North Central State College

MASTER SYLLABUS
2019-2020

A. Academic Division: Business, Industry and Technology

B. Discipline: Physics

C. Course Number and Title: PHYS1110 General Physics I

D. Course Coordinator: Gary Wood
Assistant Dean: Toni Johnson, PhD

Instructor Information:
- Name: Click here to enter text.
- Office Location: Click here to enter text.
- Office Hours: Click here to enter text.
- Phone Number: Click here to enter text.
- E-Mail Address Click here to enter text.

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

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

G. Syllabus Effective Date: Fall, 2019

H. Textbook(s) Title:

Physics: Principles with Applications
- Author(s): Giancoli
- Copyright Year: 2013
- Edition: 7th
- ISBN #: 9780321625922 (Hardcover) or 9780321869111 (Loose-leaf)

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	

College-Wide Learning Outcome	Assessments - - How it is met & When it is met
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

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 or not the result of a calculation is reasonable.

M. Topical Timeline (Subject to Change):

1. Introduction, Measurement, Estimating
2. Describing Motion: Kinematics in One Dimension
3. Kinematics in Two Dimensions; Vectors
4. Motion and Force: Dynamics
5. Circular Motion; Gravitation
6. Work and Energy
7. Linear Momentum
8. Rotational Motion
9. Static Equilibrium; Elasticity and Fracture
10. Vibrations & Waves

N. Course Assignments:

Week	Topics/ Chapter - Section	Lab
1	**1 Introduction, Measurement, Estimating** 1-1 The Nature of Science 1-2 Physics and its Relation to Other Fields 1-3 Models, Theories, and Laws 1-4 Measurement and Uncertainty; Significant Figures 1-5 Units, Standards, and the SI System 1-6 Converting Units 1-7 Order of Magnitude: Rapid Estimating 1-8 Dimensions and Dimensional Analysis **2 Describing Motion: Kinematics in One Dimension** 2-1 Reference Frames and Displacement 2-2 Average Velocity 2-3 Instantaneous Velocity 2-4 Acceleration	Graph Matching

Week	Topics/ Chapter - Section	Lab
2	**2 Describing Motion: Kinematics in One Dimension** 2-5 Motion at Constant Acceleration 2-6 Solving Problems 2-7 Falling Objects 2-8 Graphical Analysis of Linear Motion	Velocity and Acceleration with tape timers and with sensors
3	3 Kinematics in Two Dimensions; Vectors 3-1 Vectors and Scalars 3-2 Addition of Vectors—Graphical Methods 3-3 Subtraction of Vectors, and Multiplication of a Vector by a Scalar 3-4 Adding Vectors by Components	Force Table
4	**3 Kinematics in Two Dimensions; Vectors** 3-5 Projectile Motion 3-6 Solving Problems Involving Projectile Motion 3-7 Projectile Motion Is Parabolic	Projectile Motion
5	**4 Motion and Force: Dynamics** 4-1 Force 4-2 Newton's First Law of Motion 4-3 Mass 4-4 Newton's Second Law of Motion 4-5 Newton's Third Law of Motion 4-6 Weight—the Force of Gravity; and the Normal Force	Force, Mass, & Acceleration
6	**4 Motion and Force: Dynamics** 4-7 Solving Problems with Newton's Laws: Free-Body Diagrams 4-8 Applications Involving Friction, Inclines 4-9 Problem Solving—A General Approach	Friction - Static and Kinetic
7	5 Circular Motion; Gravitation 5-1 Kinematics of Uniform Circular Motion 5-2 Dynamics of Uniform Circular Motion 5-3 Newton's Law of Universal Gravitation 5-4 Gravity Applications 5-5 Types of Forces in Nature	Centripetal Force
8	6 Work and Energy 6-1 Work Done by a Constant Force 6-3 Kinetic Energy, and the Work-Energy Principle 6-4 Potential Energy 6-5 Conservative and Nonconservative Forces	Work Done by a Variable Force
9	6 Work and Energy 6-6 Mechanical Energy and Its Conservation 6-7 Problem Solving Using Conservation of Mechanical Energy 6-8 Other Forms of Energy; Energy Transformations and Conservation of Energy 6-9 Energy Conservation with Dissipative Forces: Solving Problems 6-10 Power	Energy Conservation - Ball Drop

Week	Topics/ Chapter - Section	Lab
10	**7 Linear Momentum** 7-1 Momentum and Its Relation to Force 7-2 Conservation of Momentum 7-3 Collisions and Impulse 7-4 Conservation of Energy and Momentum in Collisions 7-5 Elastic Collisions in One Dimension 7-6 Inelastic Collisions 7-7 Center of Mass (CM) 7-8 Center of Mass and Translational Motion	Ballistic Pendulum - Approx V0
11	**8 Rotational Motion** 8-1 Angular Quantities 8-2 Constant Angular Acceleration 8-3 Rolling Motion (Without Slipping) 8-4 Torque	Torque and Mechanical Equilibrium
12	**8 Rotational Motion** 8-5 Rotational Dynamics; Torque & Rotational Inertia 8-6 Solving Problems in Rotational Dynamics 8-7 Rotational Kinetic Energy 8-8 Angular Momentum and Its Conservation	NEW Ballistic Pendulum - Exact V0
13	**9 Static Equilibrium; Elasticity and Fracture** 9-1 The Conditions for Equilibrium 9-2 Solving Statics Problems 9-3 Stability and Balance 9-4 Elasticity; Stress and Strain 9-5 Fracture 9-6 Arches and Domes	Spring-Boom Crain
14	**11 Vibrations & Waves** 10-1 Simple Harmonic Motion 10-2 Energy in the Simple Harmonic Oscillator 10-3 The Period and Sinusoidal Nature of SHM 10-4 The Simple Pendulum 10-5 Damped Harmonic Motion 10-6 Forced Vibrations; Resonance	Hooke's Law & Simple Harmonic Motion
15	**11 Vibrations & Waves** 10-7 Wave Motion 10-8 Types of Waves: Transverse and Longitudinal 10-9 Energy Transported by Waves 10-10 Intensity Related to Amplitude and Frequency 10-11 Reflection and Transmission of Waves 10-12 Interference; Principle of Superposition 10-13 Standing Waves; Resonance 10-14 Refraction 10-15 Diffraction 10-16 Mathematical Representation of a Traveling Wave	Standing waves in a string

O. 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

P. Grading and Testing Guidelines:

Click here to enter text.

Q. Examination Policy:

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R. Class Attendance and Homework Make-Up Policy:

Click here to enter text.

S. Classroom Expectations:

Click here to enter text.

T. College Procedures/Policies:

Important information regarding College Procedures and Policies can be found on the syllabus supplement **located at https://sharept.ncstatecollege.edu/committees/1/curriculum/SiteAssets/SitePages/Home/SYLLABUS%20SUPPLEMENT.pdf**

The information can also be found Choose an item.