North Central State College

MASTER SYLLABUS	2025-2026

A. Academic Division: Engineering Technology, Business & Criminal Justice Division

B. Discipline: Physics

C. Course Number and Title: PHYS1110 General Physics I

D. Assistant Dean: Brooke Miller, M.B.A.

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

F. Prerequisites: MATH1130 can be concurrent (min C-required) or higher

G. Last Course/Curriculum Revision Date: Fall 2025   Origin date: 05/11/2011

H. Textbook(s) Title:

College Physics: A Strategic Approach with Mastering Physics w/ Pearson eTexts

- Author(s): Knight, Jones, Field
- Copyright Year: 2020
- Edition: 4th
- ISBN #: 9780134724744

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

J. Course Description: A study of Classical Newtonian Mechanics including measurement systems, dimensional analysis, vectors, scalars, linear, circular and rotational motion, forces in equilibrium, acceleration, work, and energy. A study of material properties including density, and hydraulic principles (both static and kinetic). Also a study of waves, and sound including simple harmonic motion, vibrations, reflection, transmission, interference and resonance for waves, intensity, sources, interference, and Doppler Effect for sound. This course meets the requirements for TAG# OSC014. If combined with PHYS1130, TAG# OSC021 is met.

K. College-Wide Learning Outcomes:

College-Wide Learning Outcome	Assessments - - How it is met & When it is met
Communication – Written	
Communication – Speech	
Intercultural Knowledge and Competence	
Critical Thinking	Critical Thinking VALUE Rubric
Information Literacy	
Quantitative Literacy	

L.   Course Outcomes and Assessment Methods:

Upon successful completion of this course, the student shall:

Outcomes	Assessments – How it is met & When it is met
1. Write a lab report for each laboratory performed. Evaluation will be based on accuracy of data taken, logical consistency of mathematical methods, appropriateness of tables and graphs, completion of required steps, evaluation of the validity of the mathematical models used, identification of sources of error, appropriate use of technology and ability to communicate clearly in writing.	Class discussions, homework, labs, quizzes, and exams during the weeks 1-16
2. Calculate all missing kinematical variables (including direction of the variable when appropriate), given a problem in one or two-dimensional kinematics (involving position, velocity, and acceleration) of a single object with a constant acceleration.	Class discussions, homework, labs, quizzes, and exams during the weeks 1-16
3. Add vectors in two dimensions given in rectangular form, and express the answer in rectangular form.	Class discussions, homework, labs, quizzes, and exams during the weeks 3-16
4. Use Newton's laws of motion to calculate the missing dynamical variables, including the reaction forces when appropriate, given a problem involving at most two masses, each with a constant acceleration.	Class discussions, homework, labs, quizzes, and exams during the weeks 5-16
5. Find specified kinematical variables and use Newton's laws of motion to find specified unknown dynamical variables, given a problem involving an object moving in a circle.	Class discussions, homework, labs, quizzes, and exams during the weeks 7-16
6. Use the principle of conservation of energy or the work-energy relationship to solve a problem, involving constant interactions between no more than two objects, for the unknown dynamical and kinematical variables, given a problem involving the motion of an object with kinetic and gravitational potential energy.	Class discussions, homework, labs, quizzes, and exams during the weeks 8-16
7. Calculate the missing kinematical variables, given a problem involving the collision of two objects in which linear momentum is conserved.	Class discussions, homework, labs, quizzes, and exams during the weeks 10-16
8. Find specified kinematical and dynamical variables using rotational kinematics, rotational dynamics, and conservation of angular momentum, given a problem involving an object in rotational motion with constant angular acceleration.	Class discussions, homework, labs, quizzes, and exams during the weeks 12-16
9. Solve for the indicated variables for a given static mechanical system that includes both tension and compression members.	Class discussions, homework, labs, quizzes, and exams during the weeks 13-16
10. Solve for the indicated variables for mechanical waves, particularly standing waves in a stretched string or in an air column.	Class discussions, homework, labs, quizzes, and exams during the weeks 14-16

M.   Recommended Grading Scale:

NUMERIC	GRADE	POINTS	DEFINITION
93–100	A	4.00	Superior
90–92	A-	3.67	Superior
87–89	B+	3.33	Above Average
83–86	B	3.00	Above Average
80–82	B-	2.67	Above Average
77–79	C+	2.33	Average
73–76	C	2.00	Average
70-72	C-	1.67	Below Average
67–69	D+	1.33	Below Average
63-66	D	1.00	Below Average
60-62	D-	0.67	Poor
00-59	F	0.00	Failure

N.   College Procedures/Policies:

North Central State College believes that every student is a valued and equal member of the community.* Every student brings different experiences to the College, and all are important in enriching academic life and developing greater understanding and appreciation of one another. Therefore, NC State College creates an inclusive culture in which students feel comfortable sharing their experiences. Discrimination and prejudice have no place on the campus, and the College takes any complaint in this regard seriously. Students encountering aspects of the instruction that result in barriers to their sense of being included and respected should contact the instructor, assistant dean, or dean without fear of reprisal.

