Physics 1114
General Physics for Non-Science Majors

Mon, Wed, Fri: 10:30-11:20

Nielsen 170

plus discussion section on Thursday at either 8:30, 10:30, 11:30, or 12:30

Dr. Brad Abbott

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Course: Desire-2-Learn at http://learn.ou.edu

Homework: http://www.webassign.com

Materials Needed

1. Textbook

   The Physics of Everyday Phenomena, 5th, 6th, or 7th edition, by Griffith/Brosing

2. iClicker-2 RF Remote Control
   - Purchase remote in the bookstore or elsewhere
   - Register your remote control at http://www.iclicker.com Click on "Register your Clicker" then fill in the information, including student i.d.
     - This must be done for you to receive clicker points

3. Webassign access code
   - Must be purchased at http://www.webassign.com for $19.95. Do not purchase an access code from the bookstore
   - We do not use a class key in this class

Syllabus Highlights

- Read the syllabus for yourself.
  - You are expected to know what is in the syllabus.
- Office Hours
  - A great resource to help you succeed. Please come!
  - I will be happy to discuss very brief issues about the class with you at any time when I am not busy, even outside of office hours.
  - However, I will not talk about homework problems or solving problems outside of office hours unless by appointment. (Lot's of homework help is available)
- Please turn off phones and other electronics in class.
- Algebra, geometry, and calculator skills that you need can be tested from class web page.

Office Hours

- Office Hours: There may still be some future updates
  - Jinfeng Tang: Nielsen Hall
    - Office Hours: TBD 4 hours available

My office hours: Neilsen Hall room 335 or 365

Monday 11:30 am-12:30 pm

Wednesday 1:30 pm -2:30 pm

Thursday 2:45 pm - 3:45 pm

Class Web page

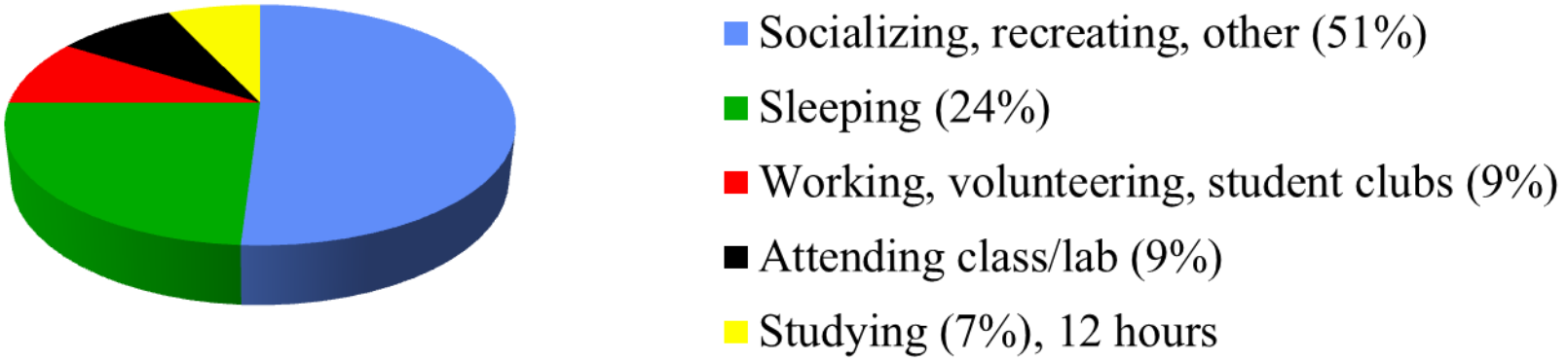
- http://www.nhn.ou.edu/~abbott/Phys-1114-Spring-2014
- Pre-Lecture notes which you should print off prior to lecture.
- Answers to clickers/problems worked in class
- Web demos
- Material for exam prep
- Pre-tests to test algebra, geometry, calculator
- Scaling problems
- Visit often
- Linked from D2L

Learning Physics

- Learning physics is more like learning a skill (e.g. how to drive or how to play an instrument) than simply acquiring academic knowledge.
  - Learning a skill requires repetition, practice, time, and effort.
  - You must try to learn the material as you do the homework, come to class, etc., not just try to complete the assignment
- I will emphasize:
  - Knowing how to approach and solve problems quantitatively
    - Look for patterns – how problems are similar
  - Relating math to physical meaning
  - Relating different concepts and thinking
- Expect to spend 2 hours outside of class for every hour in class.

