

## PS 109 §1 2014 Fall (CRN 3841) Syllabus General Physical Science I

Course-Section Web Site: [www.science.marshall.edu/foltzc/p109114f.htm](http://www.science.marshall.edu/foltzc/p109114f.htm)

Class meets: M\_W\_F 8:00-8:50 in Science 277, from Aug.25 - Dec.05 (+ final 8-10, Dec.8)

Attendance at each class meeting is expected; chronic non-attendance may be penalized.

If you miss a Quiz or Exam, contact me before the next class meeting about a make-up.

If you miss a paper homework due class, hand it in later that day or email it to me (photo).

Instructor: Dr. Curt Foltz ; Science 159 ; foltzc@marshall.edu ; (304) 696-2519

office hours: M\_W\_F 9:30-11:30 ; M\_W\_\_ 13:30-15:00 ; \_T\_\_F 12:30-14:00 (2pm)

Catalog Course Description: PS 109 General Physical Science 3 hrs.

The course covers the basic principles and concepts of the universe including energy, and its various forms. Force, motion, electricity, magnetism, the wave theory of light and sound and astronomy are also studied.

(PR: MTH 121, or 123, or 127, or 130, or 132, or 229. CR: PS 109L lab) 3 hrs. lecture.

PS 109 is half of a 2-semester survey of Physical Science, satisfying Core II Natural Science; it forms  $\frac{1}{3}$  of science content for K-6 Education majors. We'll describe objects' appearances (such as the Sun-Earth-Moon system) using diagrams and models, and will explain their behavior with physically important quantities (momentum & force and energy & action). We will incorporate these quantities in molecular theory to explain material properties, and processes in matter (such as liquid *vs* gas, and electricity, stars, light). Physical models will illustrate Arithmetic concepts; especially addition, multiplication, division, factoring. Quantity names will be abbreviated so that key statements about them can be written in concise unambiguous forms, to be manipulated via algebra, and drawn on graphs.

Required: textbook Hewitt's Conceptual Physical Science 5<sup>th</sup> edition (Pearson 2012)

*Mastering Physics* access code for on-line homework from Conceptual Physical Science calculator, with + -  $\times$   $\div$  . Formula recall and  $\sqrt{\quad}$  can be helpful (a phone is NOT acceptable) pen or pencil, and notebook or ring-binder with lined paper

attendance: (with pencil, calculator, notebook, textbook) at each class meeting

Recommended: a positive attitude; many of your future students will think this is really cool.

preparation ... before class! gather vocabulary and abbreviations, syntax and geometry.

discussion ... about what, how, and why; comment on responses; explain your reasoning.

cooperation with learners ... the best way to learn is to teach, best instruction is by peers.

balance ... between struggling to understand (by yourself) , and asking when you don't.

time & effort outside of class, 2 or 3 effective hours each day to complete assignments.

participation ... in class, and in out-of- class Learning Sessions (times to be announced)

Overview: We'll split the course into 3 large Units (2 Quizzes and one Exam in each Unit).

Unit 1: Ch.1 - 4, (26) = Motion, Force and changing motion, Momentum, Energy, Orbits.

Unit 2: Ch.5 - 9, (26)= Fluids, Heat & Matter, Engines, Electricity & Magnetism, Planets

Unit 3: Ch.10 - 12, (13), 27 = Oscillations & Waves, Atoms & Light, Sun & Stars, Galaxies.

Grade Components: about 15 homework sets  $\times$  4 points/set (1%) = 15% of course grade  
 6 Quizzes  $\times$  20 points/quiz (5%) = 30% of course grade  
 3 Unit Exams  $\times$  60 points/exam (15%) = 45% of course grade  
 1 comprehensive Final Exam  $\times$  40 points (10%) = 10% of course grade

Letter Scale: 100% > A > 85% > B > 75% > C > 65% > D > 55% > F

Plan for Exams to be: Exam 1 Sep.26 (Fri), Exam 2 Oct.27 (Mon), Exam 3 Dec. (Mon).

Exams will include matching, ranking, multiple-choice, short-answer, and essay formats about facts, units, vocabulary, proportions, cause-effect reasoning, and computations (fix-the-false is a short-answer format; classroom scenario evaluations are essay format).

Quizzes focus on the most recent topics; will include similar formats about similar aspects, as practice for the Exams; do not expect to see the same question twice!

