

# General Physics II, PHYS 1214, Section 01, 12noon MWF - Fall 2009

## MWF Part for Engineering Physics II (all sections)

Prerequisite for PHYS 1214: PHYS 1114 General Physics I

Prerequisite for PHYS 2225: MATH 3025 Calculus II

***NOTE If you enrolled in Engineering Physics II, this course is a team taught course with two textbooks and two sets of homework.***

***This course (Gen Physics II) is also 80% of Engineering Physics II for those enrolled in Engineering Physics II. Engineering Physics II students must come to a section of General Physics II at 10 am MWF with Dr. Williams and to the lab as well as the 1 hour component of calculus physics at 8 am Tues. taught by Dr. Rutledge. Grade in Engineering Physics II = .8 (% in GPII) + .2 (% in Engr PhysII). You must use Dr. Rutledge's Engineering Physics grading scale for final determination of letter grade.***

### 2. Dr. Karen Williams, Professor, Physics Dept.

Office P&ES 208. Office hours: MWF 9-10:50 MWF, 12-1T, 1-2 WR, other times by appt.

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### 3. Course/Section Requirements

#### Approved Materials:

**Texts/Supplies:** *College Physics* 6th Edition, Serway & Faughn (ISBN 0-534-49258-4)

*General Physics 1114/1214 Laboratory Manual*, 3rd ed. by Bruce Weems and Karen Williams

Scientific calculator w/ trig fns. NO PROGRAMMABLE CALCULATORS!

Metric Ruler ('12 inch' size w/ cm scale on other side)

#### Attendance:

- \* You are responsible for any announcements, quizzes, and assignments given in class so attendance is important.
- \* Anyone with 3 consecutive or 12 total absences may be academically withdrawn.
- \* Missing 4 labs may result in an academic withdrawal.
- \* No persons not enrolled in the class may attend
- \* Your cell phone ringer is to be turned off in my classroom.

#### 4a. Four Literacy Understanding Skills:

Written Communication, Reading (1,2), Mathematics (1,2), Computer Literacy, Critical Thinking

#### 4b. Course Objectives:

The objective is to use the study of General Physics to address the student outcomes.

- a. Students will interpret written text to solve physics problems and answer questions about physics phenomena, concepts, laws, and principles. Students will write in laboratory reports, homework problems, and in discussion papers or discussion questions on examinations that determines their understanding about physics phenomena.
- b. Students will read problems, text material, and laboratory instructions in order to correctly solve physics problems, gain insight about physics concepts, laws, or principles; and perform laboratory experiments.
- c. Students will observe, describe, and interpret computer demonstrations about various physical phenomena (for example: electrostatic fields). Students will also use the computer to take and do some analysis of data in the laboratory.
- d. Students will learn to think critically through the derivation of equations, the working of problems on homework and exams, in thinking through their answers to discussion questions posed on exams, and on describing possible sources of error or other hypotheses posed in the laboratory. Critical thinking will be achieved as students begin to know the difference between what given quantities are and what may be inferred by these given quantities. Students learn to become critical of their own laboratory work and to describe possible reasons for error. Students will develop decision making skills as conclusions are made from data (laboratory data and given information in class problems).
- e. Students will learn to apply the scientific method in the laboratory. For example, they will measure the period of a pendulum and determine how it depends on the length and mass (as in a grandfather clock). They will also gain knowledge about the scientific method as they read about famous scientific experiments of physics and how and why the scientists performed experiments the way they did.
- f. Students will apply the physics problem solving techniques to solving problems about physics that occur everyday. For example, students will learn about electric circuits, the telephone, the stereo, lenses & mirrors, Christmas tree lights, and compact disks in the home. Students will be able to explain ordinary physical phenomena and the resulting technology (xerox machines, ultrasound, tv's, radio, xray machines, ekg's, car engines, etc.) .
- g. Students will interpret their laboratory work to determine if their hypotheses are correct or whether they are in need of modification. Basic statistics must be employed to analyze their data. Students will almost always be expected to calculate a percentage error or percentage difference and explain what they think are the sources of error in their instance. Students will use the computer to graph data in order to interpret meaning of the data. Students will interpret the correlation computed from the graphs obtained in lab. Students will know the meaning of r- correlation as it applies to graphs. With the assistance of computer programs, linear regression will be calculated on most graphs done in the lab. The students will gain insight into the use of linear regression programs and when they are useful. Students must utilize value analysis skills to determine whether or not differences noted are indeed substantial so as to require other methods be utilized.

