Virginia Western Community College
PHY 241
University Physics I

Prerequisites
MTH 263 with a grade of "C" or better.

Corequisites
MTH 264

Course Description
Covers classical mechanics and thermodynamics. Includes kinematics, Newton's laws of motion, work, energy, momentum, rotational kinematics, dynamics and static equilibrium, elasticity, gravitation, fluids, simple harmonic motion, calorimetry, ideal gas law, and the laws of thermodynamics. Part I of II.

Semester Credits: 4   **Lecture Hours: 3**   **Laboratory Hours: 3**

Required Materials
Mastering Physics (online homework system), a scientific calculator

Textbook:
University Physics with Mastering Physics access. Young & Freeman. 15th edition. Pearson Publishing.
ISBN: any of 9780135206348, 9780135719640, 9780135717936

Course Outcomes

At the completion of this course, the student should be able to:

- Understand the equations of motion in one and two or three dimension and apply the equations of motion to predict the position and the velocity of an object from the initial condition.
- Understand Newton's Laws of Motion and many types of force. Set up equations using Newton's 2nd Law in order to find the acceleration of objects for linear and circular motion.
- Understand work and kinetic and potential energy as well as conservation of energy and find the speed using conservation of energy.
- Explain momentum, impulse and collisions.
- Solve problems about dynamics of rotational motion by applying Newton's 2nd Law in rotational form.
- Understand and solve problems regarding fluid mechanics, gravitation, and periodic motion.
- Solve problems involving temperature & heat, thermal property of matter, and ideal gas equation.

- Understand the first and second laws of thermodynamics and their application.

Topical Description

Lecture Topics

Chapter 1	Units, Physical Quantities and Vectors
Chapter 2	Motion Along a Straight Line
Chapter 3	Motion in Two or Three Dimensions
Chapter 4	Newton's Laws of Motion
Chapter 5	Applying Newton's Laws
Chapter 6	Work and Kinetic Energy
Chapter 7	Potential Energy and Energy Conservation
Chapter 8	Momentum, Impulse, and Collision
Chapter 9	Rotation of Rigid Bodies
Chapter 10	Dynamics of Rotational Motion
Chapter 11	Equilibrium
Chapter 12	Fluid Mechanics
Chapter 13	Gravitation
Chapter 14	Periodic Motion
Chapter 17	Temperature and Heat
Chapter 18	Thermal Properties of Matter
Chapter 19	The First Law of Thermodynamics
Chapter 20	The Second Law of Thermodynamics

Laboratory Topics

Lab 1	Introduction. Safety. Significant figures.
Lab 2	Addition of force: Vector
Lab 3	Free fall
Lab 4	Projectile motion
Lab 5	Static and kinetic friction
Lab 6	Newton's 2nd law
Lab 7	Energy Conservation
Lab 8	Ballistic pendulum
Lab 9	Moment of inertia
Lab 10	Angular momentum conservation
Lab 11	Simple harmonic motion
Lab 12	Archimedes principle

Notes to Instructors

- In order to pass the course, students should earn 50 % of the entire homework grade by the end of the semester. Earning less than 50% of homework will result in 'F grade'.

ADA Statement (PDF)

Title IX Statement (PDF)