ELEMENTS OF PHYSICAL SCIENCE (PHY 100)

COURSE AND INSTRUCTOR INFORMATION

Course: PHY 100 (section: 02)
Lecture Location: Merion 109
Lecture Time: MWF: 1:00 pm – 1:50 pm

Instructor: Anil K. Kandalam (Dr. Kandalam or Dr. K)
Office Location: Schmucker Science South, SS 403A
Email: akandalam@wcupa.edu
Office Hours: Monday: 9:00 am – 10:00 am, Wednesday: 9:00 am – 10:00 am, 3:00 pm – 4:00 pm
Thursday: 10:00 am – 11:00 am, Friday: 2:00 pm – 3:00 pm or by appointment

COURSE OVERVIEW

In PHY 100, we will study the application of modern physics to various aspects of our everyday lives. Our ultimate goal is to understand how scientific models of the physical world can enrich our understanding of everyday processes. We will begin by considering what a model of the physical world consists of, and learn the mathematical language by which we can ask questions of and receive quantitative answers from the natural world. From there, we will study the modern theories of motion and rotation which allow us to make sense of how and why things in the world around us move. Lastly, we will turn our attention to vibrations and waves, the study of which will allow us to understand how sounds are produced and how we hear them with our ears. Throughout the course, we will develop and build analytical reasoning and problem solving skills which are widely applicable to our modern life.

COURSE REQUIREMENTS

This course has no prerequisites. However, we will be doing some basic algebra at the high school math level; I will assume that you have done this sort of math before, though it may be a few years since you've seen it or used it. We will also be drawing and interpreting diagrams, which I will assume you have some experience doing (but may not have practiced in a while). A good deal of time in this class will be spent extending our existing body of knowledge to new situations in order to understand them; I will assume that you have experience doing this.

REQUIRED COURSE MATERIALS

Textbook: Physics: A Conceptual World View, 7th Ed., by Kirkpatrick & Francis (Thompson, Text: Brookes/Cole.

Other Required Materials:

A stand-alone calculator which is ***not*** part of an internet-accessible personal electronic device.
A Turning Technologies Response Card RF LCD clicker

COURSE GENERAL EDUCATION GOALS

Course PHY100 is an approved General Education course in the Sciences. It is designed to help students meet the following General Education goals:

1. *General Education Goal #2:* ***Ability to employ quantitative concepts and mathematical methods:*** This goal will be accomplished through in-class activities (such as concept-based *clicker*

questions) and numerical problems during the lecture, and assigned homework problems.

2. *General Education Goal #3:* ***Ability to think critically and analytically***: This goal will be accomplished through in-class activities such as *clicker* questions and assigned homework problems.

D2L

This course has a D2L page. I will post syllabus, homework assignments, and all other course related materials to the D2L webpage.

GRADING

Student learning will be assessed through weekly homework assignments, midterm examinations, laboratory, and the final exam. The final grade assessment for this course will be based on the following:

- Classroom Participation……..…..12%
- Homework .……...20%
- Exams (3 @ 16% each) ……48%
- Final exam…….……....20%

CLASS PARTICIPATION AND ATTENDANCE

Both attendance and participation in the class room discussions are important parts of the class, and will be recorded beginning the second week of classes using the Turning Technologies Response Card RF (radio frequency) "**clicker"**. You can purchase these at the university bookstore; and is the same device used in many other courses at West Chester. Given that attendance/participation comprises 12% of your final grade, make sure that you bring the clicker to every class, and that you check its battery life periodically.

How does the Response Card (clicker) contribute to your grade?

First, register your clicker for this course by going to the D2L course page and follow the instructions shown in the short video that appears on the screen. It is **your responsibility** to have an operational clicker at every lecture. I will pose several multiple choice questions to you during each lecture period. Half of the 12% goes toward simply showing up and clicking ANY answer to the questions that are posed to the class. The other half of the 12% is reserved for getting the CORRECT answer. I do understand that on occasion something unforeseen will pop up and prevent you from attending class; therefore, at the end of the term I will drop three (3) days of class participation points.

If you miss class due to an excused absence (see definition of an excused absence below), it is YOUR RESPONSIBILITY to meet with me to get credit for participation points on the day you missed.

In order to earn class participation points with your clicker, YOU must be the one entering responses with it. I have a zero tolerance policy for ANYONE who hands their clicker to a classmate and tells that classmate to use it in class for them. I will periodically do a head count in class and compare it to the number of responses for that class period. If I catch anyone using multiple clicker in a class, this will be construed as cheating, and all involved parties will lose **all** 12 percentage points for the **semester** attendance/participation grade.

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, the Dean of Students, etc. If you are sick on a day when attendance was taken, you MUST obtain a doctor's note.

