PHY 100-05 **Elements of Physical Science** **Fall 2009**

INSTRUCTOR: Dr. William Passwaters

E-MAIL: wpasswaters@wcupa.edu

OFFICE: Merion Science Center 120

TELEPHONE: (610) 436-3563 (or ext. 3563)

OFFICE HOURS

TR 9:00 – 10:00
M 9:00 - 11:00
or by appointment

Text: Physics: A World View, Kirkpatrick, 6th edition, but any earlier edition will suffice.
While the text is highly recommended, it is intended as a supplement to the material covered.

COURSE DESCRIPTION: This course focuses on the physics of many of our everyday experiences; namely, motion, light, electricity, and energy. The roles of people and issues in the development of our current ideas on our physical world will be explored within the context of the course material. Critical thinking will be emphasized throughout the course using class discussion and analysis of examples

ATTENDANCE: Three unexcused absences are allowed. Beginning with the fourth unexcused absence your course average will be lowered by 2%. Excused absences are limited to those due to participation in University sanctioned events (See policy in the WCU undergraduate catalog) or those accompanied by written confirmation from a doctor, military or religious organization official, etc. An unexcused absence for a day of a quiz or exam will result in a grade of zero being recorded for that quiz or exam. If a written excuse is produced for a missed exam, your final exam score will be substituted for the missed hourly exam score. No makeup exams will be given

EVALUATION PROCEDURE: Your course grade will be determined by your performance on four hourly exams (**T 9/22**, **R 10/15**, **T 11/10, and T 12/8**), a cumulative final, and a series of problem sets. Your lowest hourly exam grade of the four will be dropped. Failure to take an hourly exam will be the one that is dropped. The final exam grade will not be dropped. No individual extracurricular or extra credit work will be assigned.

Grading Scheme

3 Exams	**60 %**
10 Problem Sets	**10 %**
Final Exam	**30 %**

HOMEWORK: The Reading and Homework assignments are listed on the reverse side of this sheet. Readings should be done before the corresponding lectures for maximum effectiveness. The homework is not collected and graded, but similar problems often show up on problem sets and exams. The chapter summaries at the end of each chapter can be particularly helpful. Appropriate practice quizzes and exams for the material covered in this course can be found with web searches. Prior year PHY 100 exams will be posted on Blackboard. Familiarize yourself with these resources for best results.

STUDENTS WITH DISABILITIES: West Chester University is committed to make accommodations for persons with disabilities. Please make your needs known by contacting your instructor and the Office of Students with Disabilities at ext. 3217. Sufficient notice is needed in order to make the accommodations possible. The University desires to comply with the ADA of 1990.

ACADEMIC HONESTY POLICY: Cheating on the part of any student may result in a failing grade for the course and a letter sent to the Associate Provost's office documenting the incident.

STUDY HABITS: Think physics inside **and** outside of the classroom. The concepts covered and the accompanying homework assignments are manageable if completed on a regular basis. Mastering the material the night before the exam is usually overwhelming. Work together and see me during office hours if you need help.

PUBLIC SAFETY: Place your cell phones on *silence* when in the classroom.

Day	Date	Lec	Ch	Topic(s)	Reading Assignments
T	Sept 1	1	1	Introduction and course overview	• Measurements: geometry…Cir. Of Earth metric system (p. 6) power of ten notation (p.9) • Science: Laws and false starts Newton vs Bode
R	Sept 3	2	2	Describing Motion	• Average speed (p. 15) • Instantaneous speed (p. 18) • Speed with direction (p. 19) • Acceleration (p. 21) • Falling objects: a first look (p. 23) • Initial velocity (p.27)
T	Sept 8	3	3	Newton's laws **PS #1 Chs 1/2**	• Motion: Aristotle (p. 34) Galileo (p.35) • Newton's First Law (p. 36) • Newton's Second Law (p. 40) • Mass and weight (p.43) • Friction (p. 46) • Newton's Third Law (47)
R	Sept 10	4	5	Gravity	• The concept of gravity (p.75) • Inverse square Law: Newton vs Hooke • Law of Universal Gravitation (p. 79) • The value of G (p. 80) • Gravity near the Earth's surface (p. 81) • Satellites (p.83)
T	Sept 15	5	7	Energy and work **PS #2 Chs 3/5**	• What is energy? (p.112) • Conservation of kinetic energy (p. 113) • Energy conservation (p. 114) • Changing kinetic energy (p. 115) • Forces that do no work (p.116) • Stopping distance for cars(p.117)
R	Sept 17	6	7	Energy and work	• Gravitational Potential energy (p.118) • Conservation of ME (p. 119) • Roller coasters (p. 121) • Other forms of energy (p. 122) • Power (p. 127)
T	Sept 22	7		**Exam I**	
R	Sept 24	8	16 22	Introduction to wave motion	• Periodic waves (p. 300) • Sound waves: speed and form (p. 314) radar vs sonar Doppler effect (p.325) • e-m waves: photons speed and form (p. 461) • e-m spectrum: freq and wavelength (p.464) • e-m spectrum: energy AM vs FM

