Physics 1130 Syllabus
2025 Fall

A. **Academic Division:** Business, Industry and Technology

B. **Discipline:** Physics

C. **Course Number and Title:** PHYS 1130 General Physics II

D. **Course Coordinator:** Wesley Adams
Assistant Dean: Brooke Miller

Instructor Information:

- Name: Dr. Peter Sandwall
- Office Location: OhioHealth – Mansfield Hospital
- Office Hours: By Appointment
- Phone Number: 419-526-8883
- E-Mail Address psandwall@ncstatecollege.edu

E. **Credit Hours:** 4
Lecture: 3 hours
Laboratory: 3 hours

F. **Prerequisites:** PHYS 1110 (min grade of C is required)

G. **Syllabus Effective Date:** Fall, 2025

H. **Textbook(s) Title:**

College Physics: a strategic approach

- Author(s): Knight, Jones, Field
- Copyright Year: 2019
- Edition: 4th
- ISBN #: 9780134641492 (Hardcover)

I. **Workbook(s) and/or Lab Manual:** None

J. **Course Description:** A study of simple harmonic motion and the wave model with superposition. Continuing into a study of light including its particle and wave nature, and geometric optics. Furthering into study of electricity and magnetism including electric charges at rest, potentials, capacitance, and dielectrics, current, resistance, and voltage, alternating circuits theory of frequency, reactance, impedance, power and resonance, magnetic field definition and effects on moving charges and conductors. Following with a study or relativistic motion using Galilean and Lorentz transformations. A study of basic quantum mechanical systems, quantum numbers, and quantum energy levels. And closing with, a study of atomic structure and atomic instability (radioactivity).

K. College-Wide Learning Outcomes:

College-Wide Learning Outcome	Assessments - - How & when met
Communication – Written	Labs
Communication – Speech	Labs
Intercultural Knowledge and Competence	
Critical Thinking	Homework, Labs, and Exams
Information Literacy	Labs
Quantitative Literacy	Homework, Labs, and Exams

L. Course Outcomes and Assessment Methods:

Upon successful completion of this course, the student shall:

Outcomes	Assessments – How met & when it is met
Calculate the net electric force and potential energy of a test charge and the electric field and electric potential at a point due to a specified array of not more than three-point charges at rest.	Class discussions, homework, labs, quizzes, and exams
Use conservation of energy to calculate specified electrostatic or kinematic variables due to a specified electric field or charge distribution.	Class discussions, homework, labs, quizzes, and exams
Calculate current, resistance, electromotive force, power loss, potential difference, and resistivity for specified parts of a direct current circuit.	Class discussions, homework, labs, quizzes, and exams
Calculate the equivalent capacitance of a specified network of capacitors and the charge on, potential difference across and energy stored by specified capacitors in the network.	Class discussions, homework, labs, quizzes, and exams
Calculate related current, magnetic force and flux, induced electromotive force, and torque for magnetic field problems.	Class discussions, homework, labs, quizzes, and exams
Calculate the peak current, RMS current, impedance, peak voltage, and RMS voltage for alternating current problems.	Class discussions, homework, labs, quizzes, and exams
Calculate the position, size, and nature of an image (or object) given a problem in geometrical optics with no more than two optical devices.	Class discussions, homework, labs, quizzes, and exams
Use Galilean and Lorentz transformations for moving inertial reference frames.	Class discussions, homework, labs, quizzes, and exams
Calculate beta values for time dilation, length contraction and relativistic momentum in relativistic systems.	Class discussions, homework, labs, quizzes, and exams
Apply topics: the uncertainty principle, de Broglie wavelength, and photon energy.	Class discussions, homework, labs, quizzes, and exams
Calculate quantum energy levels from Bohr models and Balmer equations.	Class discussions, homework, labs, quizzes, and exams
Calculate basic quantum numbers relating to multi-electron atoms.	Class discussions, homework, labs, quizzes, and exams

Evaluation of the above will be determined by:

1. The appropriate solution formula
2. Correct substitution into said formula
3. The logical consistency of the methods and mathematical steps
4. Correctness of the final numerical result, including proper units

The students will develop the following skills to meet the above outcomes.

1. Use computers as a tool to gather and process data from an experiment.
2. Identify and use the proper units for physical quantities.
3. Interpret and construct graphs and diagrams that describe relationships among physical variables and objects.
4. Interpret formulas by identifying the meaning of constants, describing the conditions for which the formula is valid, and using mathematical relationships to predict how a change in one variable affects the value of another variable.
5. Given a problem, decide what information is missing and what given information is irrelevant. Obtain the missing information and solve the problem.
6. Integrate learning from early units in the course to solve a problem later in the course.
7. Apply appropriate physics concepts to solve problems.
8. Determine whether the result of a calculation is reasonable.