From USA Today, January 18, 2011

- "After two years in college, 45% of students showed no significant gains in learning."
- "Students also spent 50% less time studying compared with students a few decades ago, the research shows."
- "35% of students report spending five or fewer hours per week studying alone."



Assignments Due Weekly

1. Before each lecture
   - Read material
   - I will expect you to be able to learn much about physics by simply reading the textbook.
2. Monday at 11:59 p.m.
   - Homework due at http://www.webassign.com
3. Thursday
   - Group problem during class
4. Interactive Clicker Questions every day in class.

Homework

- Homework will be done at http://www.webassign.com
  - Username is your 4×4
    - Regardless of if you have other webassign accounts
  - Institution is ou
  - Initial password is your student i.d. number
    - If you had a previous WebAssign account for another class *that used your 4×4 as your username*, you password may be your previous password.
  - We **do not** use a class key for this class
  - If you can not login, please see me or send me an email.

Some Comments on Homework

- Physics is a participatory activity. You learn physics by doing the work yourself.
  - You should work through and understand the methods used to solve homework problems
- Copying the homework solutions from another student or from other sources is cheating. Also, you will not learn the material or do well on the exams by copying.
- Homework is due almost every week:
  - Don't wait until the day before homework is due to start. Start it early.
- If you get stuck on a problem come ask for help during the professor's or TA's office hours, or from the Physics department free tutor.

First Assignments Due

- In class clicker questions start to count on Wednesday, January 22
- Homework on webassign.com
  - First Homework due Wednesday, January 22, 11:59 p.m. (since Monday, January 20 is a holiday)

Daily Assignments

1. During class:
   - Answer interactive questions in class with iClicker-2 remote control
     - Another student can not enter a response for you.
   - Class will focus on most important concepts
     - All concepts from reading may be tested on.
   - It is useful to print out the class notes from the web before we have talked about the subject and bring the notes to class.
2. During class on most Thursdays
   - You will work on a problem in small groups.
   - This first Thursday will be a lecture on Chapter 1

Makeup/Extra Exam

- Mark this date: Wednesday, April 30, 2014, 7:00 p.m.
- An optional make-up/extra exam will be held at this time. All students may take this exam.
  - If you missed an exam during the semester, this is your opportunity to make it up.
  - If you take all 3 exams during the semester plus this extra exam, I will drop the lowest exam grade of the four exams.
  - This will be a comprehensive exam covering most of the material from throughout the semester
- All students must take the final exam during finals week.

Grading

Assignment	#	Points each	Total Points
In-Class Questions			160
Group Problems*	13	10	130
Homework†	11	20	210
Exams	3	100	300
Final Exam	1	200	200
Total			1000

*There are 14 group problems assigned. The lowest score is dropped.

†The first homework assignment is worth only 10 points

Grading: Alternative Method

Assignment	**#**	**Points each**	**Method 2**
~~In-Class Questions~~			~~0~~
Group Problems*	13	10	130
Homework†	11	20	210
Exams	3	100	396
Final Exam	1	200	264
Total			1000

Method 2 gives no credit for interactive in-class questions but multiplies each exam grade by 1.32

Grading

- Your grade will be calculated using both methods and you will receive the highest number of points of the two methods. (Almost no one does better with Method 2!)
- The final grade will be based on the total points accumulated at the end of the semester.
  - A > 875 points
  - B > 750 points
  - C > 625 points
  - D > 500 points
- In rare circumstances this may drop very slightly.
- Grades are updated on D2L about once a week. Once grades for an assignment are posted you have 2 weeks to report any problems to the professor. Check D2L often.

