.barransclass.com), in case the links in WyoCourses are missing or incorrect.

## **Required examinations, assignments, and activities**

Homeworks and labs will be assigned approximately weekly. There will be one quiz and three midterm exams administered on Thursday evenings, and retests also on Thursday evenings between exams.

Quiz	Thursday, Feb 6	5:10–7:00 PM	CR 133
Exam 1	Thursday, Feb 27	5:10–7:00 PM	CR 133
Exam 2	Thursday, Mar 27	5:10–7:00 PM	CR 133
Exam 4	Thursday, Apr 24	5:10–7:00 PM	CR 133
Exam 4 (Final exam)	Friday, May 16	1:15–3:15 PM	TBA

## **Required participation outside of class meetings**

Quizzes and midterm exams are scheduled for Thursday evenings 5:10–7:00 PM. Thursday evenings are reserved for Calculus exams as well; the Physics and Mathematics departments schedule exams to avoid conflicts. Let me know as soon as possible of any conflicts you encounter; I'll do my best to accommodate you. Review missed standards outside of class time, optimally during my office hours.

## **Grading scale and grading policy**

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). Standards comprise 75% of the course grade, and labs comprise 25%.

**Standards:** Standards are specific skills that I recognize as evidence of mastery of the course content. The list of standards can be viewed from the WyoCourses shell. The midterm exams, and the final exam, contain questions that probe your understanding of the standards. Your performance on the questions for a standard determines whether you satisfy the standard or not. If you satisfy a standard, great! That contributes to your tally of mastered standards.

If you don't satisfy a standard on an exam, you automatically qualify to try again at the scheduled retest. If you satisfy the standard at the retest, it counts as satisfied with no penalty. If you don't satisfy the standard at the retest, you may retest again, but you must first meet with me or a designee to review the standard. I won't keep a record of which standards we've reviewed together, just that we have done a review. Reviewing the proper content is up to you.

**Labs:** You must average **at least 60% on the labs** to pass the course. If your lab average is less than 60%, you will receive an F for the course regardless of your scores on the standards.

*A note about grades:* Your grade in this course reflects your performance over a 15-week period on a limited set of contrived evaluations. It does not reflect your worth as a person or what I think of you. Because of the scope of this course, and because it comprises only a small fraction of your college career, your grade is not a prediction of your future success or an evaluation of your potential as a scientist or engineer.

## **Attendance and absence policy**

Attendance is expected in class meetings, but there is no explicit grade for attendance in lecture or discussion. Attendance in a lab is required to receive credit for the lab. If you have an excused absence from lab, you may attend another lab session in the same week, we may arrange a make-up lab for you, or the lab may be pro-rated.

## **Classroom behavior policy**

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. To protect the privacy of your fellow students, no unauthorized video or audio recording during class is allowed. If you require recording for accommodation of disabilities, work with Disability Support Services and me to accommodate your needs.

## **Classroom statement on diversity**

The University of Wyoming values an educational environment that supports students of all backgrounds and viewpoints. Diversity of viewpoints is considered a resource for learning. Topics may be difficult, not only intellectually but emotionally; however, discussions are essential to meeting the course's student learning outcomes and assisting students in developing problem-solving and critical-thinking skills. During all conversations, respect and civility are of utmost importance.

## **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](mailto: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](http://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.

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.

## **AI technology**

Students are permitted to use advanced automated artificial intelligence or machine learning tools on assignments in this course if that use is properly documented and credited. For example, text generated by ChatGPT-3 should include a citation such as "Chat-GPT-3. (YYYY, Month DD of query). "Text of your query." Generated using OpenAI. <https://chat.openai.com/>" Material generated using other tools should follow a similar citation convention.

## **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.

## **Green Dot program at UW**

Here at The University of Wyoming, we are committed to reducing and preventing power-based personal violence such as sexual assault, relationship violence, and stalking. Green Dot is a bystander intervention program to reduce these forms of violence with one thought; If everyone does one thing, no one will have to do everything. A Green Dot is your choice at any moment to make campus safer by promoting safety for everyone and letting others know that you will not tolerate violence. A Green Dot is any behavior, choice, word or attitude that sends a clear message that:

1. Violence is not okay with you, and
2. Everyone is expected to do their part.

Additional information on Green Dot training and resources are available at <http://www.uwyo.edu/greendot/>.

## **Substantive changes to syllabus**

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, by email, and on WyoCourses. Please check your university email daily.

