SYLLABUS
PHYS 1402
General College Physics

Western Texas College

I. Basic Course Information:
   A. Fundamental principles of physics, using algebra and trigonometry; the principles and applications of electricity and magnetism, including circuits, electrostatics, electromagnetism, waves, sound, light, optics, and modern physics topics; with emphasis on problem solving. Laboratory activities will reinforce fundamental principles of physics, using algebra and trigonometry; the principles and applications of electricity and magnetism, including circuits, electrostatics, electromagnetism, waves, sound, light, optics, and modern physics topics; with emphasis on problem solving.
   B. Prerequisites: PHYS 1401 College Physics I (lecture and laboratory).
   C. Online course content is administered through the college's learning management system (LMS), Moodle, also called eCampus. A link to eCampus can be found on my.wtc.edu and to Moodle (the big M with a graduation cap) on the college's home page, www.wtc.edu.

II. Student Learning Outcomes (SLO)
   A. Solve Problems involving the inter-relationship of fundamental charged particles, and electrical forces, fields, and currents.
   B. Apply Kirchhoff's Rules to analysis of circuits with potential sources, capacitance, inductance, and resistance, including parallel and series capacitance and resistance.
   C. Solve problems in the electrostatic interaction of point charges through the application of Coulomb's Law.
   D. Solve problems involving the effects of magnetic fields on moving charges or currents, and the relationship of magnetic fields to the currents which produce them.
   E. Use Faraday's and Lenz's laws to determine electromotive forces and solve problems involving electromagnetic induction.
   F. Articulate the principles of reflection, refraction, diffraction, interference, and superposition of waves.
   G. Describe the characteristics of light and the electromagnetic spectrum.
   H. Develop techniques to set up and perform experiments, collect data from those experiments, and formulate conclusions from an experiment.
   I. Demonstrate the collections, analysis, and reporting of data using the scientific method.
   J. Record experimental work completely and accurately in laboratory notebooks and communicate experimental results clearly n written reports.
   K. Solve problems applying the principles of reflection, refraction, diffraction, interference, and superposition of waves.
   L. Solve practical problems involving optics, lenses, mirrors, and optical instruments.

III. Testing Requirements
  A. The midterm and the final exam must be proctored by an approved testing organization. (Ask your instructor for more details).
  B. Students are NOT allowed to use their book or notes of any kind while taking their midterm and final exam.
  C. Students are allowed to use the formula sheet provided for the midterm and final exam.

IV. Major Course Requirements
  A. Major Requirements 1 – There will be 6 unit tests
  B. Major Requirements 2 – There will be 6 unit lab write-ups. Students are not allowed to take the final exam until at least 4 unit lab write-ups are completed.
  C. Major Requirements 3 – There will be a midterm and final exam.
  D. Unit tests, midterm, and final are all timed.

V. Grading System
  A. See the First Day Handout for the percentages of the average in this course and the letter grade breakdown for the final grade.

VI. Information on Books and Other Course Materials
  A. **Online access required:** MasteringPhysics contains *College Physics* (e-book) *with Master Access*, 10th edition, Young, Adams, and Chastain ISBN 9780133858006. Additional textbook is optional. ISBN 9780321902566.
  B. **Lab kits will be required**: e-Science, For PHYS 1402 (only): Lab Kit #2540 Or for PHYS 1401 and 1402 combined: Lab Kit #2541. Contact the WTC Bookstore.

VII. Other policies: Please refer to the WTC Course Catalog for the following:
  A. Campus Calendar
  B. Final Exam Schedule
  C. How to drop a class
  D. Withdraw information
  E. Student conduct/ Academic Integrity
  F. Class Attendance
  G. Students with disabilities

VIII. Course Organization and Schedule

Topics	Chapters	Sections
Electricity and Magnetism	17. Electric Charge and Electric Field	17.1 Electric Charge 17.2 Conductors and Insulators 17.3 Conservation and Quantization of Charge 17.4 Coulomb's Law 17.5 Electric Field and Electric Forces 17.6 Calculating Electric Fields 17.7 Electric Field Lines 17.8 Gauss's Law and Field