Getting a Passing Grade

50% of your grade is determined by simply doing the work and coming to class. If you don't do well on these things, it is difficult to get a passing grade. Anyone can get an "A" on this 50% of their grade by

1. Come to class every day and participate (16% of grade)
2. Come to class on Thursday and work the group problem with classmates. (13% of grade)
3. Complete your homework. If there are problems you can't solve come to the professor's or TA's office hours or see the Physics Department tutor. (21% of grade)

Caution!

1. If you get only half the points available for homework, that will drop your final grade by one full letter grade! Do all the homework to get full credit. Visit office hours if there are problems you can't do.
2. If you complete perfectly only half the Group Problems in Discussion Section, that will drop your final grade by almost one full letter grade!

Do the work in this class if you want to pass!

A Tale of Three Students

A) Knows physics:

- Had high school AP physics
- Doesn't usually come to class.
- Occasionally does homework.
- Aces exams

Grade: D

B) "Good" effort:

- Usually comes to class (3 out of 4)
- Does most of the homework (~70%)
- Does average on exams (~65%) But will usually do worse.

Grade: Low C or D

C) Full Effort:

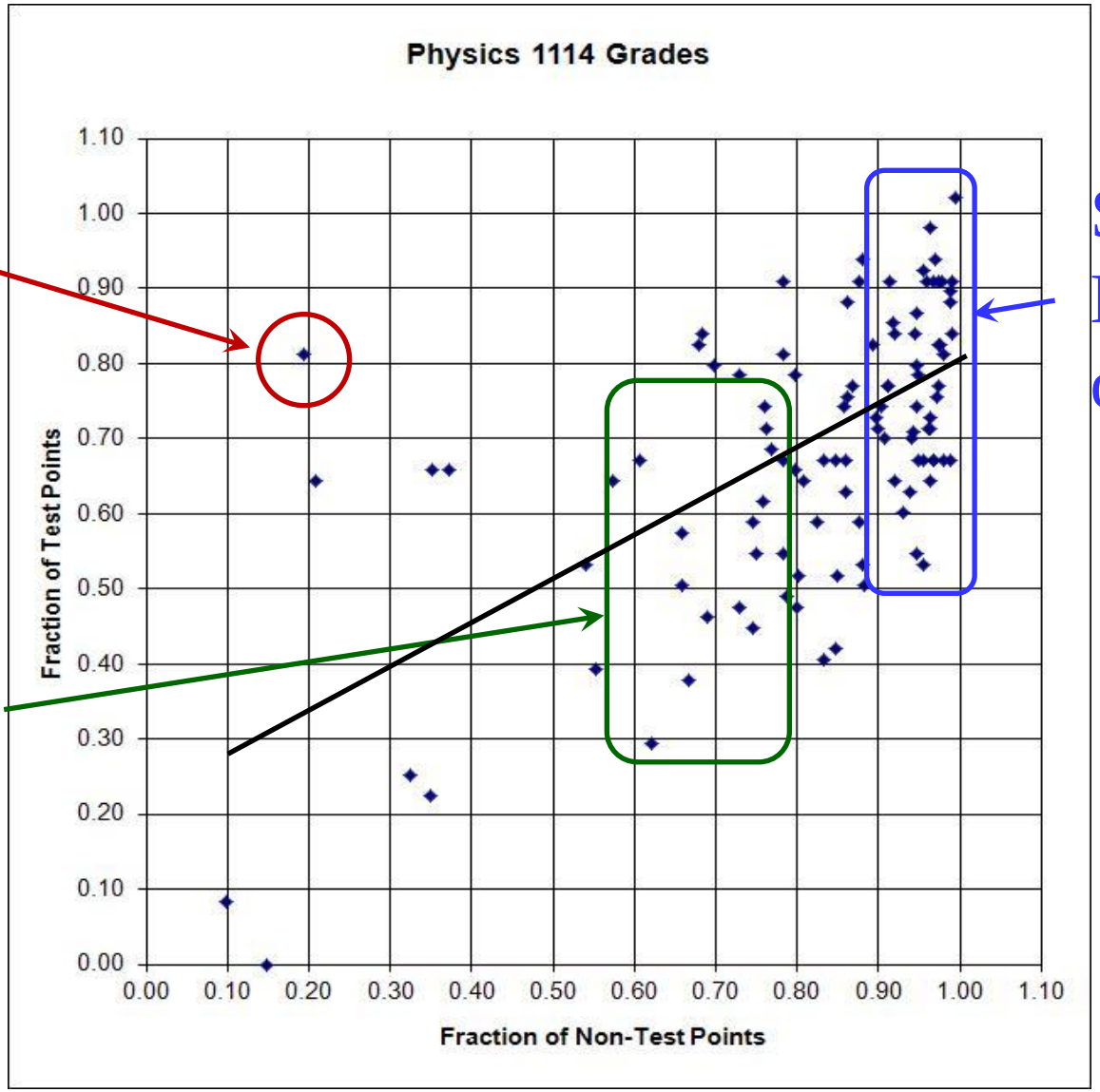
- Rarely misses class
- Does all homework. Uses office hours to solve hard problems.
- Does average on exams – But will usually do better.

