South Central College

PHYS 101 Introductory Physics

Course Outcome Summary

Course Information

Description	A one semester course covering the basic principles of physics at a conceptual level and with a minimal amount of math. Topics generally included mechanics, simple machines, atomic structure, heat, light, and sound. Lecture and laboratory components (MNTC 3: Natural Sciences)
Total Credits	3
Total Hours	48

Types of Instruction

Instruction Type	Credits/Hours
Lecture	

Pre/Corequisites

MATH 0075 with a C or higher, or a score of 56 or higher on the Arithmetic portion of the Accuplacer test.

Institutional Core Competencies

Critical and Creative Thinking - Students will be able to demonstrate purposeful thinking with the goal of using a creative process for developing and building upon ideas and/or the goal of using a critical process for the analyzing and evaluating of ideas.

Course Competencies

1. Explain the origin of physics and range of topics

Learning Objectives

Describe the subjects and phenomenon studied in physics
Review how people studied physics in history
Tell the importance of observation and experiments in physics
Name the three main branches of modern physics research

2. Review kinematics

Learning Objectives

Depict displacement and its difference from distance
Define velocity and speed
Define acceleration

Diagram basic vector operations

3. Define force and mass

Learning Objectives

Determine the acting forces in various cases
Draw free-body diagram and decompose forces
Explain the concept of inertia
Define mass as the measure of inertia

4. Describe Newton's laws of motion

Learning Objectives

Compare Newton's first law and Aristotle's view
Explain relations between force, mass and acceleration
Demonstrate the co-existence of action and reaction forces

5. Describe universal gravity

Learning Objectives

Express the relation between gravitational force and masses of objects
Describe the dependence of gravitational force on distance
Define weight
Explain the different weights of one object on different planets

6. Determine work and energy

Learning Objectives

Define work
Define kinetic energy
Explain work-energy theorem
Define potential energy
Describe the principle of conservation of energy
Define power

7. Identify simple machines

Learning Objectives

Explore the advantages of simple machines
Describe an inclined plane
Describe pulley system
Describe a lever

8. Review impulse and momentum

Learning Objectives

Define impulse and momentum
Explain the principle of conservation of momentum
Apply the conservation of momentum to rockets and airplanes

9. Discuss fluid dynamics

Learning Objectives

Define pressure
Review Pascal's principle
Define density
Explain Archimedes' principle
Explain Bernoulli's law and apply it to airplanes

10. Illustrate behaviors of waves

Learning Objectives

Describe transverse and longitudinal waves
Define period, frequency and speed of periodic waves
Illustrate the principle of linear superposition
Depict the interference and diffraction of waves

11. Describe sound phenomenon

Learning Objectives

Estimate distances by the use of the speed of sound
Describe Doppler's effect
Describe beats

12. Investigate heat and temperature

Learning Objectives

Name three main temperature scales
Examine the thermal expansion or contraction of substances
Point out different specific heat capacity of substances
Classify major processes of heat transfer

13. Study light and optics

Learning Objectives

Investigate properties of images formed by mirrors
Compare images formed by two types of thin lenses
Explain the principles of eye, camera and telescope
Illustrate the interference patterns in double-slit experiment
Describe diffraction patterns
Summarize the nature of light as wave

14. Demonstrate electric charges and electric fields

Learning Objectives

Describe properties of electric charges
Diagram electric fields caused by different charges
Describe the motion of charges in a uniform electric field
Review electric potential and electric potential energy

15. Discuss current and circuits

Learning Objectives

Describe electric current
Explain the dependence of resistance on conditions of conductors
Describe the relations of current, voltage and resistance
Name components of a simple DC circuit
Contrast DC to AC circuits

16. Investigate magnet and magnetic fields

Learning Objectives

Describe the interaction between poles of magnets
Illustrate magnetic fields
Show the motions of electric charges in magnetic fields
Explain the forces of magnetic fields on a current-carrying wire
Illustrate magnetic fields formed by a current

17. Interpret electromagnetic waves

Learning Objectives

Describe the results of changing electric fields and magnetic fields
Describe the propagation of electromagnetic waves
Classify electromagnetic waves of various wavelengths

18. Describe atoms and molecules

Learning Objectives

Tell the size and components of a hydrogen atom
Describe more complicated atoms and ions
Explain how atoms and ions are bonded into molecules
Name the nucleons and explain the source of nuclear energy

Compare nuclear fission and nuclear fusion

19. Study Earth and space

Learning Objectives

Classify the surface circles and inner layers of the Earth
Describe the relative motions of the Sun, the Earth and the Moon
List the planets and their relative positions in the solar system
Explain the energy source of the Sun
Describe dwarf stars, neutron stars and black holes
Illustrate the Milky Way and other galaxies
Describe the expansion of the Universe

20. Brief basic concepts of theory of relativity

Learning Objectives

Express the basic assumptions of special relativity
Show the equivalence of mass and energy
Describe the effects of time dilution and length shrink

SCC Accessibility Statement

South Central College strives to make all learning experiences as accessible as possible. If you have a disability and need accommodations for access to this class, contact the Academic Support Center to request and discuss accommodations. North Mankato: Room B-132, (507) 389-7222; Faribault: Room A-116, (507) 332-7222.

Additional information and forms can be found at: www.southcentral.edu/disability

This material can be made available in alternative formats by contacting the Academic Support Center at 507-389-7222.