## **Student resources:**

DISABILITY SUPPORT SERVICES: [udss@uwyo.edu](mailto:udss@uwyo.edu), 766-3073, 128 Knight Hall, [www.uwyo.edu/udss](http://www.uwyo.edu/udss)

COUNSELING CENTER: [uccstaff@uwyo.edu](mailto:uccstaff@uwyo.edu), 766-2187, 766-8989 (After hours), 341 Knight Hall, [www.uwyo.edu/ucc](http://www.uwyo.edu/ucc)

ACADEMIC AFFAIRS: 766-4286, 312 Old Main, [www.uwyo.edu/acadaffairs](http://www.uwyo.edu/acadaffairs)

DEAN OF STUDENTS OFFICE: [dos@uwyo.edu](mailto:dos@uwyo.edu), 766-3296, 128 Knight Hall, [www.uwyo.edu/dos](http://www.uwyo.edu/dos)

UW POLICE DEPARTMENT: [uwpd@uwyo.edu](mailto:uwpd@uwyo.edu), 766-5179, 1426 E Flint St, [www.uwyo.edu/uwpd](http://www.uwyo.edu/uwpd)

STUDENT CODE OF CONDUCT WEBSITE: [www.uwyo.edu/dos/conduct](http://www.uwyo.edu/dos/conduct)

## Tentative Schedule

Date	Topic	Reading*
01/22	Quantities, units, position, velocity	1.1–1.4, 2.1–2.4
01/24	Acceleration, graphs of motion	
01/27	Straight-line kinematics	2.5–2.6
01/29	Vectors	1.7–1.10
01/31	Vectors of motion	3.1–3.2
Lab 1: Graphs of motion		
02/03	Projectile trajectories	3.3
02/05	Uniform circular motion, relative motion	3.4–3.5
02/06	<b>Quiz</b> 5:10–7:00 PM, CR 133	
02/07	Curved motion practice	
Lab 2: Projectile launcher		
02/10	Newton's first and second laws	4.1–4.4
02/12	Free body diagrams, statics	4.6, 5.1
02/14	Force and acceleration	5.2–5.3
Lab 3: Force table		
<b>02/17</b>	<b>No class</b>	
02/19	Centripetal forces	5.4
02/21	Work and power	6.1–6.4
<b>No lab</b>		
02/24	Potential energy	7.1–7.2
02/26	Mechanical energy	7.3–7.4
02/27	<b>Exam 1</b> 5:10–7:00 PM, CR 133	
02/28	Energy diagrams	7.5
Lab 4: Hanging weight		
03/03	Impulse and momentum	8.1–8.3
03/05	Collisions	8.4
03/06	<b>Retesting</b> 5:10–7:00 PM, CR 133	
03/07	Center of mass	8.5
Lab 5: Friction		
03/10	Rotational kinematics	9.1–9.3
03/12	Rotational work and energy	9.4
03/14	Calculating moments of inertia	9.5–9.6
Lab 6: Pendulum challenge		

<b>Spring Break 3/17–3/21</b>		
03/24	Torque and angular momentum	10.1–10.6
03/26	Static torques	11.3
<b>03/27</b>	<b>Exam 2 5:10–7:00 PM, CR 133</b>	
03/28	Oscillations	14.1–14.3
Lab 7: Collisions		
03/31	Pendulums, damped and driven oscillations	14.5–14.7
04/02	Describing waves	15.1–15.3
04/04	Wave details	15.4–15.7
Lab 8: Torque and moment of inertia		
04/07	Sound waves	16.1–16.2
04/09	Sound intensity	16.3
04/10	<b>Retesting 5:10–7:00 PM, CR 133</b>	
04/11	Wave interference	16.4–16.7
Lab 9: Hooke's law		
04/14	Doppler effect	16.8
04/16	Wave practice	
04/18	<b>No class</b>	
Lab 10: Waves		
04/21	Fluid pressure, Pascal's principle	12.1–12.2
04/23	Buoyancy	12.3
<b>04/24</b>	<b>Exam 3 5:10–7:00, CR 133</b>	
04/25	Fluid flow	12.4–12.5
Lab 11: Buoyancy and displacement		
04/28	Newtonian gravity	13.1–13.3
04/30	Orbits	13.4–13.5
05/02	Orbital dynamics	
Make-up labs		
05/05	Gravitational fields	13.6–13.8
05/07	Review	
05/08	<b>Retesting 5:10–7:00 PM CR 133</b>	
05/09	Review	
No lab		
<b>05/16</b>	<b>Final Exam 1:15–3:15 PM</b>	