



North Central State College
MASTER SYLLABUS
2019-2020

- A. Academic Division: Business, Industry and Technology
- B. Discipline: Physics
- C. Course Number and Title: PHYS1010 Introductory Physics
- 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: 3
Lecture: 2 hours
Laboratory: 3 hours
- F. Prerequisites: MATH0084 (minimum grade of C- required)
- G. Syllabus Effective Date: Fall, 2019
- H. Textbook(s) Title:

Conceptual Physics

- Author(s): Hewitt
- Copyright Year: 2015
- Edition: 12th
- ISBN: 9780321909107 (hard copy) OR 9780321939777 (digital)

- I. Workbook(s) and/or Lab Manual: See above
- J. Course Description: This course will provide students with a general understanding, knowledge, and awareness of the physical world around them. Topics will introduce the concepts of mechanical, electrical and atomic physics with discussions, lectures, and laboratory experiences related to the principles of mechanics, heat, light, sound, electricity, magnetism, and atomic structure. This course meets the requirements for OTM in Natural Sciences TMNS.
- 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	

College-Wide Learning Outcome	Assessments - - How it is met & When it is met
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. Calculate one or two missing variables, given a problem in one dimension (involving time, position, velocity, and acceleration) of a single object.	Class discussions, homework, labs, quizzes, and exams during the weeks 1-16
2. Use Newton's laws of motion to identify the reaction force, to solve a given problem involving the force interaction of two objects.	Class discussions, homework, labs, quizzes, and exams during the weeks 1-16
3. Use Newton's laws of motion to calculate the missing variables, including force, given a problem involving one mass, with a constant acceleration.	Class discussions, homework, labs, quizzes, and exams during the weeks 3-16
4. Use conservation of energy to solve a problem involving one object with kinetic energy and gravitational potential energy for one unknown variable.	Class discussions, homework, labs, quizzes, and exams during the weeks 4-16
5. Use the law rotational equilibrium to solve a problem involving one rigid body and up to three forces for one unknown variable.	Class discussions, homework, labs, quizzes, and exams during the weeks 5-16
6. Be able to describe the proton, neutron, and electron including where they are located in the atom, and use the definitions of isotope, atomic number, and atomic mass to calculate the number of protons, neutrons, and electrons in an atom.	Class discussions, homework, labs, quizzes, and exams during the weeks 6-16
7. Solve for the indicated variable in problems involving Archimedes' principle.	Class discussions, homework, labs, quizzes, and exams during the weeks 7-16
8. Solve for the pressure, volume, temperature, mass of gas, or amount of gas in ideal gas law problems.	Class discussions, homework, labs, quizzes, and exams during the weeks 8-16
9. Calculate the final temperature of a mixture of two equal size samples of one substance at two temperatures.	Class discussions, homework, labs, quizzes, and exams during the weeks 9-16
10. Solve for one of the variables in a specific heat problem for a single substance.	Class discussions, homework, labs, quizzes, and exams during the weeks 9-16
11. Solve for one of the variables in a thermal expansion problem for a single substance.	Class discussions, homework, labs, quizzes, and exams during the weeks 9-16
12. Solve for the heat necessary to produce one to two phase changes for a single substance.	Class discussions, homework, labs, quizzes, and exams during the weeks 10-16
13. Calculate the period or frequency given the other for a vibrating object or wave.	Class discussions, homework, labs, quizzes, and exams during the weeks 11-16
14. Calculate the frequency, wavelength, or velocity given the others for a wave.	Class discussions, homework, labs, quizzes, and exams during the weeks 11-16
15. Calculate the frequency of the beats produced by two given frequencies of sound.	Class discussions, homework, labs, quizzes, and exams during the weeks 12-16
16. Solve an electrostatics problem using Coulomb's Law.	Class discussions, homework, labs, quizzes, and exams during the weeks 13-16
17. Solve for the equivalent resistance for up to three resistors in a series or parallel electric current.	Class discussions, homework, labs, quizzes, and exams during the weeks 14-16

