

COURSE SYLLABUS (2 Page)

Course Number: PHYS 2101
Course Name: Physics for Science and Engineering I

Credits and Contact Hours: 3

Instructor: Staff

Textbook: Physics for Scientists and Engineers, by D.M. Katz, Cengage Learning.
ISBN: 9781305775282

Catalog Description: First semester of a two-semester calculus-based introductory sequence in general physics. Topics include: kinematics and dynamics of particles, momentum, work, energy, conservation laws, simple harmonic motion, and mechanics of rigid bodies.

Most Recently Offered (Day): Spring 2016, Fall 2015, Summer 2015

Most Recently Offered (Evening): Course has not been offered in 3 years

Pre-Requisites/Co-Requisites: MATH 1241 with grade of C or above

Course is: Required (R)

Goals: To develop students' problem solving skills in a systematic manner, while providing a balance of quantitative reasoning and conceptual understanding. Upon the completion of this course, students should be able to: 1) accurately identify all forces acting on an object and draw a free-body diagram; 2) state and apply laws of physics to solve mechanics problems; 3) use the preferred SI units in estimates and calculations involving mechanical quantities; 4) apply conservation of energy, work-kinetic energy, and impulse-momentum theorems to solve mechanics problems; and 5) solve multi-dimensional, rotational, and oscillatory motion problems for both system of point-particles and rigid objects.

Student Outcomes Addressed:

- A. an ability to apply knowledge of mathematics, science, and engineering

Course Topics:

- Units, Dimensional analysis, error and significant figures.
- Displacement, average and instantaneous velocity & acceleration, Free fall, Coordinate systems, $x(t)$ Translations in 1D.
- Vectors
- Displacement, velocity, and acceleration in 2D, Projectiles, UCM
- 1st, 2nd, 3rd Law, Mass, Forces
- Friction, Drag, Centripetal Force

- Energy, Potential Energy, Conservation of Energy
- Work, Systems, Work-Energy, Power
- Momentum, Center of Mass, Particle Systems, Conservation of p
- Impulse, Collisions
- Rotational Kinematics, Circular Motion, Rigid Body Rotations
- Rotational Energy
- Static Equilibrium, Stress, Strain
- Fluid statics, Pressure, Fluid Flow
- Simple Harmonic Motion, Pendulum, Oscillator Energy, Damped and Driven Oscillator