		Calculations 17.9 Charges and Conductors
	18. Electric Potential and Capacitance	18.1 Electric Potential Energy 18.2 Potential 18.3 Equipotential Surfaces 18.4 Capacitors 18.5 Capacitors in Series and in Parallel 18.6 Electric-Field Energy 18.7 Dielectrics
	19. Current, Resistance, and Direct-Current Circuits	19.1 Current 19.2 Resistance and Ohm's Law 19.3 Electromotive Force and Circuits 19.4 Energy and Power in Electric Circuits 19.5 Resistors in Series and in Parallel 19.6 Kirchhoff's Rules 19.7 Electrical Measuring Instruments 19.8 Resistance-Capacitance Circuits 19.9 Physiological Effects of Currents 19.10 Power Distribution Systems
	20. Magnetic Field and Magnetic Forces	20.1 Magnetism 20.2 Magnetic Field and Magnetic Force 20.3 Motion of Charged Particles in a Magnetic Field 20.4 Mass Spectrometers 20.5 Magnetic Force on a Current-Carrying Conductor 20.6 Force and Torque on a Current Loop 20.7 Magnetic Field of a Long, Straight Conductor 20.8 Force Between Parallel Conductors 20.9 Current Loops and Solenoids 20.10 Magnetic-Field Calculations 20.11 Magnetic Materials
	21. Electromagnetic Induction	21.1 Induction Experiments 21.2 Magnetic Flux 21.3 Faraday's Law 21.4 Lenz's Law 21.5 Motional Electromotive Force

		21.6 Eddy Currents 21.7 Mutual Inductance 21.8 Self-Inductance 21.9 Transformers 21.10 Magnetic-Field Energy 21.11 The *R*-*L* Circuit 21.12 The *L*-*C* Circuit
	22. Alternating Current	22.1 Phasors and Alternating Currents 22.2 Resistance and Reactance 22.3 The Series *R*-*L*-*C* Circuit 22.4 Power in Alternating-Current Circuits 22.5 Series Resonance
	23. Electromagnetic Waves	23.1 Introduction to Electromagnetic Waves 23.2 Speed of an Electromagnetic Wave 23.3 The Electromagnetic Spectrum 23.4 Sinusoidal Waves 23.5 Energy in Electromagnetic Waves 23.6 Nature of Light 23.7 Reflection and Refraction 23.8 Total Internal Reflection 23.9 Dispersion 23.10 Polarization 23.11 Huygens's Principle
Light and Optics	24. Geometric Optics	24.1 Reflection at a Plane Surface 24.2 Reflection at a Spherical Surface 24.3 Graphical Methods for Mirrors 24.4 Refraction at a Spherical Surface 24.5 Thin Lenses 24.6 Graphical Methods for Lenses
	25. Optical Instruments	25.1 The Camera 25.2 The Eye 25.3 The Magnifier 25.4 The Microscope 25.5 Telescopes
	26. Interference and Diffraction	26.1 Interference and Coherent Sources 26.2 Two-Source Interference of Light 26.3 Interference in Thin Films 26.4 Diffraction 26.5 Diffraction from a Single Slit

		26.6 Multiple Slits and Diffraction Gratings 26.7 X-Ray Diffraction 26.8 Circular Apertures and Resolving Power 26.9 Holography
Modern Physics	27. Relativity	27.1 Invariance of Physical Laws 27.2 Relative Nature of Simultaneity 27.3 Relativity of Time 27.4 Relativity of Length 27.5 The Lorentz Transformation 27.6 Relativistic Momentum 27.7 Relativistic Work and Energy 27.8 Relativity and Newtonian Mechanics
	28. Photons, Electrons, and Atoms	28.1 The Photoelectric Effect 28.2 Line Spectra and Energy Levels 28.3 The Nuclear Atom and the Bohr Model 28.4 The Laser 28.5 X-Ray Production and Scattering 28.6 The Wave Nature of Particles 28.7 Wave-Particle Duality 28.8 The Electron Microscope
	29. Atoms, Molecules, and Solids	29.1 Electrons in Atoms 29.2 Atomic Structure 29.3 Diatomic Molecules 29.4 Structure and Properties of Solids 29.5 Energy Bands 29.6 Semiconductors 29.7 Semiconductor Devices 29.8 Superconductivity
	30. Nuclear and High-Energy Physics	30.1 Properties of Nuclei 30.2 Nuclear Stability 30.3 Radioactivity 30.4 Radiation and the Life Sciences 30.5 Nuclear Reactions 30.6 Nuclear Fission 30.7 Nuclear Fusion 30.8 Fundamental Particles 30.9 High-Energy Physics 30.10 Cosmology

Disclaimer: Schedule and content is subject to change at the instructor's discretion.

Last Modified: May 29, 2018