Physics 1260 (FEH) Syllabus Autumn 2013

Instructors:

10:20 Professor Andrew Heckler, 1002 Physics Research Building, 688-3048, heckler.6@osu.edu Office Hours: Wed. 11:30-1:00, or set up appointment.
11:30 Professor Terry Walker, M2012 Physics Research Building, 292-3251, walker.33@osu.edu Office Hours: Tue. 9-10:30, or set up appointment.
12:40 Professor Terry Walker, M2012 Physics Research Building, 292-3251, walker.33@osu.edu Office Hours: Tue. 9-10:30, or set up appointment.

No matter which course you are enrolled in, you may attend any of our office hours.

This is a GEC Science Course: Physics 1260 is a Physical Science course in the Natural Science category of the GEC.
Goals/Rationale: Courses in natural sciences foster an understanding of the principles, theories and methods of modern science, the relationship between science and technology, and the implications of scientific discoveries and the potential of science and technology to address problems of the contemporary world.
Learning Objectives:

1. *Students understand the basic facts, principles, theories and methods of modern science.*This course is a survey of the concepts and problem solving techniques involving linear and rotational motion, force, energy, work, momentum, simple harmonic motion, fluids, heat, thermodynamics, kinetic theory of gases, and special relativity.
2. *Students understand key events in the development of science and recognize that science is an evolving body of knowledge.* This course follows some of the most important developments in physics in including ideas of Aristotle, Galileo, Newton, Einstein and a variety of physicists in the 18^{th} though 20^{th} centuries.
3. *Students describe the inter-dependence of scientific and technological developments.* Applications to technology are discussed and problems involving design applications involving basic physics principals are assigned and discussed.
4. *Students recognize social and philosophical implications of scientific discoveries and understand the potential of science and technology to address problems of the contemporary world.* The applications of these foundational topics to current and recent technological problems and the promise of current and recent research based on these foundations is discussed.

Course Format:
Full Class Meetings: Every MWF in Smith 1005, the whole class will meet for discussions and problem-solving activities. Students are responsible for completing the pre-lectures and associated reading before each meeting. Note that these meetings will *not* cover all of the material of the course represented by the readings. Instead, these meetings will focus on specific activities relevant to the readings and related material. Students may also pose questions they have about the readings and prelecture assignment during these sessions.
Small group Meetings: Every Thurdsay, student will break into small groups different rooms. Within each group, students will discuss and solve problems assigned in the meeting
Labs: During various assigned days of the week for two hours in Smith 2157, students will participate in laboratory and group problem solving activities.

Text: R. Knight: **Physics for Scientists and Engineers: a strategic approach (3rd Edition)**, Addison Wesley Publishers. MasteringPhysics, the required online homework system, is included with purchase. See also "textbook info" posted on Carmen (see below) for purchasing alternatives.

Lab Manual: This is posted on Carmen (see below). You will need to print it and bring it to lab.
Lab Notebook (Required): Buy one at a bookstore for use in your physics laboratories. It should be a bound note book with graph paper pages (e.g. composition book with graph paper pages).

Standard Grading Scheme: Your grade will be computed according to the following scheme:

Homework	150
Pre Lecture Assignments (2 pts each)	82
Midterm corrections (10pts. each)	20
Two "midterm" exams @ 100 points each (12 points for group portion, 88 points individual)	200
Final exam	150
Laboratory (12pts. each)	156
Total	**758**

The guaranteed maximum cutoffs for different grades are (they *may* be adjusted down slightly at the end): A^- - 90%, B^- - 80%, C^- - 70%, D^- - 60%. (i.e., if you get a 90% or better, you are guaranteed that your grade will be no lower than an A^-.)

Alternate Grading Scheme: For those who earn at least 90% of the available homework and lab points and turn in their exam corrections, the final grade may also be calculated such that the final exam is worth 200 points and the midterms are each worth 75 points. For those that qualify for the alternate grade calculation, you will receive whichever grade (standard or alternate) is higher.

You can check your grade and other important course information on the web by logging into the course Carmen site at http://carmen.osu.edu

Homework: there are three components to the homework. See "Homework info and policies" on Carmen for detailed info. Below is a summary.

Mastering Physics. The Mastering Physics problems will be worth 7 points. More details about the homework and specific instructions are on the Carmen site. An *ungraded* tutorial is the first assignment on MasteringPhysics.com; it will take about half an hour to do and will show you how to use the system. You will need the Course ID for MasteringPhysics: this is **PH1260F13**.

