

# PHYS 175 : Calculus-based Physics Supplement

**Credits:** 1

**Class Hours:** 1 lecture

**Prerequisites:** "C" or higher in PHYS 151 and PHYS 151L. "C" or higher or concurrent enrollment in MATH 241.

**Description:** This course covers calculus topics, problem-solving rigor, and experimental focus needed to upgrade a previous introductory algebra-based physics lecture and lab (PHYS 151/151L) course to satisfy the requirements of an introductory calculus-based physics lecture and lab (PHYS 170/170L). Appropriate topics include meaning and applications of derivatives and integrals in solving equations, derivation of kinematic equations, estimation and meaning of areas under curves of various physical quantities, empirical modeling of accelerating objects, non-uniform rotational acceleration, impulse momentum theory, measuring hysteresis and loss of elastic energy, and simple harmonic motion as a differential equation.

**Semester Offered:** Fall

**Course Student Learning Outcomes (CSLOs):**

1. Analyze and interpret graphical information related to force, energy, and motion with the use of derivatives, integrals, and Riemann Sums.
2. Solve given problems involving kinematics, energy, collisions, as well as selected topics on rotation and waves using algebra, trigonometry, and calculus.
3. Explain how calculus provides more realistic models in real world situations.