- h. Students will know the fundamental principles, theories, concepts, and laws of physics: thermodynamics, simple harmonic motion, sound, electric fields, electric potential, Ohm's Law, magnetic fields, Lenz's Law, geometrical and wave optics, and basic radioactivity laws.
- i. Students of physics must always apply the fundamental principles, theories, concepts, and laws of physics by problem solving on exams and homework, answering questions on exams or problem papers, performing experiments, answering during class discussions, and making hypotheses.
- j. Much of the technology based upon physics phenomena provide an opportunity to work in physics, chemistry, and/or biology as they all many times relate to the technology. For example, physicists in medicine (biology) work in hospitals calibrating radiation instruments. Discussions of careers in science will be conducted.
- k. Technology such as radiation (home, medical and nuclear power plant) bring with it decisions that must be made regarding their safety to humans. Scientific knowledge of the phenomena (i.e. how many rads is damaging, how does the rads in a smoke detector compare with this value) and value analysis skills (whether or not this many rads is acceptable for smoke detector use in society) must be utilized by each American. Such skills are essential to life in a technological age.

#### 4c. Course Competencies (for OK/NCATE Accredited Program Courses ONLY).

##### 4c.2). Identify the OK/NCATE Subject Area Competencies to be addressed in this course.

1a. Know and understand the major concepts and principles of the teaching discipline(s) as defined by state and national standards of the science education community.

1.b. Know and understand major concepts and principles unifying science disciplines. (See National Science Education Standard Unifying Concepts).

1.d. Apply mathematics in problem-solving and scientific investigation. (Ohms Law lab-rubric included)

C.5. Recommendations for Teachers of Physics

C.5.a. *Core Competencies*. All teachers of physics should be prepared lead students to understand the unifying concepts required of all teachers of science, and should in addition be prepared to lead students to understand:

1. Energy, work, and power. (Ch. 12,17)
2. Motion, major forces, and momentum. (Ch. 13, 14,19)
3. Newtonian principles and laws including engineering applications.(Ch. 13,14,15,19)
4. Conservation of mass, momentum, energy, and charge. (Ch. 12, 13, 14, 17, 15,19)
5. Physical properties of matter. (Ch. 12, 17, 19, 22)
7. Radioactivity, nuclear reactors, fission, and fusion (Ch. 29,30, Web Readings)
8. Wave theory, sound, light, the electromagnetic spectrum and optics. (Ch. 13, 21, 22, 19)
9. Electricity and magnetism (Ch. 19,20,21)
10. Fundamental processes of investigating in physics. (Labs, coursework)
11. Applications of physics in environmental quality and to personal and community health. (Ch. 14 (sound), Ch. 17 (electricity), Ch. 19 (magnetic field safety), Ch. 22-23-25 (eyesight, glasses).

C.5.b. *Advanced Competencies*. In addition to the core competencies, teachers of physics as a primary field should be prepared to effectively lead students to understand:

12. Thermodynamics and relationships between energy and matter. (Ch. 12)
14. Angular rotation and momentum, centripetal forces, and vector analysis. (Ch. 13, 14, 15, 19)
16. Models of nuclear and subatomic structures and behavior. (Ch. 29, 30)
17. Light behavior and models (Ch. 19, 22-23)
18. Electrical phenomena including electric fields, vector analysis, energy, potential, capacitance, and inductance. (Ch. 15, 16, 17, 21)
19. Issues related to physics such as disposal of nuclear waste, light pollution, shielding communication systems and weapons development. (Ch. 22-23, 29, 30, web readings)
20. Historical development and cosmological perspectives in physics including contributions of significant figures and underrepresented groups, and evolution of theories in physics. (Each required physics course)
21. How to design, conduct, and report research in physics. (labs)
22. Applications of physics and engineering in society, business, industry, and health fields. (Each required physics course)

C.5.c. *Supporting Competencies*. All teachers of physics should be prepared to effectively apply concepts from other sciences and mathematics to the teaching of physics including concepts of:

26. Mathematical and statistical concepts and skills including statistics and the use of differential equations and calculus. (statistics in GPII labs, correlation coefficient, what it means).

