

## Course Number and Title: PHY 110 Physics for the Physical Therapist Assistant

**Campus Location:**

Georgetown, Wilmington

**Effective Date:**

2022-51

**Prerequisite:**

MAT 162, SSC 100 or concurrent

**Co-Requisites:**

None

**Course Credits and Hours:**

4.00 credits

3.00 lecture hours/week

2.00 lab hours/week

**Course Description:**

This course studies basic physics for the physical therapist assistant. Content includes motion, forces, energy, mechanical advantage, fluids, heat, sound and light waves, and electricity.

**Required Text(s):**

Obtain current textbook information by viewing the [campus bookstore - https://www.dtcc.edu/bookstores](https://www.dtcc.edu/bookstores) online or visit a campus bookstore. Check your course schedule for the course number and section.

**Additional Materials:**

None

**Schedule Type:**

Classroom Course

**Disclaimer:**

None

**Core Course Performance Objectives (CCPOs):**

1. Examine the fundamental properties of linear motion. (CCC 2, 6)
2. Examine the basic concepts of force, torque, and statics. (CCC 2, 6)
3. Differentiate among the concepts of work, energy, and power. (CCC 2, 6)
4. Examine the fundamental properties of fluids. (CCC 2, 6)
5. Examine the fundamental properties of heat. (CCC 2, 6)
6. Examine the fundamental properties of waves. (CCC 2, 6)
7. Examine the fundamental properties of electricity. (CCC 2, 6)
8. Examine the fundamental properties of sound. (CCC 2, 6)

See Core Curriculum Competencies and Program Graduate Competencies at the end of the syllabus. CCPOs are linked to every competency they develop.

## Measurable Performance Objectives (MPOs):

Upon completion of this course, the student will:

1. Examine the fundamental properties of linear motion.
  1. Identify the units of measure for mass, length, and time.
  2. Use metric prefixes accurately.
  3. Define *acceleration*, *velocity*, *displacement*, *distance*, and *speed*.
  4. Apply uniform acceleration formulas to basic problems.
  5. Conduct laboratory experiments related to linear motion.
2. Examine the basic concepts of force, torque, and statics.
  1. Identify the four basic kinds of force.
  2. Explain Newton's laws.
  3. Distinguish between weight and mass.
  4. Solve vector problems by graphical methods.
  5. Describe friction, spring force, and earth's surface gravity.
  6. Define *torque* and *static equilibrium*.
  7. State the conditions required for a body to be in static equilibrium.
  8. Define *center of mass* and *center of gravity*.
  9. Calculate force or acceleration using Newton's laws in application problems.
  10. Distinguish between conservative and non-conservative forces.
  11. Discuss the changes that occur in the amount of kinetic energy, momentum, and total energy when two objects collide in an elastic or inelastic collision.
  12. Compute torque when given the force and moment arm.
  13. Analyze the equilibrium conditions for a given system.
  14. Compute the forces exerted on an object in rotational equilibrium.
  15. Explain the angular momentum of a system.
  16. Conduct laboratory experiments related to force.
3. Differentiate among the concepts of work, energy, and power.
  1. Describe work, kinetic energy, potential energy, and power.
  2. Calculate work, kinetic energy, potential energy, and power in application problems.
  3. Apply the conservation of energy principle.
  4. Explain efficiency.
4. Examine the fundamental properties of fluids.
  1. Define *pressure*, *density*, *viscosity*, *surface tension*, and *buoyancy*.
  2. Calculate the buoyant force exerted on object by different fluids.
  3. Calculate the force that a fluid produces over a given area.
  4. Conduct laboratory experiments involving fluids.
5. Examine the fundamental properties of heat.
  1. Describe the microscopic structure of the three states of matter.
  2. Describe thermal energy, heat, and temperature.
  3. Identify three temperature scales, and locate absolute zero, the freezing point of water, and the boiling point of water on each scale.
  4. Define *specific heat*, *latent heat*, and *phase change*.
  5. Calculate the amount of heat energy contained in an object given the mass and specific heat.
  6. Describe the effects of heat transfer by radiation, convection, and conduction.
  7. Conduct laboratory experiments related to heat.
6. Examine the fundamental properties of waves.
  1. Define *wave*, *vibration*, *frequency*, *period*, *wavelength*, *amplitude*, and *wave velocity*.
  2. Explain how frequency, period, wavelength, and wave velocity are interrelated.
  3. Explain how amplitude and the energy content of a wave are related.
  4. Distinguish between longitudinal and transverse waves.
  5. Calculate wavelength given the frequency of sound and vice-versa.
  6. Describe the electromagnetic spectrum and the inverse square law.
  7. Conduct laboratory experiments related to waves.
7. Examine the fundamental properties of electricity.
  1. Define *charge*, *current*, and *voltage*.
  2. Explain Coulomb's law.
  3. Explain how current is related to charge.
  4. Distinguish between alternating current (AC) and direct current (DC).
  5. Explain the relationship between voltage, potential energy, and charge.
  6. Apply Ohm's law to basic circuit problems.
  7. Identify the requirements for a basic circuit to function.
  8. Discuss the basic hazards of electricity, and identify safety strategies.
  9. Conduct laboratory experiments related to electricity.
8. Examine the fundamental properties of sound.
  1. Describe wavelength, amplitude, and frequency.
  2. Measure the velocity of sound in air.
  3. Describe the attenuation of sound energy that occurs when it enters a dense medium, such as a certain type of human tissue.
  4. Conduct laboratory experiments related to sound.

**Evaluation Criteria/Policies:**

The grade will be determined using the Delaware Tech grading system:

90	-	100	=	A
80	-	89	=	B
70	-	79	=	C
0	-	69	=	F

Students should refer to the [Student Handbook - https://www.dtcc.edu/handbook](https://www.dtcc.edu/handbook) for information on the Academic Standing Policy, the Academic Integrity Policy, Student Rights and Responsibilities, and other policies relevant to their academic progress.

**Core Curriculum Competencies (CCCs are the competencies every graduate will develop):**

1. Apply clear and effective communication skills.
2. Use critical thinking to solve problems.
3. Collaborate to achieve a common goal.
4. Demonstrate professional and ethical conduct.
5. Use information literacy for effective vocational and/or academic research.
6. Apply quantitative reasoning and/or scientific inquiry to solve practical problems.

**Program Graduate Competencies (PGCs are the competencies every graduate will develop specific to his or her major):**

None

**Disabilities Support Statement:**

The College is committed to providing reasonable accommodations for students with disabilities. Students are encouraged to schedule an appointment with the campus Disabilities Support Counselor to request an accommodation needed due to a disability. A listing of campus Disabilities Support Counselors and contact information can be found at the [disabilities services - https://www.dtcc.edu/disabilitysupport](https://www.dtcc.edu/disabilitysupport) web page or visit the campus Advising Center.