

University of Wyoming
PHYS 1120 Section 01
General Physics II, 4 credits
Spring semester 2025

Class times and locations

MWF 1:10–2:00 PM, from 21 Jan 2025 to 9 May 2025

Classroom Building Rom 222. Exams on Thursday evenings in CR 214.

Laboratory

All labs are in STEM 175. You should be registered for *one* laboratory section.

Section	Time
10	Tue 1:10–3:00
11	Tue 3:10–5:00
12	Tue 5:10–7:00

Section	Time
13	Thu 1:10–3:00
14	Thu 3:10–5:00

Discussion

You should be registered for *one* discussion section.

Section	Time	Room
20	Tue 1:10–2:00	STEM 215
21	Tue 3:10–4:00	ENG 3102
22	Wed 1:10–2:00	ENG 2105

Section	Time	Room
23	Thu 1:10–2:00	ENG 3110
24	Thu 2:10–3:00	ENG 3110

Instructor

Richard Barrans, Ph.D., M.Ed., Assistant Lecturer, Physics and Astronomy
Physical Science Building room 116, no phone in office, rbarrans@uwyo.edu.
Office Hours: M 3:10–4:10 PM, T 1–2 PM; W 12–1 PM; F 10–11 AM

Enrollment restrictions

Prerequisite: PHYS 1110. Students receiving credit for PHYS 1120 cannot receive credit for PHYS 1050, 1220 or 1320.

Course description

Follows PHYS 1110 and completes introduction to physics without calculus. Includes electricity, magnetism, optics and modern physics. Laboratory sessions illustrate principles studied.

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.

General 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.

Required materials

Textbook: Serway and Vuille, **College Physics**, 11 Ed. Cengage, 2018, with WebAssign. 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, please 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.

Lab

The lab activities are to be completed entirely in lab. Scoring is all-or-nothing: either you get full credit for a lab, or you don't. You should always be able to get full credit, though: if your lab instructor tells you that something is incorrect or missing, just fix it before you leave.

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.

Homework

The assignments will be posted online via the WebAssign platform. Students are encouraged to work together, but each student must submit their own work. 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, 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 four exams, including the final exam, held at the following times:

Exam 1	Thursday, Feb 20	5:10–7:00 PM	CR 214
Exam 2	Thursday, Mar 27	5:10–7:00 PM	CR 214
Exam 4	Thursday, Apr 24	5:10–7:00 PM	CR 214
Exam 4 (Final exam)	Monday, May 12	7:00–9:00 PM	TBA

Required participation outside of class meetings

Midterm exams are scheduled for Thursday evenings 5:10–7:00 PM. Retesting sessions will be on Thursday evenings between these times. 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 career potential.

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 equipment, ensure that it does not make noise during class and that it does not create a distraction for your classmates or the instructor. Laptops and tablets are allowed for note-taking purposes. 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. 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.

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.

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, 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

Date	Topic	Reading*
01/22	Introduction, density and pressure	9.1–9.2
01/24	Pascal's principle, pressure with depth	9.3–9.4
01/27	Buoyancy, Archimedes's principle	9.5
01/29	Fluid flow	9.6–9.7
01/31	Surface tension and viscosity	9.8
Lab 1: Fluids		
02/03	Charge and Coulomb's law	15.1–15.2
02/05	Electrostatics and electric field	15.3–15.7
02/07	Gauss's law, electric potential	15.8, 16.1–16.3
Lab 2: Fields		
02/10	Capacitors and dielectrics	16.5, 16.8
02/12	Energy in capacitors, capacitor combinations	16.7, 16.6
02/14	Current and resistivity	17.1–17.4
Lab 3: Electric potential and electric field		
02/17	No class	
02/19	DC circuits	18.1–18.3
02/20	Exam 1 5:10–7:00 PM, CR 214	
02/21	Kirchhoff's circuit laws	18.4
No lab		
02/24	RC Circuits	18.5–18.7
02/26	Magnetism, Lorentz force	19.1–19.4
02/28	Laplace force	19.5–19.6
Lab 4: DC circuits		
03/03	Ampère's law, fields of currents	19.7–19.9
03/05	Faraday's law, emf	20.1–20.3
03/06	Retesting 5:10–7:00 PM, CR 214	
03/07	Motors, generators, inductors	20.4–20.5
Lab 5: RC Circuits		
03/10	Energy in inductors, LR circuits	20.6–20.7
03/12	LC Circuits, AC (RMS),	21.1, 21.6
03/14	Transformers	21.7
Lab 6: Currents and magnets		
Spring Break 3/17–3/21		

03/24	Electromagnetic waves	21.8–21.13, 22.1
03/26	Reflection and refraction	22.2, 22.7
03/27	Exam 2 5:10–7:00 PM, CR 214	
03/28	Light and color	22.4–22.6
Lab	Lab 7: Impedance and resonant circuits	
03/31	Images from mirrors	23.1–23.2
04/02	Images from lenses	23.3, 23.5
04/04	Ray and mathematical optics practice	
	Lab 8: Light and color	
04/07	Optics practice	
04/09	Angular magnification	25.1–25.3
04/10	Retesting 5:10–7:00 PM, CR 214	
04/11	Compound optics	25.4–25.6
	Lab 9: Reflection and refraction	
04/14	Optics practice	
04/16	Interference of light	24.1–24.4
04/18	No class	
	Lab 10: Lenses and mirrors	
04/21	Diffraction of light	24.6–24.8
04/23	Special relativity: time and space	26.1–26.4
04/24	Exam 3 5:10–7:00, CR 214	
04/25	Energy; General relativity: mass and space	26.5–26.8
	Lab 11: Interference of light	
04/28	Wave-particle duality	27.1, 27.6–27.8
04/30	Nuclei and radioactivity	29.1–29.6
05/02	Fission and fusion	30.1–30.2
	Make-up labs	
05/05	Particle zoo	30.4–30.9
05/07	Review	
05/08	Retesting 5:10–7:00 PM, CR 214	
05/09	Review	
05/12	Final Exam 7:00–9:00 PM	

*Reading assignments are from the textbook.