Finally, whether your absence is excused or unexcused (or if you are late to class), you will be responsible for any material covered and any announcements that were made in class that day.

HOMEWORK POLICIES

There will approximately ten homework assignments over the course of the semester. All homework will be posted and submitted online through the "homework" section of this course's D2L webpage. ***You are responsible for checking D2L and keeping up with homework assignments***: this means checking to see that an assignment has been posted, knowing when it is due, and ensuring that it is completed before the deadline. Because the grading is automatic, all late homework assignments will receive a grade of zero. **Homework assignments will not be accepted over email - no exceptions!** The lowest percentage homework grade of the semester will be dropped. If you are sick on the day that a homework assignment is due, that homework will be the one that is dropped.

If you have a question or a computer problem, you must notify me at least 48 hours before the homework due date. Plan on your internet access and/or computer failing at the *worst possible time*, so ***have a go at the homework at some point before the day it is due***. Report any problems with D2L ASAP by calling 1-877-325-7778 or visiting the D2L help desk in Anderson Hall Room 2 (610-436-3350, option 1).

I encourage you to discuss the homework problems with each other, but ***the work you do on homework assignments must be your own.*** (See the Academic Integrity statement below.) I also encourage you to discuss and review course material with your classmates. But do be sure to study and think about the material on your own, because your classmates cannot help you on exams.

As with any technology, problems with online D2L assessments can pop up unexpectedly, and for this reason I reserve the right to change details about how they are conducted. I also reserve the right to modify homework due dates and times due to unforeseen circumstances. You will be notified of any such changes both in class and on D2L.

REGULAR EXAM POLICY

Four in-class exams will be given during the course of the semester. Each of these exams will consist of 20 – 25 multiple choice questions (conceptual and numerical). Some exams MAY contain one open-ended problem; any open-ended problem appearing on an exam will be designed to be similar to example and practice problems done in class. *I will drop your lowest exam grade.*

Exams will be *closed book* and *closed notebook*. However, I will give you one sheet of equations to use during the exam. This equations sheet will be **the only aid** allowed to you during exams, with the exception of a stand-alone calculator (as described below). All other written and electronic aids are **strictly forbidden**. I will post on D2L the equations sheet that I will give you for an exam prior to the exam time, so that you can see what will be on the sheet.

You are permitted to use a stand-alone calculator (i.e., one that is ***not*** part of an iPod/iPad, cell phone, tablet PC, Kindle, etc.) during exams. If I catch you using an internet-accessible personal electronic device as a calculator during an exam, I will take your exam and you will get a zero on it. No exceptions. If you will be using a graphing calculator, I must personally see you clear its memory before you receive your exam. I will NOT bring extra calculators for you to use during exams. It is ***YOUR RESPONSIBILITY*** to make sure that you have a working stand-alone calculator for exams.

If you miss an exam: If you miss an exam, you will receive a ZERO on that exam. The policy of dropping an exam score is meant to alleviate the need for make-up exam. This means every student has one in-class exam that they can for whatever reason, sickness, family emergency, etc., not be counted. **Therefore, I will not give a make-up exam**. The exceptions, however, are limited to the absences related to University

Sanctioned Events (see below). If you miss an exam for a University Sanctioned Event you must notify me in advance so that we can arrange for you to take the exam in a manner consistent with its integrity. You must also provide some form of documentation (performing arts program, competition schedule etc.

FINAL EXAM

The final exam (closed book) will include all topics covered (cumulative) in the course and is ***MANDATORY***. Final exam will consist of 40 – 50 multiple choice questions (conceptual and numerical). Missing the final exam will result in a zero for the exam unless EXTREME circumstances apply. Even in that case, extra questions will be added to the make-up final. The date and time of the final exam for this course (as set by the registrar, as of 08/27/2016) is:

Friday, December 16, 2016 from 1:00 pm – 3:00 pm

You should plan to be available for the entire finals week. We have in past semesters had to reschedule finals due to weather related events. The final exam will be held in Merion 109.

ELECTRONIC DEVICES POLICY

In order to create a conductive learning environment, please arrange for all electronic devices to be set in silent/vibrate mode and put away. If you need to use a device to accommodate a disability, please see below. If I see anyone **texting or using their cell phones** during the class, **I will take 5 points off of the nearest exam grade**, and you will be considered "absent" for that day, since you are obviously not mentally present.

DISABILITY STATEMENT

If you have a disability that requires special accommodations under the Americans with Disabilities Act (ADA), please present your letter of accommodation and meet with me as soon as possible so that I can support your success in an informed manner. Also, contact the Office of Services for Students with Disabilities (OSSD) at (610) 436-2564, their email address is ossd@wcupa.edu, and their website is www.wcupa.edu/ussss/ossd. Sufficient notice is needed in order to make the accommodations possible. Both the WCU and I desire to comply with the ADA of 1990.