We'll try to do some (1/3) of our homework on paper, but most (2/3) will be on the web; we can modify this as we go through the course and see how well each type works.

Schedule: This is Approximate and Tentative!

week	Mon	Wed	Fri
Aug.25	Units ; measure $L, m, t...$	addition ; weighted sum	ratio => rates: speed, $v, p$
Sep.01	---	relative $v$ ; system $\Sigma(mv)$	<b>Quiz 1</b> ; $F \cdot \Delta t \Rightarrow \Delta p$ ; $ma$
Sep.08	gravity, desk, rope, spring	friction ; projectiles;	circles ; elliptic orbits
Sep.15	<b>Quiz 2</b> ; $F \cdot d \Rightarrow \Delta(E)$ ; $PE$	Friction Work ; Power	escape Energy ; Kepler
Sep.22	Torque => precession	Action? review?	<b>Exam 1</b>
Sep.29	mass density ; Pressure	$P(\text{depth})$ ; gas density ( $P$ )	$KE \rightarrow T$ ; $\Sigma E \rightarrow \text{Therm.}E$
Oct.06	Heat ; melt & vaporize	equilibrium ; Entropy	<b>Quiz 3</b> ; charge & $E$ -field
Oct.13	Current ; Voltage, $PE$	circuits & Power	<b>Quiz 4</b> ; magnet ; motors
Oct.20	Planet interiors	Planet atmospheres	Planet surface features
Oct.27	Planet fields ; review?	<b>Exam 2</b>	oscillations, resonance. $\Omega$
Nov.03	waves ; doppler	echoes & standing waves	absorb, reflect, refract
Nov.10	<b>Quiz 5</b> ; light waves	images (mirror & lens)	light as photons ; colors
Nov.17	photographs ; lasers	<b>Quiz 6</b> ; star surfaces	star interiors ; nuc.fusion
Nov.24	---	no classes	---
Dec.01	star formation ; exotica	Milky Way	other galaxies ; universe
Dec.08	<b>Exam 3 &amp; Final Exam</b>	---	

## Goals:

learn science content - facts about physical reality, theories about nature, applications.

practice its process - measure scenarios, deduce conclusions, exploit different perspectives.

relate science to life - reason by cause → effect, explore the tangible, consider implications.

communicate science - vocabulary with syntax - in context & math, on diagrams & graphs.

## Practices:

study with a partner or two ... not 5 ... not a tutor, not a dummy ... use our vocabulary.

don't try to memorize questions and their answers - learn what the quantities depend on.

focus on qualitative dependence ... increase or decrease ... then the math will make sense.

draw situations and scenarios - label them - your future students will be visual learners.

know (flashcards?) the units for quantities, and the abbreviations for those quantities.

skim the whole chapter, looking at pictures and reading captions, before going for details.

every chapter, draw a new concept map (vocab nouns, with labeled arrows to relate them).

ASK in class about things that puzzle your study group - like WHY some answer is right.

come see me in my office if 2 chapters in a row don't make sense - before the 3<sup>rd</sup> one starts.

Most Topics in Physical Science build upon the base formed by several previous Topics.

## Statements that are valid for ALL Classes at Marshall:

These are printed in your MU catalog - the most recent version is also on-line at

[www.marshall.edu/academic-affairs/?page\\_id=802](http://www.marshall.edu/academic-affairs/?page_id=802)

+ Academic Dishonesty Policy: progress in science is founded on honesty and openness  
- no lying, no cheating, no stealing, no copying - zero tolerance!

+ Absence Policy: email me ASAP after any missed class (before visiting Dean of Students);  
if class-work slides "too far" behind (3 weeks max) before Nov.01, you should withdraw.

+ Incomplete Grade Policy: to receive an "I", you must have completed  $\frac{3}{4}$  of the course  
successfully (passing); course work must be completed within 1 semester (by 2014 May)

+ Computing Services' Acceptable Use Policy :, don't "lend" your account, or send spam  
from it, or solicit from it ... remember to LOG OUT before leaving the Lab!

+ Students with Disability Policy: the student must initiate procedures to document a  
disability, then request accommodation, at the Office of Disability Services (Prichard 117).

+ Inclement Weather Policy: don't over-risk your safety to get to class (see Absence Policy)

Other Academic Responsibilities of Students are described in your catalog and on-line.

Cell Phones and other networked devices may NOT be used in class, except by MY invitation.