T	Sept 29	9	17	Light/reflection/mirrors **PS #3 Chs 16/22**	• Pinhole cameras (p. 339) • Reflection (p. 340) • Flat mirrors (p. 341) • Curved mirrors (p. 343) • Images produced by mirrors (345) • Locating images (p. 346)
R	Oct 1	10	18	Light/refraction/lenses	• Index of refraction (p.359) • Total internal reflection (p. 361) • Dispersion and refraction(p. 363) • Rainbows (p.364) • Lenses(p. 367) • Images produced by lenses (p.368)
T	Oct 6	11	18	Light/applications of lenses	• Cameras (p.371) • The eye (p. 371) • Eyeglasses(p.373) • Simple magnifiers (p. 374) • Prism binoculars (p. 375) • Telescopes: refractors & Galileo (p. 375) reflectors and Hershel the Hubble
R	Oct 8	12	18 19	Light and review **PS #4 Chs 17/18**	• Shadows (p. 337) • Eclipses (p. 338) • Atmospheric scattering (p. 353) • Polarization (p. 392)
T	Oct 13			**Fall Break**	
R	Oct 15	13		**EXAM II**	
T	Oct 20	14	20	Electricity: Charges at rest	• Electrical properties (p. 404) • Two kinds of charge (p. 405) • Conservation of charge (p. 406) • Induced attractions (p. 407) • The electroscope (p. 411)
R	Oct 22	15	20 21	Electricity: Charges in motion **PS #5 Ch 20**	• The electric force (p.411) • Electricity and Gravity (p.413) • The electric field (p.414) • Lightning (p.419) • Batteries d.c. (p.428) • Pathways (p.429) • A water model (p.430) • Resistance (p. 431)
T	Oct 27	16	21	Electricity: circuits	• Ohm's law (p.432)
R	Oct 29	17	19	Electricity: circuits **PS #6 Ch #21**	• The danger of electricity (p.433) • Batteries and bulbs (p.433) • Electrical power (p.439) • The cost of electricity

T	Nov 3	18	22	Electromagnetism	• Magnets (p.447) • Electric currents & magnetism (p.449) • Making magnets (p.450) • Magnetism & electric currents (p.455) • d.c. vs a.c. • The magnetic Earth (p.453
R	Nov 5	19	22	Electromagnetism **PS #7 Ch 22**	• Transformers (p.457) • Generators and motors (p.458) • Efficiencies • Storage Technologies
T	Nov 10	20		**Exam III**	
R	Nov 12	21	14	Heat engines/efficiency	• Temperature scales (p.218) • Temperature vs heat • Heat engines (p. 269) • Ideal heat engines (p. 271) • Perpetual motion machines (p. 272) • Refrigerators (p. 274) • Entropy and disorder (p.278)
T	Nov 17	22		Renewable energy sources **PS # 8 Ch 14**	• The sun's source of energy: nuclear rxs • Solar: thermal • Solar: solar cell basics/efficiencies isolation maps photovoltaic • Solar: passive vs active
R	Nov 19	23		Renewable energy sources	• Energy storage: battery technology potential energy…water hydrogen
T	Nov 24	24		Renewable energy sources **PS #9 Solar**	• Fuel cells: hydrogen • Hydropower • Wind power: maps
R	Nov 26			**Thanksgiving Break**	
T	Dec 1	25		Applications	• Biomass: ethanol • Tidal power • Geothermal • Energy from waste
R	Dec 3	26		**PS #10 Solar**	• automobiles and mileage • the solar house • industry remote sites: telecommunications towers
T	Dec 8	27		**Exam IV**	
R	Dec 10	28		Final exam preview	