

Standard Institutionally Developed College: Atlanta Technical College

EDGE Compatible: No

Pre-requisites

Co-requisites

Course Description

Introduces the fundamentals of classical physics, the solar system, and universe from a descriptive viewpoint. Topics include mechanics, temperature and heat, waves, electricity and magnetism, and astronomy. Laboratory exercises supplement class work. Computer use is an integral part of class and laboratory assignments.

Course Length

	Minutes	Contact Unit
Lecture:	1500	
Lab 2:	0	
Lab 3:	2250	
Practicum/Internship:	0	
Clinical:	0	
Total:	3750	3
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Semester Credit Hours:		3

Competencies

Order	Description	Lecture	Lab2	Lab3	Practicum/Internship	Clinical	Total Minutes	Semester Credit Hrs
1	Mechanics	750	0	1125	0	0	1875	
2	Temperature and Heat	187	0	225	0	0	412	
3	Waves	188	0	225	0	0	413	
4	Electricity and Magnetism	187	0	450	0	0	637	
5	Astronomy	188	0	225	0	0	413	
	Totals for Course PHSC 1111.823 - Physical Science (version 201003):	1500	0	2250	0	0	3750	3

Learning Outcomes

Mechanics

Order	Description	Learning Domain	Level of Learning
1	Convert units from US to metric.	Cognitive	Comprehension
2	Distinguish between scientific laws, hypotheses, and theories.	Cognitive	Analysis
3	Differentiate between scalar and vector quantities.	Cognitive	Analysis
4	Define speed, velocity, and acceleration.	Cognitive	Knowledge
5	Use motion equations.	Cognitive	Application
6	Describe acceleration in uniform circular motion.	Cognitive	Knowledge
7	Describe projectile motion.	Cognitive	Knowledge
8	Explain Newton's three laws of motion.	Cognitive	Comprehension
9	Define voltage, and state how Ohm's law relates to current and resistance.	Cognitive	Knowledge
10	Explain Newton's law of gravitation.	Cognitive	Comprehension
11	Relate Newton's three laws to the concept of equilibrium.	Cognitive	Analysis
12	Discuss circular motion.	Cognitive	Comprehension
13	Define linear momentum.	Cognitive	Knowledge
14	Explain the law of conservation of momentum.	Cognitive	Comprehension
15	Define torque and angular momentum and state their relationship.	Cognitive	Knowledge
16	Define work, energy, and power.	Cognitive	Knowledge
17	Explain the relationship between work and energy.	Cognitive	Comprehension
18	Define kinetic energy.	Cognitive	Knowledge
19	Define conservation of energy.	Cognitive	Knowledge
20	Discuss conservation of energy.	Cognitive	Comprehension
21	Describe transformation of energy forms.	Cognitive	Knowledge
22	Distinguish between electrical power and electrical energy.	Cognitive	Analysis
23	Identify some common forms of energy.	Cognitive	Knowledge
24	Compare the major sources of energy and the main sectors of energy consumption.	Cognitive	Synthesis

Temperature and Heat

Order	Description	Learning Domain	Level of Learning
1	Distinguish between temperature and heat.	Cognitive	Analysis
2	Convert units of temperature measurements from one scale to another.	Cognitive	Comprehension
3	Define heat.	Cognitive	Knowledge
4	Discuss heat units.	Cognitive	Comprehension
5	Relate expansion to temperature change.	Cognitive	Analysis
6	Explain how specific heat relates to heat and temperature.	Cognitive	Comprehension
7	Distinguish between specific heat and latent heat.	Cognitive	Analysis

Order	Description	Learning Domain	Level of Learning
8	Describe the three methods of heat transfer.	Cognitive	Knowledge
9	Give examples of these methods.	Cognitive	Comprehension
10	Discuss conditions for phase changes.	Cognitive	Comprehension
11	Use the perfect gas law and explain the properties of gases.	Cognitive	Application
12	State and explain the three laws of thermodynamics.	Cognitive	Knowledge
13	Compare and Contrast heat engines and heat pumps.	Cognitive	Evaluation
14	Describe what is meant by entropy.	Cognitive	Knowledge