Outcomes	Assessments – How it is met & When it is met
18. Determine the direction of the magnetic field around a current carrying wire.	Class discussions, homework, labs, quizzes, and exams during the weeks 15-16
19. Solve for the direction of the force on a moving charge in a magnetic field.	Class discussions, homework, labs, quizzes, and exams during the weeks 15-16

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

M. Topical Timeline (Subject to Change):

1. Newton's 1st Law of Motion
2. Linear Motion
3. Newton's 2nd Law of Motion
4. Newton's 3rd Law of Motion
5. Energy
6. Rotational Motion
7. The Atomic Nature of Matter
8. Solids
9. Liquids
10. Gases and Plasmas
11. Temperature, Heat, and Expansion
12. Heat Transfer
13. Change of Phase
14. Vibrations & Waves
15. Sound
16. Electrostatics
17. Electric Current
18. Magnetism

N. Course Assignments:

Week	Title	Topics	LAB
1	Newton's 1 st Law of Motion	History of Science, Newton's First Law of Motion, Net Force, The Equilibrium Rule, Support Force,	Constant Velocity and Acceleration
	Linear Motion	Speed, Velocity, Acceleration, Free Fall	
2	Newton's 2 nd Law of Motion	Force, Acceleration, Friction, Mass and Weight, Newton's Second Law of Motion, Free Fall	Ride the Elevator
3	Newton's 3 rd Law of Motion	Newton's Third Law of Motion	Force, Mass, & Acceleration
4	Energy	Work, Power, Energy, Conservation of energy, Machines, Efficiency	Review for test , & Machine demos
5	Rotational Motion	Circular Motion, Rotational Inertia, Torque, Center of Mass and Center of Gravity, Centripetal Force, Centrifugal Force, Angular Momentum, Conservation of Angular Momentum	Rotational Inertia

Week	Title	Topics	LAB
6	The Atomic Nature of Matter	Atomic Structure, Elements, The Periodic Table, Isotopes, Compounds, Mixtures, and Molecules	Mass & Weight Density
	Solids	Density, Elasticity, Tension & Compression, Arches, Scaling	
7	Liquids	Pressure, Pressure in a Liquid, Buoyancy, Archimedes' Principle, Flotation, Pascal's Principle, Surface Tension, Capillarity	Buoyancy
8	Gases	Atmosphere, Atmospheric Pressure, Boyle's Law, Buoyancy of Air, Bernoulli's Principle, Plasma	Gas Law Problems
9	Temperature, Heat, and Expansion	Temperature, Heat, Specific Heat Capacity, Thermal Expansion	Specific Heat
10	Heat Transfer	Conduction, Convection, and Radiation, Controlling Heat Transfer	Radiation and Boiling and Freezing Temp
	Change of Phase	Phases of Matter, Evaporation, Condensation, Boiling, Melting and Freezing, Energy and Changes of Phase	
11	Vibrations & Waves	Vibrations, Vibration of a Pendulum, Wave Description, Wave Motion, Wave Speed, Transverse Waves, Longitudinal Waves, Interference, Standing Waves, Doppler Effect	Standing waves in a string
12	Sound	Sound, Reflection, Refraction, Energy in Sound Waves, Forced Vibrations, Natural Frequency, Resonance, Interference, Beats	Resonance
13	Electrostatics	Electricity, Electrical Forces, Electric Charges, Conservation of Charge, Coulomb's Law, Conductors and Insulators, Superconductors, Charging, Charge Polarization, Electric Field, Electric Potential, Electric Energy Storage	Calculating Coulomb's Force
14	Electric Current	Electric Current, Voltage, Resistance, Ohm's Law, Direct Current and Alternating Current, Electric Power, Fuses	Calculating electric circuits Lights in series & parallel
15	Magnetism	Magnetism, Magnetic Forces, Magnetic Poles, Magnetic Fields, Magnetic Domains, Electric Current and Magnetic Fields, Electromagnets, Magnetic Force on Moving Charged Particles, Magnetic Force on Current-Carrying Wires, Earth's Magnetic Field	Review Final

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:

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Q. Examination Policy:

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R. Class Attendance and Homework Make-Up Policy:

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S. Classroom Expectations:

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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.