M. Topical Timeline and Assignments: (Subject to change)

Week	Day	Chapter	Topic	Lab/Demo
1	Monday, August 11, 2025	17	Wave Optics	
	Wednesday, August 13, 2025	17	Wave Optics	
2	Monday, August 18, 2025	17	Wave Optics	Diffraction & Interference
	Wednesday, August 20, 2025	18	Ray Optics	
3	Monday, August 25, 2025	19	Optical Instruments	
	Wednesday, August 27, 2025		Exam 1 Review	
4	Monday, September 1, 2025		Labor Day	
	Wednesday, September 3, 2025		**Exam 1 (Ch 17-19)**	
5	Monday, September 8, 2025	20	Electric Fields and Forces	
	Wednesday, September 10, 2025	20	Electric Fields and Forces	Intro to Electricity
6	Monday, September 15, 2025	21	Electric Potential	
	Wednesday, September 17, 2025	22	Current and Resistance	
7	Monday, September 22, 2025	23	Circuits	
	Wednesday, September 24, 2025	23	Circuits	DC Circuits
8	Monday, September 29, 2025		Exam 2 Review	
	Wednesday, October 1, 2025		**Exam 2 (Ch 20-23)**	
Break	Monday, October 6, 2025			
	Wednesday, October 8, 2025			
9	Monday, October 13, 2025	24	Magnetic Fields and Forces	Planeterrella
	Wednesday, October 15, 2025	24	Magnetic Fields and Forces	
10	Monday, October 20, 2025	25	EM Induction and EM Waves	Helmholtz Coil
	Wednesday, October 22, 2025	26	AC Electricity	
11	Monday, October 27, 2025		Exam 3 Review	
	Wednesday, October 29, 2025		**Exam 3 (Ch 24-26)**	
12	Monday, November 3, 2025	27	Relativity	
	Wednesday, November 5, 2025	28	Quantum Physics	
13	Monday, November 10, 2025	28	Quantum Physics	Photoelectric Effect
	Wednesday, November 12, 2025	29	Atoms and Molecules	
14	Monday, November 17, 2025	29	Atoms and Molecules	Atomic Spectroscopy
	Wednesday, November 19, 2025	30	Nuclear Physics	
15	Monday, November 24, 2025	30	Nuclear Physics	Radioactivity
	Wednesday, November 26, 2025		Thanksgiving	
16	Monday, December 1, 2025		Exam 4 Review	

	Wednesday, December 3, 2025		**Exam 4 (Ch 27-30)**	
Final	Monday, December 8, 2025		Final Review	
	Wednesday, December 10, 2025		**Final Exam**	

N. Recommended Grading Scale:

> 93%	92% - 90%	89% - 87%	86% - 83%	82% - 80%	79% - 77%	76% - 73%	72% - 70%	69% - 67%	66% - 63%	62% - 60%	< 60%
A	**A-**	**B+**	**B**	**B-**	**C+**	**C**	**C-**	**D+**	**D**	**D-**	**E**

O. Grading and Testing Guidelines:

Assessment of your learning will come in two primary ways. First, you will be graded on your application of physics concepts in solving conceptual and mathematical problems. This grade will come from homework assignments, and exams. Secondly, assessment will be done in class through labs where you will demonstrate your knowledge and work as a group. The student is responsible for his or her active learning in the course.

Grade weights:

Assignments 20%, Lab 20%, Quizzes 10%, and Exams 50%

Grade Policy

Assignments: Assignments are required to be done online at www.masteringphysics.com by the due date given. To register, **first log into the class NCSC Canvas** site and select the MyLab and Mastering tab. From there you can use the number from your textbook or buy one there. After registering, you must join the class by using the class code **sandwall64687**. Assignments submitted after the due date will be marked down 3% for each day after the due date, down to receiving 50% credit. These assignments require time and are not conducive to procrastination. Note that the assignments are due a week after the date of the class discussion. Some time may be given at the beginning of class for homework related questions.

Lab: Part of the class will include semi-weekly labs (no labs on exam weeks, first week, and finals/dead week) that will relate to the lecture part of the week. Labs will be completed on provided lab packets. Labs will be completed in class, handed in on Thursday, and graded over the weekend.