Grade: High B, maybe A

A Tale of Three Students
(continued – actual scores from a previous class)

Student (A)
Earned a D

Student (B)
Earned D
through B



Student (C)
Earned A
or B

How to Succeed in Physics

1. Come to class every lecture and be prepared
   a. Participate in class activities
   b. I discuss important and difficult concepts in class.
2. Read the book carefully and completely before class
   a. Read with your mind engaged
   b. Read and understand all examples and equations
   c. If you don't understand something, read it again
3. Do all homework
   a. Work through the problems yourself
   b. Start doing the homework as soon as it is assigned
   c. If there are any problems you can't completely solve, ask for help from the TA's or professor

Guaranteed Passing Grade of C

Guaranteed passing grade of C if you do all of the following:

1. Turn in **all** assignments on time.
2. Earn at least 80% of the points available in each category of assignments, except exams.
   - i.e. you must earn 80% of all available homework points, 80% of all available group problem points, 80% of all available reading question points, and 80% of all available interactive question points.
3. Take all exams and average greater than 20% on exams.

Grading Bonus

- In a class this large someone will miss the next highest letter grade by a few points, even 2 or 3 points.
  - If you have done all the assignments and performed well on them, then I don't want you to miss the next highest letter grade by less than 10 points (1%).
- So, you will receive up to 10 bonus points if you complete **all** the criteria on the previous slide and if you need 10 points or less to attain the next highest letter grade.
- Not applied to grade calculated by "Method 2"
  - You must get at least 80% of the points available for the interactive questions

Chapter 1

Physics, the Fundamental Science

What is Physics?

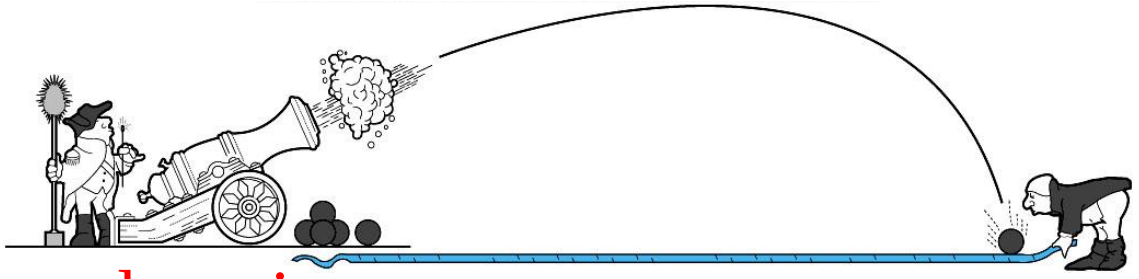
An *experimentally* based science with a goal of understanding and explaining the *fundamental* principles that govern the physical universe.

Physics is not just about learning facts, but about doing experiments to understand how the universe operates. We will try to understand the principles that have been learned through experimentation and solve problems using those principles.

