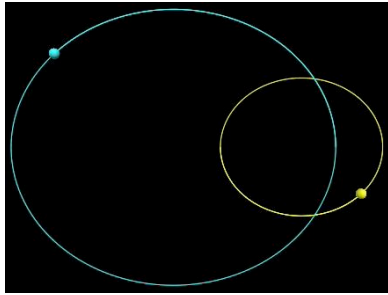




## PHY 221 - Physics I with Calculus



## Syllabus

### Course web site:

<http://linus.highpoint.edu/~atitus/courses/phy221/>

Email: [hpuphysics@gmail.com](mailto:hpuphysics@gmail.com)

Twitter: @appleandplanet

**Lecture and Lab** are integrated. Each day will consist of lecture and/or lab, which includes experiments and computer programming/modeling.

**Textbook:** Matter & Interactions, Vol. I, 2nd edition, by Chabay and Sherwood.

**Homework:** WebAssign; log in through Bb; collaboration is encouraged.

**Help:** Solutions to practice problems are posted at

<http://linus.highpoint.edu/~atitus/mandi/>

**Class Participation:** Clicker is required.



## Syllabus

### Grading Scale

A+ (96), A (92), A- (88), B+ (84), B (80), B- (76), C+ (72), C (68), C- (64), D+ (60), D (56), D- (52), F (<52).

**Grade Calculation:** lab (15%), homework (10%), class participation (5%), quizzes (50%; 5 quizzes, 10% each), final exam (20%). Lab includes lab reports and a **project**.

**Quizzes:** 6 quizzes; lowest is dropped. Any missed quiz is a zero. If two quizzes are missed with excused absences, the final exam will count for the quiz grade.

**Final Exam:** Dec. 12, 1:30 PM -- 4:30 PM



## Syllabus

### Use of Technology

During lectures and lab, use of cell phones and computers for *social purposes* is strictly forbidden.

You may use phones and computers for learning physics and communicating physics in class.

You must be engaged with the material being presented in class and lab.

We have no spare time, so stay on task.



## Syllabus

### Learning Objectives

1. apply a small set of fundamental physical principles to a wide variety of physical situations.
  1. The Momentum Principle (Newton's second law, or Conservation of Momentum) relates forces and motion.
  2. The Energy Principle (Conservation of Energy) accounts for energy exchanged between a system and its surroundings and energy transformed within a system.
  3. The Angular Momentum Principle (Newton's second law for rotation, or Conservation of Angular Momentum) governs torques and rotational motion.

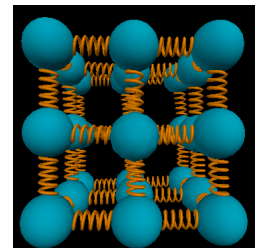
Physics is fundamentally *simple*.



## Syllabus

2. model complicated physical systems by making approximations and idealizations in order to apply fundamental principles.

A solid can be modeled as balls connected by springs.





## Syllabus

- use these fundamental principles to explain a wide variety of macroscopic and microscopic physical phenomena.

...such as orbits, oscillations, projectile motion, projectile motion with air resistance, transverse waves on a string, longitudinal waves in a gas, buoyancy, bond stiffness, diatomic molecules, quantized energy and angular momentum of a hydrogen atom, and many more...



## Syllabus

- use these fundamental principles to predict the behavior of a variety of physical systems.  
"What initial velocity is required to make a free throw in basketball?"
- learn experimental skills such as video analysis, uncertainty (i.e. experimental error), analysis of graphs, curve fitting, computer data acquisition.

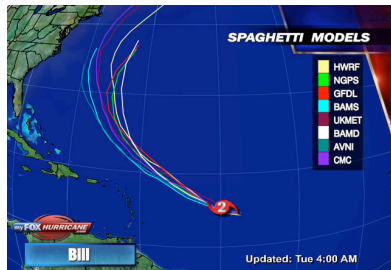


## Syllabus

- develop computational models.

A computational model includes:

- Assumptions
- Physical laws
- Numerical methods



[http://myfoxmedia.com/wordpress/wp-content/uploads/2009/08/models\\_storm3.jpg](http://myfoxmedia.com/wordpress/wp-content/uploads/2009/08/models_storm3.jpg)



## Syllabus

### Goals:

**Have Fun!**

**Work your butt off**

(so that you walk funny at the end of the semester)

**Work together**

(this is a collaboration between you, me, and your classmates)

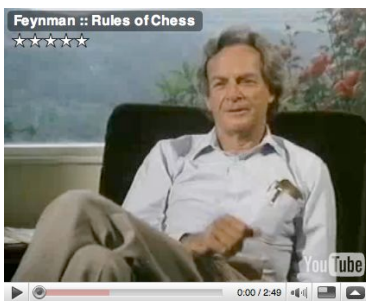
**Be a scientist**

(you are discovering the rules of the game...)



## Richard Feynman

<http://www.youtube.com/watch?v=o1dgrvWML4>



## Checkerboard Universe

Select one person in your lab group to be "God."

The others will be the "scientists."

After each "Universe" is discovered, change roles and have another person be "God."