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 Content will emphasize unifying concepts:  
 Systems, order, and organization  
 Evidence, models, and explanation  
 Constancy, change, and measurement  
 Evolution and equilibrium  
 Form and Function  
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C.2.c. *Supporting Competencies*. All teachers of biology should also be prepared to effectively apply concepts from other sciences and mathematics to the teaching of **biology** including basic concepts of:

23. Physics including light, sound, optics, electricity, energy and order, magnetism, and thermodynamics. (see C.5.a and C.5.b)

C.3.c. *Supporting Competencies*. All teachers of chemistry should be prepared to effectively apply concepts from other sciences and mathematics to the teaching of **chemistry** including:

30. Physics, including energy, stellar evolution, properties and functions of waves, motions and forces, electricity, and magnetism. (All but stellar evolution is covered in GPII)

### 5. Topical Outline of Course Content:

Test 1 Ch. 12-13	Thermo. & Waves
Test 2 Ch. 14-15-16	Sound/Elect. Fields & Forces/Capacitors
Test 3 Ch. 17-18-19	Elec. current,circuits,magnetism
Test 4 Ch. 20-21	Induction,AC, em waves
Test 5 Ch. 22,23, 25.2,29,30	Optics, Radioactivity
Final	Comprehensive -Optional

## 6. Grading:

### Exams:

- \* All exams are worth 100 points
- \* Make-ups will only be given in the event of extreme circumstances which I deem acceptable (athletes, illness) and you must contact me before the exam.
- \* If you are happy with your grade, the final is optional. You may substitute the final exam score for one missed exam or for a low exam score. Problems on the final will be taken from previous exams. You are responsible for the correct answers to the old exams.
- \* Cheating on an exam will result in an "F" for the course if the incident occurs after the drop deadline. If the incident occurs before the drop deadline, a grade of zero will be assigned for that exam and the final can NOT replace that exam grade. Be sure to read the ECU Academic Integrity Policy.
- \* Sufficient work must be shown for full credit to be given.
- \* Keep your old exams until final grades are given-they are your only proof of your grades.

### Homework:

- \* Homework problems with an asterisk beside them are due at the beginning of class. No late homework accepted.
- \* Show your work-not your neighbor's! In the event of rampant cheating, I will abolish the collection of homework in favor of giving closed-book quizzes! Be sure to read the ECU Academic Integrity Policy.
- \* Each pair of homework problems will be worth 10 points.
- \* Be sure to work all of the homework problems before the exam-if you hope to pass exams.

### Prelabs & Labs:

- \* You must be on time for the labs or you will not be allowed to attend them. Labs are Wed. 2-4 pm and Thurs 1-3.
- \* Athletes have one week in which to make up a missed lab and must contact their lab instructor beforehand to set up the time to make up the lab.
- \* 10 pts per each *Prelab question set* will be completed using Beyond Question (web based).
- \* Questions must be answered by 12 pm Wed. ([www.erskine.edu/bq/ecudefaul.html](http://www.erskine.edu/bq/ecudefaul.html))  
Select Preclass button  
then select section: **Fall 09 - Physics II/Engr Physics II K. Williams taught by instructors**
- \* Prelabs are graded by your lab instructor Dr. Rutledge. If all questions are answered, first submission is graded.
- \* Bring your lab manual on lab day. Labs are to be turned in at the end of the lab and are to be done in pencil.
- \* Be careful to include units, label your graphs, and use complete English sentences to answer the questions.
- \* Labs will be worth a maximum of 10 points, with the associated prelab worth 10 pts.
- \* One make-up lab at the end of the semester will allow you to make-up one missed lab and/or missed prelab.

### Lab Schedule:

8/19-20	L1 Telephone Dialer	10/21-22	L9 AC Circuits
8/26-27	L2 Simple Harmonic Motion	10/28-29	No lab (Centennial Reunion)
9/2-3	L3 Velocity of Sound	11/4-5	L10 Index of Refraction
9/9-10	L4 Electric Fields	11/11-12	L11 Thin Lenses
9/16-17	L5 Capacitors	11/18-19	L12 Diffraction Grating
9/23-24	L6 Resistivity of Wire	11/25-26	Thanksgiving Holiday No Lab
9/30-1	L7 Ohms Law	12/2-3	Makeup Lab: Prism Spectrometer
10/7-8	L8 Magnetic Field of Solenoid		

### Whiteboard Participation:

I hope to implement some group work using whiteboards. This will work against your homework scores if you do not participate.

- 0 pts. will be given to each student who participates fully in the whiteboard groups
- 1 pt. if the student's participation is limited.
- 2 pts. if the student does not participate in group work or is absent.

### Calculating Final Grade in course:

Keep all graded papers in the event of spreadsheet errors-they are your proof.

