

Fundamentals of Physics

PHYS 3400 Fall 2009

Dr. David Lamp 742-3234 David.Lamp@ttu.edu
Office SC 21/23 office hours by appointment
PHYS 3400-001 MW 9:00-11:50
PHYS 3400-003 TR 9:00-11:50
PHYS 3400-004 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 fill 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, then we will learn several ways to explore this physics, and then 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.

Essentially, from mid-semester on we will be in classrooms around town about half 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 to 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 at least three concept clusters, balance & motion, sink & float, and electricity & magnetism. 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 system will be provided.

Grading: Your grade will be based on your class participation, your class lesson plans, and pre- and post-instruction content mastery exercises.

The class lesson plans will be collected to make a portfolio you will assemble throughout the semester. 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 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.

Relative weights to these components will be as follows:

- 50% Class participation @ Tech & the schools
- 25% Portfolio of lesson plans
- 25% Pre-/Post-test on concepts

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.

It is assumed that you will comply with the student handbook on academic honesty. Work submitted must be your own. The point of this class is to prepare you to teach. Do not short change yourself by trying to submit someone else's work. In a course like this, the grade is less significant than what you carry forward to your students.

Any student, who because of a disabling condition, may require special arrangements in order to meet the 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.

Tentative Class Meeting Schedule PHYS 3400 -001

Class	Date	Topic
1	M 8/31	Balance & Motion --- Pre-Test / Newton's Laws / Spring Scales
2	W 9/2	B&M --- Balance / Mobiles / Levers
	M 9/7	Labor Day Break
3	W 9/9	B&M --- Weighing / Roller coasters / Kinetic & Potential Energy
4	M 9/14	B&M --- Weighing Game / Pendulums / Post-Test
5	W 9/16	Sink & Float --- S&F Pre-Test / Objects / Density
6	M 9/21	S&F --- Salt & Fresh / Hot & Cold / Clay Boats
7	W 9/23	1
8	M 9/28	S&F --- Hot air balloons / Soap bubbles / Displacement Boat
9	W 9/30	2
10	M 10/5	S&F --- Archimedes' Principle / AP Spring Scales
11	W 10/7	3
	M 10/12	Fall Break
12	W 10/14	4
13	M 10/19	Density Column
14	W 10/21	5
15	M 10/26	S&F --- Vials / S&F Post-Test / Measurement
16	W 10/28	6
17	M 11/2	Color --- Mouse Paint / Chromatography
18	W 11/4	7
19	M 11/9	States of Matter: Oobleck
20	W 11/11	8
21	M 11/16	Sound & Music
22	W 11/18	9
23	M 11/23	Electricity & Magnetism --- Battery, bulb, wire / Circuits 1
	W 11/25	10
24	M 11/30	Thanksgiving Break
25	W 12/2	11
26	M 12/7	E&M --- Magnetism / Electromagnet
27	W 12/9	@ttu Last Class Meeting ***** Discuss and Evaluate
	R 12/10	Dead Day

Tentative Class Meeting Schedule PHYS 3400 -003 and -004

Class	Date	Topic
	R 8/27	Syllabus/Pre-Test/Science Survey
1	T 9/1	Balance & Motion --- Newton's Laws / Spring Scales
2	R 9/3	B&M --- Balance / Mobiles / Levers
3	T 9/8	B&M--- Weighing / Roller coasters / Kinetic & Potential Energy
4	R 9/10	B&M --- Weighing Game / Pendulums / Post-Test
5	T 9/15	Sink & Float --- S&F Pre-Test / Objects / Density
6	R 9/17	1
7	T 9/22	S&F --- Salt & Fresh / Hot & Cold / Clay Boats
8	R 9/24	2
9	T 9/29	S&F --- Hot air balloons / Soap bubbles / Displacement Boat
10	R 10/1	3
11	T 10/6	S&F --- Archimedes' Principle / AP Spring Scales
12	R 10/8	4
	T 10/13	Fall Break
13	R 10/15	5
14	T 10/20	Density Column
15	R 10/22	6
16	T 10/27	S&F --- Vials / S&F Post-Test / Measurement
17	R 10/29	7
18	T 11/3	Color --- Mouse Paint / Chromatography
19	R 11/5	8
20	T 11/10	States of Matter: Oobleck
21	R 11/12	9
22	T 11/17	Sound & Music
23	R 11/19	10
24	T 11/25	Electricity & Magnetism --- Battery, bulb, wire / Circuits 1
	R 11/27	Thanksgiving Break
25	T 12/1	E&M --- Magnetism / Electromagnet
26	R 12/3	12
27	T 12/8	@ttu Last Class Meeting ***** Discuss and Evaluate
	R 12/10	Dead Day