Quizzes: Part of the class will include semi-weekly quizzes (no quizzes on exam weeks, first week, and finals/dead week) given on the last day of the week (Wednesday). The quiz will consist of a randomly picked homework question (number generator in class). Quiz will be given at the start of class, completed on a separate piece of paper, and then turned in.

P. Examination Policy:

There will be four exams (worth 100 points each) and a final (worth 200 points). You will be given test notes that you may use on the exam. Be sure to bring your calculator, you will need it, if you forget it there are several available to borrow in class. Cell phones must be out of pockets, lying face down in front of you during every exam. **If your cell phone is not in front of you, you are found using your cell phone, or you have a smart watch during an exam, your exam is subject to be taken and you receive a 0**. If you have questions during an exam you are allowed to come ask the professor, but they are free to be as cryptic with their response as needed. If you have a question concerning the grading of a test, feel free to bring it to my attention and argue your point either before or after class. If you need to leave the class for any reason during a test, acquire permission from your instructor and leave your cell phone in the classroom where the instructor can see it.

Grading of the exams will mostly be based **on your shown work and not the final result**. Your work getting to the answer is more important than the answer being correct. The final exam will cover the last section of material and will have a few comprehensive questions.

Extensions of time for assignments and exams are only available at the discretion of the professor and only if requested PRIOR to the due date. Students unable to attend the scheduled exam time must notify the professor PRIOR to the time of the test (contact info above). If an emergency arises (examples: car accident, hospitalization, family emergency) then contact your instructor *ASAP*.

Extra Credit

Extra credit is offered by way of test corrections. The due date will be announced in class, normally one week after the tests are handed back. Test corrections are always due at the beginning of the announced class period and will not be accepted late. If you think you may be late for class that day, send me an electronic copy before class to show that it is completed and give me the hard copy at the end of class.

Instructions:

- Do your work on a SEPARATE SHEET OF PAPER (do not write on your original exam).
- If you miss a multiple-choice concept question, write down the correct answer AND explain WHY it is correct (pretend you are explaining it to a classmate that does not understand the answer). You will receive extra credit IF you convince me, you know why the answer is correct.
- If you miss a workout problem, it's best if you first explain where you went wrong. If you used incorrect equations, explain WHY they were incorrect (what type of problem would the equation be used for and why does it not work here). Be sure to start all corrected problems using equations from the test notes, since these are the equations, you are given when you take the exam. Finally, recalculate the problem showing how you arrive at the correct answer (show all your calculation steps).
- Get help from classmates if you need it.
- Turn the corrections in by the due date, typically the class after the weekend it is handed back (you can turn them in earlier if you want).
- Make sure you include everything that was asked for. You will not receive credit unless everything is included.

You will receive 1/3 of the points you missed as extra credit (assuming your corrections are done correctly). No partial credit is given for test corrections.

Q. Class Attendance and Homework Make-Up Policy:

Attendance will not be strictly enforced. However, attendance is encouraged as physics is a difficult subject to master, and there are several labs and homework quizzes that require attendance and cannot be made up. Homework will be available until the end of finals week, see above for late policy.

R. Classroom Expectations:

Keys to Success:

- ✓ Be prepared for class – *read the chapter, think about the material, and prepare questions you want to ask.*
- ✓ Take responsibility for your learning – *form study groups, and discuss class topics, do the homework early.*
- ✓ Start homework the day of class and spend time every day doing more – *Physics is not conducive to cramming.*
- ✓ Learn how to approach problems rather than memorizing one problem and making it fit all the other.

Masteringphysics Suggestions:

- ✓ Read the submission instructions carefully. Many problems specifically state how the answer is to be submitted.
- ✓ Carefully watch your significant figures (most problems require 3 significant figures). If you use the incorrect number of significant figures, your answer will be marked wrong.
- ✓ Use the hints! You are NOT penalized for reading the hints. (You are penalized if you incorrectly answer a question within the hints).
- ✓ Do the problems on paper and save them for later. You will probably want to refer to them later.
- ✓ Each numerical answer asks for specific units. Be sure you pay close attention to these.
- ✓ Ask questions! Don't keep submitting answers over and over and over again, only to get them wrong. Ask for help!
- ✓ Use the numerical values given in the problem. Most problems randomize the numbers, so you and your classmates will have different numbers.

S. College Procedures/Policies:

Attendance Requirements: All students are required to attend all scheduled classes and examinations. Each faculty member has the right to establish regulations regarding attendance that he/she considers necessary for successful study.