Add your points on all homework, any quizzes, labs, prelabs and exams; then divide this sum by the points possible on these items. Multiply this quotient by 100 to obtain a percentage. This percentage corresponds to a letter grade as follows: A 90-100 %, B 80- 89 %, C 70- 79 %, D 60- 69 %, F 0- 59 %

- \* Any questions about a graded paper must be brought to my attention no later than one week from the date that I returned it in order for a grade change to occur.
- \* Your grades will be posted by secret # on the bulletin board by classroom and after exams at:  
<http://homepage.mac.com/kwillims/NewCoursepage.html>. - unless you tell me otherwise.
- \* Your continued enrollment in this class constitutes your acceptance of these policies.

### **7. ADA Voluntary Self-Identification Policy:**

East Central University is committed to providing equal access to university programs and services for all students. Under university policy and federal and state laws, students with documented disabilities are entitled to reasonable accommodations. If any member of the class has a documented disability requiring academic accommodations, s/he should report to the Office of Disability Services (telephone #: 580/559-5297). A student seeking reasonable accommodations originating from a documented disability must register with the Office of Disability Services so that said accommodations may be provided.

### **8. Writing Proficiency Policy:**

In keeping with the university's emphasis on writing proficiency, all student produced writing will be expected to reflect clear content, coherent and organized structure, and adherence to stylistic and mechanical standards articulated by the professor. Students needing help with writing are encouraged to visit the Writing Center and talk with Dr. Kevin Davis in DH 101.

### **Classroom Courtesies:**

Talking in class about subjects other than physics is prohibited during class.

Tobacco, snuff, drinks, and food are prohibited (unless otherwise notified by ADA clause).

Baseball caps are not to be worn on the head in the classroom during exams unless they are turned with the bill toward the back of the neck. They are to remain on your head during exams. Cowboy hats obstruct other students' view of the board, so they must be removed during class.

No Cell phones should ring in the classroom. 5 Points will be deducted for 2nd offense.

### **Important Dates:**

Sept. 7 Labor Day Holiday

Nov. 25-27 Thanksgiving Holiday

Oct 15-16 Fall Break Holiday

Nov. 30 Last day to drop

Nov. 4 Last day drop with W

**GPII Spring 2009 Homework Serway/Faughn 6th ed.**

**Homework problems. Turn in \*'d problems for grading. Do all before test.**

8/21 Ch. 12 # 3, \*5, 7, 8, 9, 13, 17, 23, 24, \*26, 27, 29, 35, 37, 39

8/25 Ch. 13 # 1, 2, 8, 10, \*11, 13, 14, 16, 18, 20, 22, 26, \*27, 28, 30, 39, 40

**8/31M Test Ch 12-13**

9/9 W Ch. 14 #1, 2, 4, 10, 11, 12, \*16, 20, 21, 32, 43, \*44, 45, 54, 55

9/15W Ch. 15 #2, 10, 11, 12, \*13, \*17, 18, 20a, 24, 25, 26, 27

9/21 M Ch. 16 #1, 2, 3, 4, 5, 12, \*13, 15a, \*16, 17, 22, 29, 30, 31, 33, 34, 35, 44

**9/23 W Test Ch 14, 15, 16**

10/2 F Ch. 17 #10, 13, 18, \*20, 22, 31, 32, \*34, 40, 44, 52

10/12 M Ch. 18 # 4, 5, \*6, 7 and find V each, 8, 10, 13 and find Req, 14 and find Req,  
22a and find Req, 37, \*40; concept question 14, 12

10/19 M Ch. 19 # 1a&b, 2, 3, \*5, 6, 9, 14, 15, 27, 31, 32, \*34, 36, 37, 38, 39, 47

**10/21 W Test Ch 17, 18, 19**

10/28 W Ch. 20 #1, 2, 8, \*9, 10, 18,19, 20, 23, \*24, 25, 26, 27, 28, 29

11/9 M Ch. 21 #1,8, 9, 14, 16, 18, 19, \*20, 21, 33, 34, \*38, 39, 41, 45, 50, 51b, 53

**11/11 W Test Ch. 20-21**

11/18 W Ch. 22 # 7, 9, 13, \*14, 18, 19, 24, \*27, 33, 34

11/23 Ch. 23 # 5, 6, 7 and by rays, 8, 10, 15, 21, 22, 27, 29 and by rays, 32, 33a, \*34, 35, 37,  
\*then do 29 if diverging lens and by rays  
Read: Sect 25 Sect 2, Ch 29 sect. 3,4,7 and Ch. 30 Sect. 1 & 2 and Web readings

**12/2 W Test on Ch 22, 23, 25 (100 pts.)**

**12/9 W at 11:30-2:30 Final Exam comprehensive 1 problem off each old exam.  
Problems are chosen by random #.  
no one enters after 1st one leaves exam room**