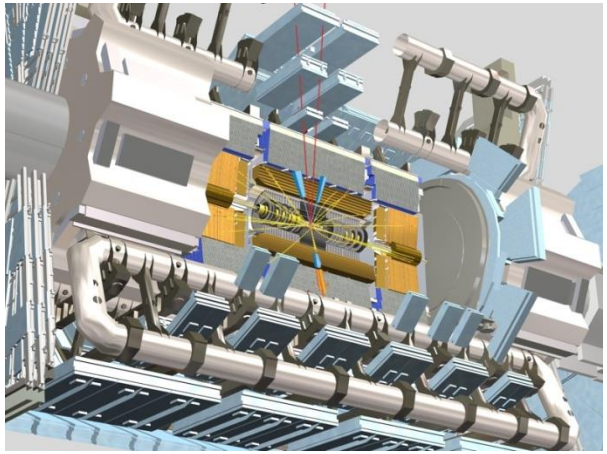
"The goal of physics is to predict the future."

-Dr. C. Fronsdal (UCLA)

Subfields of Physics



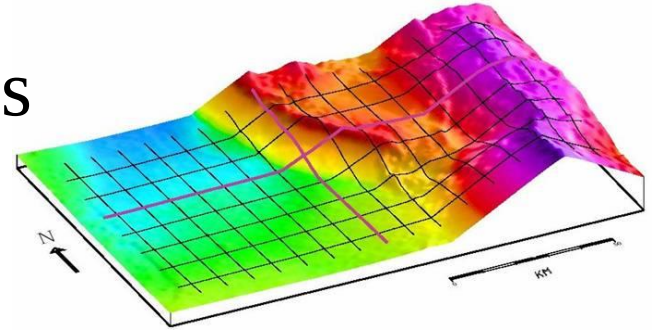
- Classical Physics
  - Mechanics - forces and motion
  - Thermodynamics - temperature, heat, energy
  - Electricity and Magnetism
  - Optics - light

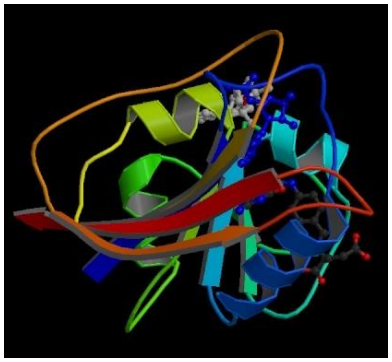


- Modern Physics
  - Atomic physics - atoms
  - Nuclear physics - nucleus of the atom
  - Particle physics - subatomic particles: quarks, etc
  - Condensed matter physics - solids and liquids

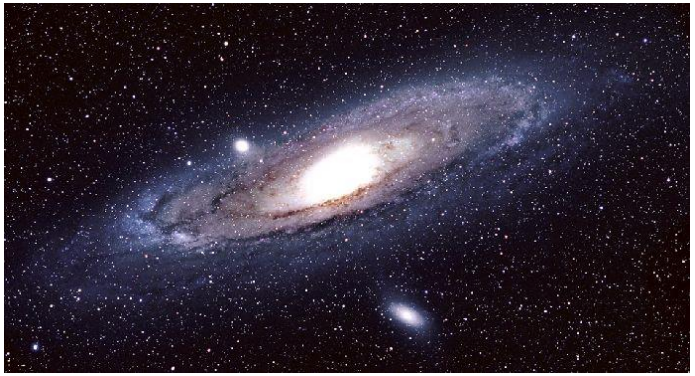
Subfields of Physics

- Interdisciplinary Fields
  - Biophysics
  - Geophysics
  - Astrophysics





- Physicists: fundamental understanding
- Engineers: practical applications
  - Often overlapping roles



Scientific Laws and Theories

- In modern language both mean the same thing
- They are a generalization of a principle of nature based on observation and experiment
  - Before ~1900: Called a law
  - After ~1900: Called a theory
- They can always be refined or falsified based on experiment
- Has a realm of application
  - Some laws/theories seem to always be true
  - Some laws/theories are more confined

- Most of Chapter 1 is review of material you have had in other science classes.
- The rest of Chapter 1 will be discussed this week in your Thursday discussion section.
- Wednesday we will begin discussing Chapter 2 in class.
- For Wednesday read chapter 1 and 2.1-2.2