Students who do not attend classes may be administratively withdrawn from those classes. However, failure to attend classes does not constitute withdrawal, and students are expected to process a formal withdrawal though the Student Records Office in Kee Hall.

Student engagement requirements:
Student engagement is based on the "active pursuit" of learning which can be measured by class attendance, class participation (in class or online), taking required quizzes/examinations, and submission of work assignments or papers. Student engagement consists of a student attending at least 60% of the class sessions (there should be attendance throughout the term) and/or completing 75% of the assignments listed on the syllabus at the midpoint in the term. Exceptions can be made when there is on-going communication between the student and faculty member. The communication must be documented, and the faculty member and student must be in agreement regarding the exception. Students not meeting the expectation will be administratively withdrawn from class. If a student believes he/she was administratively withdrawn in error, he/she may file an appeal. Being administratively withdrawn may have program and financial aid implications.

Academic Misconduct is any activity that tends to compromise the academic integrity of the college or subvert the educational process. Examples of academic misconduct include, but are not limited to:

1. Violation of course or program rules as contained in the course syllabus or other information provided to the student; violation of program requirements as established by departments and made available to students.

2. Plagiarism including, but not limited to, submitting, without appropriate acknowledgment, any written, visual, or oral material that has been copied in whole or in part from the work of others (whether such source is published or not) even if the material is completely paraphrased in one's own words. This includes another individual's academic composition, compilation, or other product, or a commercially prepared paper. Plagiarism also includes submitting work in which portions were substantially produced by someone acting as a tutor or editor.

   Such practices constitute plagiarism regardless of motive. Those who deny deceitful intent, claim not to have known that the act constituted plagiarism, or maintain that what they did was inadvertent are nevertheless subject to penalties when plagiarism has been confirmed.

3. Cheating and dishonest practices in connection with examinations, papers and projects, including but not limited to using unauthorized notes, study aids or information on an examination; obtaining help from another student during an examination; taking an exam or doing work for another student; providing one's own work for another student to copy and submit as his/her own; or allowing another student to do one's work and then submitting the work as one's own. Also included would be altering a graded work after it has been returned, then submitting the work for re-grading; or submitting identical or similar papers for credit in more than one course without prior permission from the course instructors.

4. Fabrication including but not limited to falsifying or inventing any information, data or citation; presenting data that were not gathered in accordance with defined appropriate guidelines, and failing to include an accurate account of the method by which data were collected.

5. Obtaining an Unfair Advantage including, but not limited to stealing, reproducing, circulating, or otherwise gaining access to examination materials prior to the time authorized by the instructor; unauthorized collaborating on an academic assignment; taking, hiding or altering resource material; or undertaking any activity with the purpose of creating or obtaining an unfair advantage over another student's academic work.

6. Aiding and Abetting Academic Dishonesty including, but not limited to providing material, information or other assistance to another person with the knowledge that such aid could be used in any of the violations stated above, or providing false information in connection with any inquiry regarding academic integrity.

7. Alteration of Grades or Marks including but not limited to, action by the student to change the earned credit or grade.

In addition, cases of academic dishonesty may involve photocopied materials. Materials used may fall under the Copyright Act. Violations of said Act may subject the user and/or the College to sanctions.

Statement on Disabilities: Any student who requires reasonable accommodations related to a disability should inform the course instructor and the Coordinator of Specialized Services (Room 138 in Kee Hall; phone 419-755-4727).

Students who encounter difficulty in any of their courses are encouraged to visit the Tutoring Resource Center (Room 119 in Fallerius Technical Education Center) for tutoring assistance, and the Student Success Center (Room 136 in Kee Hall) for academic assistance, advising services, referrals for personal counseling and Learning Disability (LD) Testing.

Statement on Withdrawals: As a student, you are expected to attend class. If you are unable or choose not to attend class, or if for whatever reason you are unable to keep up with the requirements of a course, you need to officially drop the class at the Student Records Office. Refund dates and withdrawal dates will vary slightly from term to term. Contact the Student Records Office for applicable dates. Additionally, these dates are posted on the academic calendar available on the college's website, www.ncstatecollege.edu, under the Academics heading on the home page and are available at the Student Records Office in Kee Hall. **S**tudents should go to the Student Records Office **(**Room 142 in Kee Hall) to process their withdrawal from any class.

If you choose to walk away from your class without officially withdrawing from it, the faculty member teaching the class must grade your classroom performance on the material available to him or her. This normally results in an "F" grade. An "F" grade can lower your grade point average considerably depending on the total credits accumulated.