PHYSICS OF TECHNOLOGY – PHYS 1800

Spring Semester 2010

Course: Designed for non-physics majors (4 credits).

Goal: To help you develop a good understanding of everyday physics, i.e. the world around us.

Help you develop an enjoyment in understanding and explaining everyday phenomena.

Not aimed at simply accumulating a bunch of facts!

You will discover- that learning to develop your own physical explanations will be most gratifying and will give you a much better appreciation of nature.

Class: Mon, Wed, Fri, 10:30-11:20 am, Room BUS 318

Instructor: Dr. Mike J. Taylor, SER Bld. 220C, Tel: 797-3919, e-mail: mike.taylor@usu.edu.

Office Hours: Mon, Wed, Fri, 11:30am -12:30pm

Laboratory Demonstrations: Tue 1:30-2:45 pm, ESLC Room 046

Recitation: Thur 1:30-2:45 pm, ESLC Room 046

Teaching/Lab Assistant: Jonathan Pugmire, e-mail: jon.pugmire@aggiemail.usu.edu.

Prerequisites: Algebra (Math 1050) and Trig (Math 1060).

Objectives:

This course provides a **conceptual introduction** to physics with the primary goals of gaining knowledge and intuition into every day phenomena using well-developed physical principles and to acquire basic problem solving skills.

Texts:

W. Thomas Griffith, ***The Physics of Everyday Phenomena, A Conceptual Introduction to Physics*, 3rd or later editions** (McGraw Hill, 2001 or later) **REQUIRED.**

Eugene Hecht, Physics: Algebra/Trig, 2nd Ed (Brooks/Cole Publishing, Pacific Grove, 1997) recommended as a study guide**.**

Course Fee: $10 for laboratory demonstrations.

Disability Note: If there is any student in this class with a disability who requires some accommodation should contact the instructor and the Disability Resource Center (797-2444) as soon as possible. Course material may be requested in alternative formats.

Honor Code: The honor code will be strictly enforced in this course. Any suspected violations of the honor code will be promptly reported to the honor system. Policies regarding the honor code will be enforced and can be found at: http://www.usu.edu/policies/PDF/Acad-Integrity.pdf

COURSE ACTIVITIES:

Lectures (BUS 318):

- Will focus on basic physical concepts and their application in our every day world.
- To better assist the student they will augment and follow the textbook development but will not cover all the text material in detail.
- The student is advised to **read the text** (as indicated in the attached Syllabus breakdown) **prior** to coming to each lecture to be more familiar with the topics discussed.

Lecture notes will be made available on the university Web at: www.physics.usu.edu, then follow: Class Website, Phys 1800, homework…

Laboratory (ESLC 046):

- To aid the understanding of the physical concepts a **laboratory demonstration class** will be given every **Tuesday** (1:30 -2:45 pm). Over 100 experiments will be performed to illustrate the principles discussed in the lectures and to help develop your understanding.
- No direct credit will be given for attending these demonstration labs, but the homework and exam questions will often draw upon these experiments and you are **strongly advised to attend** the demonstrations.

Note: The $10 fee is used to upkeep the laboratory demonstration equipment used in this class.

Recitation (ESLC 046)

- A recitation class will be given every **Thursday** (1:30-2:45 pm). They are designed to **review and reinforce** the material presented in the lectures and in the textbook and will act as a forum for developing your problem solving skills.
- Recitation classes also provide an excellent opportunity for you to discuss any problems with your homework or exams.

Homework:

- Assignment problems based on the class and laboratory material will be given out weekly at the **Friday class** and should be returned at the beginning of class on the **following Friday** (see Syllabus for exact schedule).
- **You are encouraged to discuss your homework assignments with others and to work together solving the problems**. However, it is a violation of USU rules to copy someone else's homework. Your homework must be in your own words and **MUST NOT** duplicate the work of other students. Homework is important for exam preparations.

HOMEWORK FORMAT:

- There will be **13 homeworks** each of which will consist of several short answer questions as well as some basic problems.
- Each homework is worth up to **20 points.** (Note, to get credit for a problem you must show your workings and make a reasonable attempt to solve it.)
- **Only your top 10 homework scores will be counted in your grade**. Homework must be handed in on time.

HOMEWORK GRADING:

- **No credit** will be given for **late homework**; it will be counted as one of the two scores that are dropped.
- Up to two additional ***Bonus Questions*** will be given out with each homework assignment. These are a little more challenging (but quite doable) problems that are intended to expand your physics comprehension and problem solving skills.
- These bonus questions are optional and must be handed in with your homework. You may receive an additional score of up **10 extra points** for these optional questions.

CLASS GRADING:

Your final grade will be based on your homework, and four exams as described below:

Homework (20%):

This is an essential part of your studies and is **key** to doing well in the class. A large fraction of the exam questions will be based on the homework and laboratory problems.

In-Class Exams (20% each):

There are three in-class exams. These will be scheduled during recitation time on **Thursdays** (see attached Syllabus). Each test will be **closed-book** and will be based on the recent topics covered in class and on the homework and laboratory demonstrations. Each test will consist of a number of multiple choice questions, short answer questions and some basic numerical problems. **A list of relevant formulas will be provided**.

