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Ohio Articulation Number (OAN)
Course Submission Form
2005-2006

College/University Youngstown State University

Course(s) Submitted(Title & Course #) Fundamentals of Physics 2 for
Ohio Articulation Number OSC 015

Date 5/19/06 Course Phys. 1502 of a 1 of 2 Course OAN mapping.

Name and title of individual submitting on behalf of the college/university

Name William Sturrus Title Chair Department of Physics & Astronomy

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Credit Hours 3 qtr sem X
Lecture Hours 3
Laboratory Hours (if applicable)
Pre-Requisites(s) Course work : PHYS 1501

Placement Score:

(Domain) (Score)

Catalog/Course Description (Includes Course Title and Course #)

1502. Fundamentals of Physics 2. Study of electricity, magnetism, and light. Topics include electric charge, electric forces and fields, electric potential, capacitance and resistance in direct current circuits, basic circuit analysis, magnetic forces and fields, induced emf, inductance, reflections, refraction, geometric optics as applied to lenses and mirrors, interference,

and diffraction. Prereq.: PHYS 1501 or equivalent. 3 S.H.

Texts/Outside Readings/Ancillary Materials

College Physics 2 by Giambattista, (2nd edition)

Course Objectives and/or Plan of Work

This course is an introduction to the principles and techniques of physics utilized in the analysis of light, electricity and magnetism. Specific topics to be investigated include electric charge, electric forces and field, electric potential, capacitance and resistance in direct current circuits, basic circuit analysis, magnetic forces and fields, induced emf, inductance, reflections refraction, geometrical optics applied to lenses and mirrors, interference and diffraction. A solid background in algebra and trigonometry is needed for the problem solving working in this course.

This course is a General Education course in the Natural Science Domain and emphasizes General Education Goals. (2) Acquiring, processing and presenting quantitative and qualitative information using the most appropriate technologies, including computers. (3) Reasoning critically, drawing sound conclusions, and applying those conclusions to one's life and society. (6) Understanding the scientific method, forming and testing hypotheses as well as evaluating results. (7) Realizing the evolving relationships among science, technology, and society. (13) Understanding the and appreciating the natural environment and the processes that shape it.

Description of Assessment and/or Evaluation of Student Learning

Understanding and/application of the following topics using algebra and trigonometry concepts and methods where appropriate:

1. Electric field, potential, forces
2. Current, magnetic field integration over continuous charge/current distribution.
3. Induction and Inductance
4. Resistance
5. Capacitance
6. Basic circuit anayalsys
7. Electric power
8. Energy stored field
9. EMP
10. Electromagnetic waves
11. Gauss Law
12. Kirchhoff's Law
13. R-L-C circuits
14. Amphere's Law
15. Faraday's Law
16. Conductivity
17. Geometric optics
18. Diffraction
19. Interference
20. Polarization

Master Syllabi and Working Syllabi (if both are used)

Syllabus – Fundamentals of Physics 2
Physics 1502

Prereq.: Physics 1501 or equivalent
Text: College Physics, 2nd edition by Giambattista

The student is responsible for all of the material discussed in class and all class assignments. The purpose of the quizzes and tests is to determine your understanding of the concepts and theories discussed in class. Therefore, it is essential that you give complete details of your solutions to obtain credit. The periodic homework assignments will help you prepare for the quizzers and tests.

Grading:

Quizzes	15%
Highest 2 Tests	25% each
Lowest Test	0%
Final Exam	35%

No make-up test will be given

Grading Scale: A= 90-100%, B = 80-89%, C – 60-79%, D = 50-59%, F= below 50%

Course Objectives:

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This course is a General Education course in the Natural Science Domain and emphasizes General Education goals (2) acquiring, processing, and presenting quantitative and qualitative information using the most appropriate technologies, including computers; (3) reasoning critically, drawing sound conclusions, and applying those conclusions to one's live and society; (6) understanding the scientific method, forming and testing hypotheses as well as evaluating results; and (7) realizing the evolving relationships among science, technology, and society and (13) understanding and appreciating the natural environment and the processes that shape it.