Written solution. Every week, you will be assigned a problem in which you will provide a written solution, worth 3 points. These assignments are to be done on paper and handed in at the beginning of recitation on the due date. They will *not* be accepted at the end of recitation. The additional problem(s) will have a special format to follow, as explained in the "Homework info and policies" document on Carmen.

Pre-Lecture Assignments and associated Readings: By 9:45 am on every day of Full Class meetings (MWF), a short assignment is due. The assignment can be found on Mastering Physics. The assignment is directly relevant to the topics of the course and the associated readings. Each assignment includes two feedback questions. These two questions do not carry points, but if they are not answered satisfactorily (at least a reasonable sentence or two), you will risk receiving zero credit for that pre-lecture assignment. The Readings are on the course Carmen site. The readings are relevant to the assignment and it will be assumed that you have read them before each meeting.

Midterm exams will consist of two portions – a group part worth 12 points which occurs during a recitation class and an individual part worth 88 points, to administered in the evening (see calendar.) If you have an official conflict with the evening exam, you must contact your lecture instructor no later than 1 week prior to the exam to make arrangements for an alternate exam.

Exciting bonus point opportunity! As an incentive for you to work together in groups, if every member of your group scores above 75% on the individual portion of the midterm, everyone in the group will have 3 bonus points added to their exam score.

Midterm corrections: To assist you in using your graded midterm exams as learning tools, we require that you turn in corrections to any problems you missed. These will be due at the recitation after the exams are handed back. While writing these corrections, you may consult with any resources, including the book, classmates, or instructors. You will receive all 10 points for an honest effort. If your score on the individual portion of the midterm *before* any group bonus points is 80 or greater (ie 90%), you do not need to submit the corrections and will receive 10/10 for the assignment.

Midterm regrades: If you find a problem with the grading of the midterm, please fill out a regrade form found at the Carmen site, or in the physics student lounge in Smith Hall.

Small group "Recitation" sections: Every Thursday is the recitation class, were you will work in groups on important selected exercises and problems. Attendance is expected and is important for proper group activity. NOTE: if you miss more than one recitation class you will risk having to take the group test alone, without your group.

Laboratory: There are 13 labs total. Each lab is 12 points. Bring the laboratory manual and a calculator to the lab each week. You are to record all of your work in your lab notebook, which may be collected and graded for completeness. Your lab grade depends upon the quizzes/practice (as outlined above), attendance, your answers to questions posed by the lab TA, and spot checks of your lab notebook. Missed labs may be made up provided 1) there is a valid excuse for missing your scheduled lab, 2) there is space in another lab section later in the week, and 3) you get the permission of the laboratory instructor for the make-up section. Labs are group activities. Make sure you attend labs regularly.

IMPORTANT FEH POLICY NOTE: If you get less than 50% in the lab portion of the course, no matter how well you perform in the rest of the course, you will fail the class.

Study Aids: Solutions for the homework will be posted on the web. The recitation instructors and lecturers have office hours, and can also meet you at other times if scheduled in advance. PLEASE TAKE ADVANTAGE OF THESE RESOURCES!!!

Course Structure: We will be using a method of instruction that depends on individual participation and group interaction. In addition to solving complex problems, you will observe phenomena, develop explanations for your observations, help construct physical quantities and quantitative physical principles based on these observations, design experiments to test the explanations and principles, and apply the principles to interesting real-world phenomena. The method supports the goals of the engineering ABET engineering accreditation organization.

Academic Misconduct: Academic misconduct will not be tolerated in this class. If you are unsure about what constitutes academic misconduct, consult the University's Code of Student Conduct. Please see your instructor if you have any questions or are at all unclear about this issue.

Research on Learning: as part of an ongoing effort to improve physics instruction, data from student performance in this course may be used in research projects. Any data used will be compiled in aggregate form and in no way will your name be used to identify you with the data. If you object to the use of data on your performance in a research project, please contact your instructor and we will remove your data from any projects.

Disability Statement: Any student who feels s/he may need an accommodation based on the impact of a disability should contact their lecture instructor privately to discuss his/her specific needs. Please contact the Office for Disability Services (2-3307, 150 Pomerene Hall) to coordinate reasonable accommodations for any documented disabilities.

