

**Course Name: PHY-125 General Physics I - Lecture**

Date Updated: 2/2022

Credit Hours/week: 3 hrs./wk. – 3 cr.

BEGINNING: SPRING 2022

Catalog Description: This is the first course of a two-semester sequence in general physics Topics include kinematics and dynamics of translational and rotational motion, conservation of energy, conservation of momentum, fluid statics and dynamics, and heat.

Prerequisite: MAT-123, PHY-126

Text: Curtell & Johnson, Physics, Wiley

Curtell & Johnson, Physics, Student Solutions Manual, Wiley

Supplementary Material: Specialized equipment, supplies, facilities, for classes limited by enrollment or restricted by accreditation and/or equipment limitations:

Syllabus:

Topics
Introduction; Physics; Base physical quantities; Length standard; Units
Mass standard & units; Time standard & units; Conversions; Scalars; Vectors & their properties
Graphics; Vector addition & subtraction; Components; Method of components
More on method of components; Examples; Displacement; Velocity; Acceleration
Acceleration; Kinematic equations; Signs; Applications
Examples of kinematic equations; Freely falling bodies; Symmetry in free fall
Two-dimensional kinematics; Velocity; Acceleration; Projectile motion; Applications
Range; Examples; Miscellaneous ideas; Force & mass; Newton's first law; Inertia; Newton's second law; Units
Concepts; Free-body diagrams; Examples; Newton's third law; Examples; Force of gravity; Weight
Mass & weight; Normal force; Frictional force
Tension; Strategies for applying the first & second laws; Examples
More examples; Uniform circular motion; Speed; Concepts; Centripetal acceleration
Acceleration concepts; Centripetal force; Concepts; Rounding curves
Banked curves; Vertical circle; Work; Examples; Energy concept
Kinetic energy; Work-energy theorem; Work of the gravitational force; Conservative forces
Gravitational potential energy; Non-conservative forces; Conservation of energy; Examples
Work with non-conservative forces; Examples; Power; Miscellaneous ideas; Impulse; Momentum; Theorem

Conservation of momentum; Concepts; Categories; One-dimensional collisions
Examples; Rotational kinematics; Angular displacement; Radian; Angular speed & acceleration; Kinematic equations
Tangential velocity & acceleration; Centripetal & tangential acceleration; Examples; Rotational dynamics; Torque
Newton's first law for rotation; Methods & applications
Center of gravity; Newton's second law for rotation; Moment of inertia; Examples
Work when rotation; Rotational kinetic energy; Angular momentum; Analogies; Conservation of angular momentum
Concepts & applications; Fluids; Models; Density; Pressure; Concepts
Atmospheric pressure; Pressure at a depth; Examples; Barometer
Manometer, Pascal's principle; Archimedes principle; examples
Fluid dynamics; Streamlines; Equation of continuity; Examples; Bernoulli's equation; Concepts
Features of Bernoulli's equation; Applications; Miscellaneous comments
Note: Extensive coverage will be given to the "examples" found in the textbook

*Format for Offering this Course: Traditional*

Students are expected to adhere to the policies of the County College of Morris. These can be accessed at: (insert link here)

### **Statement of Expected Course LEARNING OUTCOMES**

- Describe the physical forces acting on a particle at rest
- Describe the physical forces that act upon a particle in linear and circular motion
- Develop a knowledge and understanding of potential and kinetic energy, the conservation of energy and momentum
- Draw a free body diagram
- Organize, analyze, synthesize and evaluate experimental data
- Evaluate and draw conclusions from numerical data and graphical information
- Use the scientific method to analyze and derive conclusions from collected data and information (Gen Ed)
- Explain the difference between a hypothesis, a theory and a law as they are used in science (Gen Ed)
- Learning Activities for Gen Ed: Lectures, demonstrations and in-class activities. Assessment Methods for Gen Ed: Exam questions that test a student's understanding of the presented material.

#### **Statement of Relation to Curriculum(s)**

Fulfills lab science option in programs requiring lab science