ACADEMIC INTEGRITY & CONDUCT

I have a zero tolerance policy for breaches of academic integrity. It is the responsibility of each student to adhere to the university's standards for academic integrity. Violations of academic integrity include any act that violates the rights of another student in academic work, that involves misrepresentation of your own work, or that disrupts the instruction of the course. Other violations include (but are not limited to): cheating on assignments or examinations; plagiarizing, which means copying any part of another's work and/or using ideas of another and presenting them as one's own without giving proper credit to the source; selling, purchasing, or exchanging of term papers; falsifying of information; and using your own work from one class to fulfill the assignment for another class without significant modification. Proof of academic misconduct can result in the automatic failure and removal from this course. For questions regarding Academic Integrity, the No-Grade Policy, Sexual Harassment, or the Student Code of Conduct, students are encouraged to refer to the Department Undergraduate Handbook, the Undergraduate Catalog, the *Ram's Eye View*, and the University website at www.wcupa.edu.

UNIVERSITY SANCTIONED EVENTS

If you are participating in a University sanctioned event during one of our scheduled exams you must notify me in advance. You must provide some form of documentation. We can then arrange for you to take the exam in a manner consistent with exam integrity. Students are advised to carefully read and comply with the excused absences policy for university-sanctioned events contained in the WCU Undergraduate Catalog. In particular, please note that the "responsibility for meeting academic requirements rests with the student," that this policy does not excuse students from completing required academic work, and that professors can require a "fair alternative" to attendance on those days that students must be absent from class in order to participate in a University-Sanctioned Event.

E-MAIL POLICY STATEMENT

It is expected that faculty, staff, and students activate and maintain regular access to University provided e-mail accounts. Official university communications, including those from your instructor, will be sent through your university e-mail account. You are responsible for accessing that mail to be sure to obtain official University communications. Failure to access will not exempt individuals from the responsibilities associated with this course.

ALL OTHER ACADEMIC POLICIES

For any university wide academic policy not explicitly covered in this document, such NO Grade policies, please consult your major advising handbook, the Undergraduate Catalog, the Ram's Eye View, or University Website.

TITLE IX STATEMENT

West Chester University and its faculty are committed to assuring a safe and productive educational environment for all students. In order to meet this commitment and to comply with Title IX of the Education Amendments of 1972 and guidance from the Office for Civil Rights, the University requires faculty members to report incidents of sexual violence shared by students to the University's Title IX Coordinator, Ms. Lynn Klingensmith. The only exceptions to the faculty member's reporting obligation are when incidents of sexual violence are communicated by a student during a classroom discussion, in a writing assignment for a class, or as part of a University-approved research project. Faculty members are obligated to report sexual violence or any other abuse of a student who was, or is, a child (a person under 18 years of age) when the abuse allegedly occurred to the person designated in the University protection of minors policy. Information regarding the reporting of sexual violence and the resources that are available to victims of sexual violence is set forth at the webpage for the Office of Social Equity at http://www.wcupa.edu/_admin/social.equity/.

EMERGENCY PREPAREDNESS

All students are encouraged to sign up for the University's free WCU ALERT service, which delivers official WCU emergency text messages directly to your cell phone. For more information, visit www.wcupa.edu/wcualert. To report an emergency, call the Department of Public Safety at 610-436-3311.

COURSE SCHEDULE: A tentative schedule for the course is given below. I will try to follow it as closely as possible. **I reserve the right to modify the schedule as needed over the course of the semester** (due to snow or for any other reason).

