COURSE NUMBER: Vp240	**COURSE TITLE:** Physics II
CREDIT: 4	**PREREQUISITES:** Vp140 or Vp160
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 course covers electricity and magnetism: charge, Coulomb's law, electric fields, Gauss' law, electric potential, capacitors and dielectrics, current and resistance, EMF and circuits, magnetic fields, Biot-Savart law, Amperes law, Faraday's Law of Induction, and simple AC circuits.	**COURSE TOPICS:** • electric charge and electric field (4 hrs) • Gauss's law (5 hrs) • electric potential (3 hrs) • capacitance and dielectrics (3 hrs) • current, resistance, and electromotive force (4 hrs) • direct-current circuits (4 hrs) • magnetic field and magnetic forces (5 hrs) • sources of magnetic field (4 hrs) • electromagnetic induction (6 hrs) • inductance (4 hrs) • alternating current (5 hrs) • electromagnetic waves (4 hrs) • light: polarization, reflection and refraction (5 hrs) • elements of wave optics: interference and diffraction (optional) (4 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. discuss, at a qualitative and quantitative level, electric fields generated by discrete and continuous systems of electric charges using both superposition principle and Gauss's law [a, e, k]. 3. understand the notion of electric potential, calculate it for discrete and continuous systems of charges, and apply it to discuss physical phenomena in electrostatics [a, e, k]. 4. identify and describe magnetic field sources [a, e, k]. 5. describe dynamic phenomena involving magnetic fields and discuss their applications [a, e, h, k]. 6. understand the concepts of electromotive force, resistivity, capacity and inductance, explain their role in electric circuits [a, e, g, k]. 7. analyze, both qualitatively and quantitatively, the flow of charge in simple electric circuits (both DC and AC) [a, e, g, k]. 8. discuss fundamental properties of electromagnetic waves [a, e, h, k]. 9. have a general understanding of the nature of light and discuss basic optical phenomena [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]