1260 (FEH) Class Schedule

	Kinematics: describing motion Chapters 1, 2
Aug. 21-23 Week 1	NO LAB THIS WEEK Introductory remarks Understanding position, velocity and acceleration Interpreting Kinematic graphs Multiple representations of kinematics: verbal, pictorial, graphical and algebraic.
	Kinematics in 1-D and 2-D, Vectors Chapters 2, 3, 4.1-4.3
Aug 26-30 Week 2	LAB 1: Thinking About Motion Using Diagrams & Graphs Interpreting Kinematic graphs Multiple representations of kinematics: verbal, pictorial, graphical and algebraic. Solving kinematics problems and interpreting the results Properties of vectors; adding and subtracting vectors Projectile motion HW #1 due: 8/29
	Force and Motion Chapters 5, 6
Sept 2-6 Week 3	LAB 2: 2-D Kinematics The relationship between force and motion Kinds of forces Drawing and using free-body diagrams Solving dynamics problems and interpreting the results
No Class: Sept. 2 (Mon)	HW #2 due: 9/5

	Force and Motion in 1-D and 2-D Chapters 6, 7
Sept. 9-13 Week 4	LAB 3: Static Equilibrium: Practice using free body diagrams and force equations Defining the system Understanding force as interaction; Newton's 3rd Law Solving dynamics problems and interpreting the results Applications and context-rich problems HW #3 due: 9/12
	Force and motion in 2-D, Circular motion, Newton's 3rd Law Chapter 8 LAB 4: TBA
Sept. 16-20 Week 5	Understanding circular motion Solving dynamics problems and interpreting the results Applications and context-rich problems HW #4 due: 9/19
	Momentum and Impulse Chapter 9
Sept. 23-27 Week 6	LAB 5: The Monster Truck and Airplane Flier Experiment Problems Momentum and impulse Conservation of momentum Understanding inelastic collisions, explosions and recoil Solving impulse-momentum problems and interpreting the results HW #5 due: 9/26
Sept 26 **Sept 26**	**1st Group Midterm**- in recitation **1st Individual midterm: Time 7:05p-9:00p, Location TBA**
	Energy & Work Chapters 10, 11
Sept 30- Oct4 Week 7	LAB 6: Study change in momentum versus impulse and also situations with no external impulses in which momentum is conserved Introduction to Energy Understanding kinetic and potential energy Understanding and using the work-energy theorem Defining the system, Conservation of energy Energy transformation and transfer, thermal energy Constructing and using energy bar charts HW #6 due: 10/3

Oct. 7-11 Week 8	**Energy, Work & Power** Chapters 10,11 LAB 7: Pendulum and Box Bash Experiment Understanding power Solving energy problems and interpreting the results Applications and context-rich problems Introduction to rotational motion HW #7 due: 10/10
Oct 14-18 Week 9	**Rotational Motion** Chapter 12 LAB 8: TBA Rotational Kinematics Torque, energy, angular momentum Rotational Dynamics Solving rotation problems and interpreting the results HW #8 due: 10/14
Oct 21-25 Week 10	**Rotational motion of rigid bodies, gravity** Chapters 12, 13 LAB 9: TBA Torque, energy, angular momentum Rotational Dynamics Solving rotation problems and interpreting the results Gravity and orbital motion HW #9 due: 10/24
Oct 28- Nov 1 Week 11 **Oct 31** **Oct 31**	**Gravity, Oscillations** Chapters 13,14 LAB 10: Rotational Kinematics and Dynamics Oscillatory motion HW #10 due: 10/31 **2nd Group Midterm**- in recitation class **2nd Individual midterm: Time 7:05p-9:00p, Location TBA**
Nov 4- 8 Week 12	**Fluids, Temperature, Heat** Chapters 15, 16 LAB 11: Oscillations Pressure, Temperature, Heat. HW #11 due: 11/7

Nov 11- 15 Week 13 No Class: Nov 11 (Mon)	**Thermodynamics** Chapters 17,18 LAB 12: Heat & Temperature HW #12 due: 11/14
Nov 18- 22 Week 14	**Thermodynamics** Chapters 18,19 LAB 13: Thermodynamics HW #13 due: 11/21
Nov 25- 29 Week 15 No Class: Nov 27-29	**Thermodynamics** Chapters 18,19 NO LAB THIS WEEK HW #14 due: 11/27 (Note this is a Wednesday!)
Dec 2- 3 Week 16	**Thermodynamics** Chapters 19 NO LAB THIS WEEK HW #15 due: 12/5
Final Exam: Monday, December 9, 2013 **Time 8:00p-9:55, Location TBA:**	