

Kendall Park Learning Center

Course: Honors Physics with Lab

Course Length:

Six weeks (140 hours with lab) equivalent to a full-year course.

Course Description:

The course introduces the fundamentals of Physics including motion, force, vectors, heat, light, and sound. Other topics considered include: electricity, magnetism, atomic and nuclear physics. This course is intended to cover a full-year physics class.

The method of instruction varies. Lecture is used for presentation of new concepts. Students are encouraged to participate frequently in class. Homework is assigned to enhance the daily session. It is designed to take students approximately 1 ½ to 2 hours each day. With the exception of the first and last day, quizzes are given frequently to assess the students' progress on covered material. A Lab Practical test will be given mid-semester that will cover all topics presented up to that point; it represents 10% of the final grade. All major tests are announced and a final exam is given to test student's knowledge of the material taught.

Objectives:

After completing the course, students will be able to:

- Name the subdivisions of physics and their major areas of focus
- List the basic properties of matter, energy, motion and force
- Discuss the basic properties of vectors, scalar, displacement, speed, velocity, heat, waves, electricity, magnetism and acceleration
- Discuss the interrelationships between the properties listed above
- Identify how physics is applied to our everyday life

Requirement:

Students must pass with at least A- to receive full credit for this class.

Course Content:

I. **MECHANICS**

- Introduction
- Motion in One Dimension
- Vectors and Two-Dimensional Motion
- The Laws of Motion
- Energy
- Momentum and Collisions
- Rotational Motion and the Law of Gravity
- Rotational Equilibrium and Rotational Dynamics
- Solids and Fluids

II. **THERMODYNAMICS**

- Thermal Physics
- Energy in Thermal Processes
- The Laws of Thermodynamics

III. **VIBRATIONS AND WAVES**

- Vibrations and Waves

- Sound

IV. **ELECTRICITY AND MAGNETISM**

- Electric Forces and Electric Fields
- Electrical Energy and Capacitance
- Current and Resistance
- Direct Current Circuits
- Magnetism
- Induced Voltages and Inductance
- Reflection and Refraction of Light
- Mirrors and Lenses
- Wave Optics
- Optical Instruments
- Quantum Physics
- Atomic Physics
- Nuclear Physics
- Nuclear Energy and Elementary Particles

Text and Materials:

College Physics by Serway, Faughn, & Vuille, 8th Ed.
Physics Laboratory Manual