COURSE NUMBER: Vp140	**COURSE TITLE:** Physics I
CREDIT: 4	**PREREQUISITES:** 3 years high school math, strong background in high school Physics
TEXTBOOKS/REQUIRED MATERIAL: Hugh D. Young, Roger A. Freedman, *University Physics* (13th edition)	**INSTRUCTOR:** Mateusz Krzyzosiak **DATE OF PREPARATION:** Sep 27, 2012 **DATE OF UC APPROVAL:** Oct. 30, 2013
INSTRUCTOR(S):	**SCIENCE/DESIGN:** n/a
CATALOG DESCRIPTION: This is the first of a two-term sequence in general physics for scientists and engineers. Covers topics from classical mechanics, including vectors, motion in one dimension, circular motion, projectile motion, relative velocity and acceleration, Newton's laws, particle dynamics, work and energy, linear momentum, torque, angular momentum of a particle, simple harmonic motion, gravitation, planetary motion, pressure and density of fluids, and Archimedes principle.	**COURSE TOPICS:** • nature of physics physical quantities scalars and vectors (2 hrs) • kinematics: motion in one dimension (2 hrs) • kinematics: motion in two and three dimensions (3 hrs) • Newton's laws of motion and their applications (6 hrs) • non-inertial frames of reference (3 hrs) • periodic motion (4 hrs) • work and kinetic energy (3 hrs) • potential energy and conservation of mechanical energy (5 hrs) • momentum, impulse, and collisions (4 hrs) • rigid body dynamics, angular momentum (8 hrs) • equilibrium and elasticity (4 hrs) • elements of fluid mechanics (4 hrs) • gravitation (5 hrs) • mechanical waves and sound (7 hrs)
COURSE STRUCTURE/SCHEDULE: lecture (twice per week, 90 minutes each)	
COURSE OBJECTIVES [Course Outcomes in brackets]	• To provide knowledge of principles governing the physical universe, and develop an understanding of the scientific method and its application to the advancement of knowledge [1-9]. • To develop conceptual and mathematical understanding of physics principles in modeling of real-world problems [1-10]. • To develop effective problem-solving skills, with emphasis on modeling, estimation, alternative representations, and critical analysis of results [1-10].
COURSE OUTCOMES [Program Outcomes in brackets]	After completing this course, students should be able to: 1. use the scientific method to analyze real-world problems [a, e, g, h, i, k]. 2. identify and describe forces and torques acting on objects (particles and rigid bodies) which cause changes in their motion, quantify the description in terms of kinematic and dynamic physical quantities and differential equations [a, e, k]. 3. discuss periodic motion (simple harmonic, damped, and forced) and understand its importance in various areas of science and engineering [a, e, g, k]. 4. have an understanding of role of conservation principles in classical mechanics and be able to apply them to discuss and solve problems [a, e, g, k]. 5. understand the notion of work, kinetic energy and potential energy and use them to analyze physical phenomena [a, e, g, k]. 6. have a general understanding of concepts of stress, strain, elasticity and their importance in description of objects beyond the particle and rigid-body models [a, e, k]. 7. discuss fundamental properties of fluids both at rest and in motion [a, e, h, k]. 8. describe motion of objects in the universe using laws of gravitation [a, e, h, k]. 9. describe wave motion and relate it to basic phenomena in sound propagation [a, e, h, k]. 10. incorporate the use of computer-based technology (CAS, graphing software) in problem-solving and results presentation [a, e, g, h, i, k].
ASSESSMENT TOOLS [Course Outcomes in brackets]	paper homework [1-10] on-line homework [2-9] midterm and final exams [1-9]