Learning Outcomes:

1. Electric field, potential, forces
2. Current, magnetic field integration over continuous charge/current distribution.

3. Induction and Inductance
4. Resistance
5. Capacitance
6. Basic circuit analysis
7. Electric power
8. Energy stored fields
9. EMF
10. Electromagnetic waves
11. Gauss Law
12. Kirchhoff's Law
13. R-L-C circuits
14. Ampere's Law
15. Faraday's Law
16. Conductivity
17. Geometric optics
18. Diffraction
19. Interference
20. Polarization

In accordance with the University procedures, if you have a documented disability and require accommodations to obtain equal access in this course, please contact me privately to discuss your specific needs. You must be registered with the Disability Services Office in Wick House and provide a letter of accommodation to verify your eligibility. You can reach the Disability Services Office at 330-941-1372.

Additional Documentation

Youngstown State University
PHYS 1502 Course Topics
Introductory Algebra/Trigonometry Sequence

Week 1:
(16) Static electricity; Electric charge and its conservation; Electric charge in the atom; Insulators and conductors; Induced charge; Electroscopes; Coulomb's law; Solving problems with Coulomb's law and vectors; Electric field
Week 2:
Problem solving in electrostatics; Field lines; Electric fields and conductors; Electric forces in molecular biology; (17) Electric potential and potential difference; Relation between electric potential and electric field; Equipotential lines; Electron volt energy units
Week 3:
Electric potential due to point charges; Electric dipoles; Capacitance; Dielectrics; Storage of electric energy; Cathode ray tube and TV monitors; Electrocardiagrams

Week 4:
(18) Electric battery; Electric current; Ohm's law; Resistance; Resistivity; Superconductivity; Electric power; Power in household circuits; Alternating current
Week 5:
Microscopic view of electric current; Nervous system conduction of current
(19) Resistors in series and parallel; Emf and terminal voltage; Kirchhoff's rules; Solving problems with Kirchhoff's rules
Week 6:
Emfs in series and in parallel; Charging a battery; RC circuits; Capacitors in series and parallel; Electric hazards and leakage currents; DC ammeters and voltmeters; Effects of meter resistance
Week 7:
(20) Magnets and magnetic fields; Electric currents produce magnetism; Force on an electric current in a magnetic field; Definition of B; Force on an electric charge moving in a magnetic field; Magnetic field due to a straight wire; Force between two parallel wires; Definition of the ampere and the coulomb; Ampere's law
Week 8:
Torque on a current loop; Magnetic moment; Galvanometers, motors, loudspeakers; Hall effect; Mass spectrometer; Ferromagnetism and domains; Electromagnets and solenoids; Magnetic fields in magnetic materials and hysteresis; (21) Induced emf; Faraday's law of induction; Lenz's law
Week 9:
Emf induced in a moving conductor; Changing magnetic flux and the electric field; Electric generators; Counter emf and torque; Eddy currents; Transformers; Transmission of electric power; Induction applications; Inductance; Energy stored in a magnetic field; LR circuits, AC circuits and impedance
Week 10:
LRC series circuit; Resonance in AC circuits; Impedance matching; (22) Changing electric fields to produce magnetic fields; Maxwell's Equations; Maxwell's fourth equation including displacement current; Production of electromagnetic waves; Calculation of the speed of electromagnetic waves
Week 11:
Light as an electromagnetic wave; Electromagnetic spectrum; Measuring the speed of light; Energy in electromagnetic waves; Radio and television waves; (23) Ray model of light; Reflection; Image formation by a plane mirror
Week 12:
Formation of images by spherical mirrors; Problem solving with spherical mirrors; Index of refraction; Refraction and Snell's law; Total internal reflection; Fiber optics; Thin lenses and ray tracing; Thin lens equation; Problem solving for lenses
Week 13:
Combinations of lenses; Lensmaker's equation; (24) Waves versus particles; Huygen's principle and diffraction; Huygen's principle and the law of reflection; Interference and Young's double slit experiment; Visible spectrum and dispersion; Diffraction by a single slit or disk; Diffraction gratings
Week 14:
Spectrometers and spectroscopy; Interference and thin films; Michelson

interferometer; Polarization; Scattering of light by the atmosphere; (25) The camera; Human eye and corrective lenses
Week 15:
Magnifying glass; Telescopes; Compound microscope; Aberrations of lenses and mirrors; Resolution of telescopes and microscopes; Resolution of human eye and useful magnification; X-rays and x-ray diffraction; Computerized axial tomography

OBR Use	Action
Approved	
Additional Information Requested	
Rejected	
Date	