Date		Lecture	Reading
M	Aug. 29	Course Introduction and Logistics	
W	Aug. 31	Building a World View / What is Physics	Ch. 1: "On Building a World View", AND Ch. 11: "Building Models"
F	Sept. 2	What "Counts" as Physics / Measurement	Ch. 1: "Bode's Law", "Measurements", and "Sizes: Large and Small"
M	Sept. 5	**LABOR DAY: NO CLASSES**	
W	Sept. 7	Measurement / Scales / Speed	Ch. 1: "Sizes: Large and Small", Ch. 2: "Average Speed", and "Images of Speed"
F	Sept. 9	Speed / Velocity	Ch. 2: "Images of Speed", "Instantaneous Speed", and "Speed with Direction"
M	Sept. 12	Acceleration / the Kinematic Equations of Motion	Ch. 2: "Acceleration" and "A First Look at Falling Objects"
W	Sept. 14	The Kinematic Equations of Motion / Free - fall	Ch. 2: "Free Fall: Making a Rule of Nature", "Starting with an Initial Velocity", and "A Subtle Point"
F	Sept. 16	Adding Vectors / Force / Tour de Force	Ch. 3: "Adding Vectors", "An Early Explanation", "The Beginnings of Our Modern Explanation", "Weight", and Friction
M	Sept. 19	Newton's Laws / Mass vs. Weight	Ch. 3: "Newton's First Law", "Newton's Second Law", "Mass and Weight".
W	Sept. 21	Newton's Laws / Free-Body Diagrams	Ch. 3: "Mass and Weight", "Newton's Third Law", and "Free-Body Diagrams".
F	Sept. 23	Review for Exam I	Ch. 1 – 3
M	Sept. 26	**Exam – I (Ch. 1 – 3)**	
W	Sept. 28	Uniform Circular Motion	Ch. 4: "Circular Motion", "Acceleration Revisited", and "Acceleration in Circular Motion"
F	Sept. 30	Uniform Circular Motion / Projectile Motion	Ch. 4: "Acceleration in Circular Motion" and "Projectile Motion"
M	Oct. 3	Projectile Motion	Ch. 4: "Projectile Motion", and "Launching an Apple into Orbit"

Date		Lecture	Reading
W	Oct. 5	Projectile Motion / Newton's Gravity	Ch. 4: "Launching an Apple into Orbit", and Ch. 5: "The Concept of Gravity"
F	Oct. 7	Newton's Gravity	Ch. 5: "The Concept of Gravity", "Newton's Gravity", and "The Law of Universal Gravitation"
M	Oct. 10	**FALL BREAK: NO CLASSES**	
W	Oct. 12	Newton's Gravity / Gravitational Field	Ch. 5: "The Law of Universal Gravitation", "The value of G", and "The Field Concept".
F	Oct. 14	Tides / Momentum / Impulse	Ch. 5: "Tides", Ch. 6: "Linear Momentum", and "Changing an Object's Momentum"
M	Oct. 17	Impulse Systems / The Law of Conservation of Linear Momentum	Ch. 6: "Changing an Object's Momentum", and "Conservation of Linear Momentum"
W	Oct. 19	Collisions	Ch. 6: "Conservation of Linear Momentum", and "Collisions".
F	Oct. 21	Review for Exam II	Ch. 4 – 6
M	Oct. 24	**Exam II (Ch. 4 – 6)**	
W	Oct. 26	What is Energy / Kinetic Energy	Ch. 7: "What is Energy?", and "Energy of Motion"
F	Oct. 28	Work / Gravitational Potential Energy	Ch. 7: "Changing Kinetic Energy", "Forces that Do No Work", and "Gravitational Potential Energy"
M	Oct. 31	Gravitational Potential Energy / The Law of Conservation of Mechanical Energy	Ch. 7: "Gravitational Potential Energy", and "Conservation of Mechanical Energy"
W	Nov. 2	The Law of Conservation of Mechanical Energy / Power	Ch. 7: "Conservation of Mechanical Energy", "Power"
F	Nov. 4	Power / Rotational Motion	Ch. 7: "Power", and Ch. 8: "Rotational Motion"
M	Nov. 7	Torque / Extended Free-Body Diagrams	Ch. 8: "Torque", "Center of Mass", and "Extended Free-Body Diagrams"
W	Nov. 9	Extended Fee-Body Diagrams / Static Equilibrium	Ch. 8: "Extended Free-Body Diagrams"
F	Nov. 11	Review for Exam III	Ch. 7 – 8
M	Nov. 14	**Exam III (Ch. 7 – 8)**	
W	Nov. 16	Vibrations	Ch. 15: "Simple Vibrations" and "the Pendulum"
F	Nov. 18	Resonance / Waves	Ch. 15: "Resonance", "Waves", and "One-dimensional Waves"
M	Nov. 21	The Superposition of Waves	Ch. 15: "Periodic Waves" and "Superposition"

Date		Lecture	Reading
W	Nov. 23	**THANKSGIVING BREAK**	
Th.	Nov. 24		
F	Nov. 25		
M	Nov. 28	Superposition / Standing Waves	Ch. 15: "Superposition" and "Standing Waves"
W	Nov. 30	Interference and Diffraction	Ch. 15: "Interference" and "Diffraction"
F	Dec. 2	Sound / Hearing Sounds	Ch. 16: "Sound", "Speed of Sound", "Hearing Sounds", and "the recipe of Sounds".
M	Dec. 5	Musical Instruments	Ch. 16: "Stringed Instruments", "Wind Instruments", and "Percussion Instruments"
W	Dec. 7	The Doppler Effect	Ch. 16: "The Doppler Effect"
F	Dec. 9	**Exam IV (Ch. 15 – 16)**	Ch. 15 – 16
M	Dec. 12	**Review for Final**	