*   *Inclusive of race, color, religion, gender, gender identity or expression, national origin (ancestry), military status (past, present or future), disability, age (40 years or older), status as a parent during pregnancy and immediately after the birth of a child, status as a parent of a young child, status as a foster parent, genetic information, or sexual orientation*

Important information regarding College Procedures and Policies can be found on the syllabus supplement located at https://ncstatecollege.edu/documents/President/PoliciesProcedures/PolicyManual/Final%20PDFs/14-081b.pdf

North Central State College
SYLLABUS ADDENDUM

Academic Division:	Engineering Technology, Business & Criminal Justice	**Discipline:**	Physics
Course Coordinator:	Wesley Adams		
Course Number:	PHYS 1110	**Course Title:**	General Physics I
Semester / Session:	SP 2026 / Full Session	**Start / End Date:**	01/12/2026 thru 05/08/2026

Instructor Information

Name:	Peter Sandwall	**Credentials:**	PhD, DABR (Nuclear Eng., Medical Physics)
Phone Number:	419-526-8883	**E-Mail Address:**	psandwall@ncstatecollege.edu
Office Location:	OhioHealth Mansfield / Zoom	**Office Hours:**	by appointment

I. Topical Timeline / Course Calendar (Subject to Change):

Weeks	Topics	Assignment	Due Date
1	Force and Motion	Representing Motion, Motion in One Dimension	02/05/2026
2	Force and Motion	Motion in 1-D, Vectors and Motion in 2-D	02/05/2026
3	Force and Motion	Forces and Newton's Laws of Motion, Applying Newton's Laws of Motion	02/05/2026
4	Force and Motion	Exam 1	02/05/2026
5	Force and Motion	Circular Motion, Orbits, and Gravity	02/17/2026
6	Force and Motion	Rotational Motion, Equilibrium and Elasticity	02/24/2026
7	Force and Motion	Exam 2	02/24/2026
8	Conservation Laws	Momentum	03/17/2026
9	Conservation Laws	Energy and Work	03/24/2026
10	Conservation Laws	Exam 3, Using Energy	03/24/2026
11	Properties of Matter	Thermal Properties of Matter, Fluids	04/09/2026
12	Properties of Matter	Exam 4	04/09/2026
13	Oscillations and Waves	Oscillations, Traveling Waves and Sound	04/21/2026
14	Oscillations and Waves	Traveling Waves and Sound, Superposition and Standing Waves	04/30/2026
15	Oscillations and Waves	Exam 5	04/30/2026
16	Comprehensive	Comprehensive Final Exam	05/07/2026

II. 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, assessments will be made in class through questions you will answer and demonstrations you will work together to explain. The student is responsible for his or her active learning in the course.

Final Grade Calculation

Activity	Qty	Points	Percentage
Assignments	16	Varies	50%
Exams	5	100	36%
Comprehensive Final Exam	1	200	14%

1. **Topic 1: Measurement, Models, and Motion (Ch. 1–2)**
   Introduction to physics as a model-based science. Emphasis on units, vectors vs. scalars, graphical representations of motion, and one-dimensional kinematics. Students develop strategies for translating physical situations into mathematical descriptions.

2. **Topic 2: Motion in Two Dimensions and Vectors (Ch. 3)**
   Vector addition and decomposition, relative motion, and two-dimensional kinematics. Applications include projectile motion and motion with constant acceleration in multiple dimensions.

3. **Topic 3: Forces and Newton's Laws (Ch. 4–5)**
   Forces, free-body diagrams, and Newton's three laws of motion. Problem solving involving equilibrium and constant acceleration, including friction, tension, and normal forces.

4. **Topic 4: Circular Motion and Gravitation (Ch. 6)**
   Uniform circular motion, centripetal acceleration, and Newton's law of universal gravitation. Applications to orbits and rotational systems without full mathematical orbital derivations.

5. **Topic 5: Rotational Motion and Static Equilibrium (Ch. 7–8)**
   Angular kinematics, torque, rotational dynamics, and conditions for static equilibrium. Analysis of systems involving rigid bodies, tension, and compression members.

6. **Topic 6: Momentum and Collisions (Ch. 9)**
   Linear momentum, impulse, and conservation of momentum. Analysis of one- and two-object systems including elastic and inelastic collisions.

7. **Topic 7: Work and Energy (Ch. 10–11)**
   Work, kinetic energy, gravitational potential energy, and conservation of mechanical energy. Emphasis on energy methods as an alternative to force-based analysis.

8. **Topic 8: Thermal Properties and Fluids (Ch. 12–13)**
   Thermal expansion, basic heat concepts, density, pressure, buoyancy, and fluid statics. Applications include Archimedes' principle and simple hydraulic systems.

9. **Topic 9: Oscillations and Mechanical Waves (Ch. 14–16)**
   Simple harmonic motion, wave properties, superposition, standing waves, and sound. Focus on qualitative understanding and basic quantitative relationships.

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 online. After registering, you must join the class by using the class code **sandwall75895**. 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.

III.   <u>**Examination Policy:**</u>

There will be five 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 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 during a test, acquire permission from your instructor and leave your cell phone in the classroom where the instructor can see it. Grading the exams will be based on your shown work and not simply the result. Your work getting the answer is more important than the answer itself. 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 test must notify the professor PRIOR to the time of the test (contact info above). If an emergency arises (for example: car accident, hospitalization) then contact your instructor IMMEDIATELY or ASAP.

IV.   <u>**Class Attendance and Homework Make-Up Policy:**</u>

Attendance will not be strictly enforced. However, attendance is strongly encouraged as physics is a difficult subject to master, and there are several demonstrations and illustrations that require attendance and cannot be made up. Homework will be available until the end of finals week, yet points will be deducted for late assignments, as outlined in mastering physics.

V.   <u>**Classroom Expectations:**</u>

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Keys to Success:
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- ✓   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.

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Masteringphysics Suggestions:
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- ✓   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 this.
- ✓   Ask questions! Don't keep submitting answers repeatedly, 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.