COURSE NUMBER: Vp141/Vp241	**COURSE TITLE:** Physics Laboratory I/II
CREDIT: 1+1	**PREREQUISITES:** Vp140 (or 160), concurrently with Vp240 (or 260)
TEXTBOOKS/REQUIRED MATERIAL: Hugh D. Young, Roger A. Freedman, *University Physics* (13th edition)	**PREPARED BY:** Mateusz Krzyzosiak **DATE OF PREPARATION:** Jul 23, 2013 **DATE OF UC APPROVAL:** Oct. 30, 2013
INSTRUCTOR(S): Mateusz Krzyzosiak	**SCIENCE/DESIGN:** n/a
CATALOG DESCRIPTION: (Vp141) Introduction to Excel; Probability and Statistics for Beginners; Uniform Velocity and Uniform Acceleration; Non-Uniform Acceleration; Impact, Momentum and Energy; Rotational Motion; The Gyroscope; Bernoulli's Equation and Hydrodynamics; Simple Harmonic Motion. (Vp241) Electrostatics; Electric Fields; Capacitance; DC Circuits; Magnetic Fields and Forces I; Magnetic Fields and Forces II; *e/m* of the Electron; Faraday's Law; AC Generators; AC Transformers; AC Circuits	**COURSE TOPICS:** **VP141** • Measurement of the moment of inertia • Measurement of fluid viscosity • Simple harmonic motion: oscillations in mechanical systems • Measurement of the speed of sound • Damped and driven oscillations. Mechanical resonance **VP241** • Basic characteristics of magnetic materials • Hall probe: characteristics and applications • Solar cells: current-voltage characteristics • Polarization of light • RC, RL, RLC circuits
COURSE STRUCTURE/SCHEDULE: laboratory session (once a week, 160 minutes each) + introductory lecture (first week)	

COURSE OBJECTIVES [Course Outcomes in brackets]	• To provide hands-on experience in an introductory physics laboratory; to learn fundamental experimental methods and apply them to verify the laws of physics [2-11]. • To develop basic skills in experiment-design and measurement techniques [1-11]. • To develop skills in experimental data analysis and presentation, report writing; to learn the importance of critical analysis of results [12].
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. effectively use fundamental measurement techniques and devices [a, e, g, h, i, k]. 3. 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]. 4. discuss periodic motion (simple harmonic, damped, and forced) and understand its importance in various areas of science and engineering [a, e, g, k]. 5. have an understanding of role of conservation principles in classical mechanics and be able to apply them to discuss real-world phenomena [a, e, g, k]. 6. understand the notion of work, kinetic energy and potential energy and use them to analyze physical phenomena [a, e, g, k]. 7. discuss fundamental properties of fluids both at rest and in motion [a, e, h, k]. 8. describe wave motion and relate it to basic phenomena in sound propagation [a, e, h, k]. 9. analyze, both qualitatively and quantitatively, the flow of charge in simple electric circuits (both DC and AC) [a, e, g, k]. 10. describe dynamic phenomena involving magnetic fields and discuss their applications [a, e, h, k]. 11. have a general understanding of the nature of light and discuss basic optical phenomena [a, e, h, k]. 12. 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]	pre-lab quiz [1,3-11] in-lab work [1-11] laboratory report [1,3-12]