Fundamentals of Physics
PHYS 3400 Spring 2012

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PHYS 3400	-001	MW	9:00 - 11:50
	-002	MW	1:00 - 3:50
	-003	TR	9:00 - 11:50
	-004	TR	1:00 - 3:50

Text:

Coloring Book of Physics preliminary edition ISBN 978-0-7575-5574-9. It contains almost all of the activities we will be doing in class. More is being written this semester, pictures are being taken to illustrate the text. You may well be asked to have your exercise 'make the book'. You will be given a release form if you are photographed.

Course Description:

This is a course designed to instruct future educators in the basics of science and, then, introduce the techniques of teaching science. Class time will move freely from lecture to hands-on activities and back again. First, we will learn the fundamentals of a part of physics, and then we will learn several ways to explore this physics. Lastly, we will learn how to teach this to someone else. This will, hopefully, de-mystify science and you can then approach the teaching of science with less fear. This is an unparalleled opportunity for beginning educators. You could learn a great deal this semester.

We will be in Cooper ISD classrooms about half the time. We will get you into public school classrooms as quickly as possible. You will have an opportunity to observe science and in some cases practice your own ideas. You will get an impression of how to start with a new science concept, put it in a deliverable form, and see your idea change as it and you react with the students. You can learn a lot in just a few classes.

Learning Outcomes Assessment:

The successful student will acquire content information on physics applicable to the primary classroom. This will be assessed by pre- and post-testing around concept clusters (balance & motion and sink & float). The successful student will learn to take a topic, research it, design a lesson to teach it, and implement it. This will be assessed by having you design your own lessons around a variety of topics. You will write lesson plans around the material presented in class. This will hopefully show how well you learned the material presented and how well you can potentially teach it. You will design a lesson and write a coherent lesson plan to teach it. A lesson plan model designed around a 5E (Engage, Explore, Explain, Elaborate, Evaluate) system will be provided.

Grading:

Your grade will be based on your class participation, your class lesson plans, participation in pre- and post-instruction content mastery exercises, and several very short self-reflection papers.

Participation means that this is a hands-on class, if your hands aren't in class, then you can't get the material. You must attend consistently. **If you exceed 3 absences your course grade will be reduced a full letter grade**. Your attendance at TTU will be monitored by asking you to sign an attendance sheet. Your attendance at the schools will be monitored at the front office where you'll sign in and out.

The class lesson plans will be collected to make a portfolio you will assemble throughout the semester. You will design 6 science lesson plans focused on the grade you are interested in teaching. The science lesson plans can cover any science curriculum (Biology, Chemistry, Physics, Earth Science). This may be one of your first exposures to portfolio assessment. A portfolio is, first a collection of evidence of your learning, and, second, a record of how to teach several lessons. When writing your portfolio you need to think in terms of coming back to this in about five years.

The portfolio of your lessons will follow a 5E format.

- Engage
- Explore
- Explain
- Elaborate
- Evaluate

The pre- and post- testing will be short quizzes given to you before and after instruction to see if you learned anything. These will be conducted in class. Your honest participation is required. Your actual score is not part of your grade. These tests assess my teaching more than your learning.

The reflection papers will be assigned sporadically. Topics assigned by the professor will be given to the class to ensure learning and understanding. Often times the reflection papers will be used as free writing to discuss a topic learned in class or an experience at the off-campus schools. The length of the reflection papers will vary from a half of a page to a page.

Your group at your table will be asked to use a flip camera to record your consensus view of an activity and its meaning. This may happen several times.

If plagiarism is found, the students involved will lose a full letter grade from the final grade. Plagiarism will be determined solely by the informed opinion of the instructor.

Relative weights to these components will be as follows:

20% Class participation at Tech and the schools
20% Portfolio of lesson plans
20% Pre-/Post-test on concepts
20% Reflection Papers
20% Video Explanations

The anticipated grading scale is 90+% A; 80+% B; 70+% C; 60+% D; and less than 60% F. There will not be a comprehensive written final. You are learning to do things, not write things or regurgitate facts.

Any student, because of a disability, who may require special arrangements in order to meet course requirements, should contact the instructor as soon as possible to make any necessary arrangements. Students should present appropriate verification from Student Disability Services during the instructor's office hours. Please note that instructors are not allowed to provide classroom accommodations to a student until appropriate verification from Student Disability Services has been provided. For additional information, you may contact the Student Disability Services office at 335 West Hall or (806) 742-2405.

Academic dishonesty includes, but is not limited to, cheating, plagiarism, collusion, falsifying academic records, misrepresenting facts, and any act designed to give unfair academic advantage to the student, such as, but not limited to, submission of essentially the same written assignment for two courses without the prior permission of the instructor or the attempt to commit such an act.

Any student who intends to observe a religious holiday should make that intention known to the instructor prior to the absence. A student who is absent from class for the observance of a religious holiday shall be allowed to take an examination or complete an assignment scheduled for that day within a reasonable time after the absence.

Tentative Class Meeting Schedule PHYS 3400

	Date	Topic
1	M 1/23, T 1/34	Balance & Motion --- Pre-Test / Newton's Laws / Discuss schools
2	M 1/30, T 1/31	B&M --- Movement and measuring it
3	M 2/6, T 2/7	B&M --- Balance / Mobiles / Levers
4	M 2/13, T 2/14	B&M --- Weighing / Roller coasters / Energy / Literature in primary
5	M 2/20, T 2/21	B&M --- Weighing Game / Pendulums / Post-Test
6	M 2/27, T 2/28	Sink & Float --- S&F Pre-Test / Objects / Density
7	M 3/5, T 3/6	S&F --- Salt & Fresh / Hot & Cold / Clay Boats / Soap bubbles
	M 3/12, T 3/13	Spring Break-----No Class Meeting
8	M 3/19, T 3/20	S&F---Hot air balloons / Displacement Boat / Archimedes' Principle
9	M 3/26, T 3/27	S&F---Water Bottle & Nuts / Video Explanation
10	M 4/2, T 4/3	S&F --- Density Column / Vials / Horse & Chihuahua / Video Explanation
	M 4/9, T 4/10	No Class
11	M 4/16, T 4/17	S&F---S&F Post-Test / Measurement / States of Matter --- Oobleck
12	M 4/23, T 4/24	Color---Mouse Paint / Black Butterfly / Chromatography
13	M 4/30, T 5/1	Sound --- Tuning Forks / Table Guitar / Boomwhackers
14	M 5/7, T 5/8	Last Class Meeting at TTU ***** Discuss and Evaluate
	W 5/9	Dead Day