Waves

Order	Description	Learning Domain	Level of Learning
1	Describe the characteristics of wave motion.	Cognitive	Knowledge
2	Distinguish between longitudinal and transverse waves.	Cognitive	Analysis
3	Identify the terms used to describe waves.	Cognitive	Knowledge
4	Use the basic wave equation that relates velocity, wavelength, and frequency.	Cognitive	Application
5	Describe sound waves.	Cognitive	Knowledge
6	Describe the sound spectrum and the decibel scale.	Cognitive	Knowledge
7	Define resonance.	Cognitive	Knowledge
8	Explain standing waves and frequencies.	Cognitive	Comprehension
9	Identify various waves in the electromagnetic spectrum.	Cognitive	Knowledge
10	Describe geometric properties of light.	Cognitive	Knowledge
11	Define the law of reflection.	Cognitive	Knowledge
12	Distinguish between specular and diffuse reflections.	Cognitive	Analysis
13	Describe refraction and explain how light is dispersed.	Cognitive	Knowledge
14	Describe total internal reflection.	Cognitive	Knowledge
15	Distinguish between converging and diverging spherical mirrors.	Cognitive	Analysis
16	Describe image formation and contrast real and virtual images.	Cognitive	Knowledge
17	Distinguish between converging and diverging spherical lenses.	Cognitive	Analysis
18	Describe image formation and contrast real and virtual images.	Cognitive	Knowledge
19	Use the thin lens equation.	Cognitive	Application

Electricity and Magnetism

Order	Description	Learning Domain	Level of Learning
1	Describe properties of charged objects.	Cognitive	Knowledge
2	State Coulomb's law.	Cognitive	Knowledge
3	Compare Newton's law of gravitation to Coulomb's law.	Cognitive	Synthesis

Order	Description	Learning Domain	Level of Learning
4	Discuss conversion of electric charge.	Cognitive	Comprehension
5	Distinguish between alternating and direct current.	Cognitive	Analysis
6	State Ohm's law.	Cognitive	Knowledge
7	Apply Ohm's law to series circuits.	Cognitive	Application
8	Apply Ohm's law to parallel circuits.	Cognitive	Application
9	Define voltage, and state how Ohm's law relates to current and resistance.	Cognitive	Knowledge
10	Calculate power in an electric circuit.	Cognitive	Application
11	Explain the difference between a parallel and series and electric circuit.	Cognitive	Comprehension
12	Discuss the aspects of electrical safety.	Cognitive	Comprehension
13	Discuss interaction between two magnets.	Cognitive	Comprehension
14	Relate magnetism to electricity	Cognitive	Analysis
15	Describe a magnetic field.	Cognitive	Knowledge
16	Discuss the various types of magnetism.	Cognitive	Comprehension
17	Describe the magnetic domains.	Cognitive	Knowledge
18	Analyze some aspects of the Earth's magnetic field.	Cognitive	Application
19	Explain the operation of an electric motor.	Cognitive	Comprehension
20	Explain the operation of an electric generator.	Cognitive	Comprehension
21	Explain the operation of a transformer.	Cognitive	Comprehension

Astronomy

Order	Description	Learning Domain	Level of Learning
1	Discuss the origin of the solar system.	Cognitive	Comprehension
2	Discuss the structure of the solar system.	Cognitive	Comprehension
3	Relate earth's motion to the seasons.	Cognitive	Analysis
4	Explain the phases of the moon.	Cognitive	Comprehension
5	Explain varieties in the length of day.	Cognitive	Comprehension
6	Discuss tides.	Cognitive	Comprehension
7	Describe the composition of the sun.	Cognitive	Knowledge
8	Discuss solar energy.	Cognitive	Comprehension
9	Summarize the life cycle of stars.	Cognitive	Comprehension
10	Describe types of stars.	Cognitive	Knowledge
11	Describe types of galaxies.	Cognitive	Knowledge
12	Discuss theories of cosmology.	Cognitive	Comprehension

References

Order	Reference Type	Description
1	Book with Author(s) Listed	Hewitt, P.G., Suchocki, J. & Hewitt, L.. (2007). Conceptual physical science. (4th). New York: Addison Wesley.
2	Book with Author(s) Listed	Krauskopf, K.B., & Beiser, A.. (2007). The physical universe. (12th). New York: McGraw-Hill.
3	Book with Author(s) Listed	Shipman, J.T., Wilson, J.D. & Todd, A.W.. (2006). An introduction to physical science. (11th). New York: Houghton Mifflin.