Final Exam (20%):

The final exam is **not cumulative** but will follow the format of the previous three in-class exams (Final exam: Fri: 7 May, 09:30-11:20am, BUS 318).

Make-Up Exams:

- These will **not** be given unless you have compelling reasons (see instructor well beforehand), or illness in which case a Doctor's letter will be required.
- **ID:** You should be prepared to present a photo ID at the time of each exam.

ABOUT THE TEXT:

The Physics of Everyday Phenomena (3^{rd} edition or later) provides a clear explanation of each physics topic that we will cover: first in words and then using simple examples employing basic math and formulas. The text is divided into six units:

1. **Motion** – Newton's laws, linear and circular motion, energy.
2. **Fluids and Heat**- Behavior of fluids, heat flow, engines.
3. **Electricity and Magnetism**- electrostatics, magnetic fields, generators, motors etc.
4. **Waves and Optics**- Properties of waves, light, lenses, telescopes.
5. **Atomic and Nuclear**- Atoms, radioactivity, nuclear reactions.
6. **Relativity**- Einstein's theories, cosmology.

This course will focus on the **first 4 units** (Chapters 2-17) which concern major ideas in Classical Physics.

Each chapter is divided into several separate sections and concludes with a well-developed summary of the most important points. Each chapter also has a list of:

-Conceptual questions- aimed at developing basic concepts of the phenomena.

-Numerical questions- aimed at developing skills in problem solving using basic algebra.

-Home experiments- that can be performed to augment the laboratory demonstrations. (There is no substitution to doing some simple experiments yourself!)

WHERE TO GET HELP:

If you find yourself confused on a particular topic in this course or are spending more than 10-15 min on any given homework problem you should:

1. Review the relevant chapter and look over their example problems.

2. Try to solve a similar problem. (The solutions to odd numbered problems are given in the back of the textbook.)

3. Talk with other colleagues in your class. Ask them to explain things to you (rather than solving the problem for you).

4. Ask questions in the **Recitation class** (be prepared to show your work and explain where the problem arises). This will lead to a better understanding for you and will result in a positive discussion for the whole class too.

5. Seek additional help from the **Class Instructor** (Dr. Mike Taylor), the **Assistant Instructor** (Mr. Jonathan Pugmire) during designated office hours (or other times as available).

PHYSICS OF TECHNOLOGY, PHYS-1800
Spring 2008 Syllabus

Date	Day	Lecture	Chapter	Homework Due
Jan 11	M	Class Admin: Intro.Physics Phenomena	1	
13	W	Units, Scalars, Vectors,	1 & App. B, C	
15	F*	Speed and Velocity	2	-
Jan 18	M	***Martin Luther King Day***	***No Class***	
20	W	Acceleration	2	
22	F*	Free Falling Objects	3	1
Jan 25	M	Projectile Motion	3	
27	W	Newton's Laws	4	
29	F*	Mass and Weight	4	2
Feb 1	M	Motion with Friction	4	
3	W	**Review**	1-4	
4	**Th**	**EXAM 1**	-	
5	F*	Circular Motion	5	3
Feb 8	M	Planetary Motion	5	
10	W	Gravity and Orbits	5	
12	F*	Energy	6	4
Feb 15	M	***Presidents Day***	***No Class***	
16	Tu	Harmonic Motion (Monday class)	6	
17	W	Momentum	7	
	F*	Impulse and Collisions	7	5
Feb 22	M	Rotational Motion	-	
24	W	Angular Momentum	8	
26	F	Catch up Day	8	6
Mar 1	M	Static Fluids, Pressure	9	
3	W	**Review**	5-8	
4	**Th**	**EXAM 2**		
5	F*	Flotation	9	-
Mar 8	M	Fluids in Motion	9	
10	W	Temperature and Heat	10	
12	F*	First Law of Thermodynamics	10	7
Mar 15-19	M-F	***Spring Break***	***No Classes***	
Mar 22	M	Heat flow and Greenhouse Effect	10	
24	W	Climate Change	-	
26	F*	Heat Engines	11	8
Mar 29	M	Power and Refrigeration	11	
31	W	Electric Charge	12	
Apr 2	F*	Electric Fields	12	9
Apr 5	M	Electric Potential and Lightning	12	
7	W	**Review**	9-12	
8	**Th**	**EXAM 3**	-	
9	F*	Magnetic Force	14	10
Apr 12	M	Electromagnets	14	
14	W	Motors and Generators	14	
16	F*	Making Waves	15	11
Apr 19	M	Sound Waves	15	
21	W	E-M Waves, Light and Color	16	
23	F*	Mirrors and Reflections	17	12
Apr 26	M	Refraction and Lenses	17	No test week
28	W	Telescopes and Microscopes	17	
30	F	**Review**	14-17	13
May 7	**F**	**FINAL EXAM: 09:30-11:20am**	**BUS 318**	

* = Homework Handout