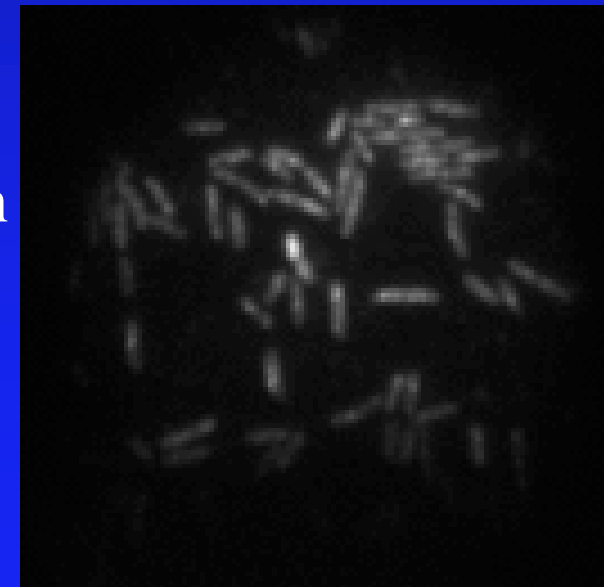# Physics 101 covers…

- Forces
- Kinematics
- Energy/Momentum
- Rotations
- Fluids
- Waves/Sound
- Thermodynamics

Meet the Lecturer

- Professor Tom Kuhlman
  tkuhlman@illinois.edu

- Office Hours

  315 Loomis; start next week

- Research

  » Biophysics: Gene regulation, genome organization, and intracellular diffusion

• http://kuhlman.physics.illinois.edu/

Course Format
(upward) Spiral Learning

- PreLectures   25
- iClickers   25
- Homework   100
- Lab   150
- Discussion   100
  - ➔ 11 quizzes; drop lowest 1
- Hour Exams (3 x 100)   300
- Final Exam   300

            1000

Excused (EX) Absences

- Can get excused absences for:
    - ➔ Discussions
    - ➔ Labs
    - ➔ Exams

- ONLY for:
    - ➔ Illness
    - ➔ Emergency
    - ➔ Required attendance at University event
    - ➔ Religious observance or practice
    - ➔ Serving as volunteer emergency worker

- Absence excuses must be submitted within 2 WEEKS of absence!

Home page

Schedule

Gradebook

byteShelf

Course Description   ← **Step 1**

Course Grading

Required Materials

Office Hours

Contact Information

Practice Exams

Exam Information

James Scholar Credit

Section Information

Tutor List

Absences

Types of Absence

Two types of absence can be recorded in the gradebook:

- Excused absences--issued a grade of **EX**
- Unexcused absences--issued a grade of **ABS**
  - Equates to a grade of zero (0) for the missed course component.

The *only* course components eligible to be issued a grade of EX:

- Discussions
- Labs
- Exams

Regardless of the type of absence, Discussions and Labs *cannot be made up*.

The consequences of absences, excused or otherwise, are discussed in the Grading Policy.

Excused Absences

Excused absences will be granted and documented in accordance with University policy as described in Article 1, Part 5 Class Attendance, of the Student Code.

Excused absences fall into the following categories as defined by the code:

- illness
- emergency beyond the student's control (e.g. an auto accident or death in the family)
- required attendance at a University event (e.g. varsity athletics)
- religious observance or practice
- serving as an volunteer emergency worker

Procedures

Step 2 → The Excused Absences application will guide students through the procedure for documenting missed classes, including the effects of the absence on students' grades.

Final Exams

Failing to show-up for a final exam will result in an AB grade *resulting in failure (F) for the course*.

In accordance with University policy as described in Article 3, Part 1 Grades and Grading Systems of the Student Code, only an authorized member of the Dean's Office *of the student's college* can change an AB final exam grade to an EX.

University policy will apply for EX grades so granted, as described in Article 3, Part 2 Examinations of the Student Code.

Grading Scale

- 950-1000   A+
- 920-949   A
- 900-919   A-
- 880-899   B+
- 860-879   B
- 835-859   B-

- 810-834   C+
- 780-809   C
- 750-779   C-
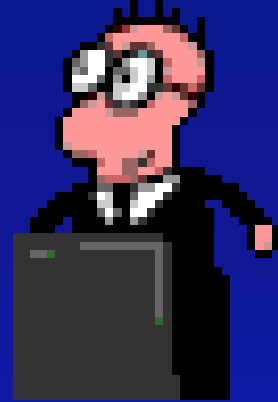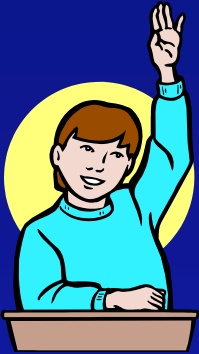- 720-749   D+
- 690-719   D
- 610-689   D-
- <610   F

"My goal is to receive an A…"

Reading, Lecture, & Prelecture

- Need to complete Prelecture BEFORE Lecture!

- Answer prelectures 25/1000 points
  - ➔ Due 6:00 am day of lecture.
  - ➔ 1 point for honest attempt
  - ➔ No EX, 28 Lectures can miss three and still get all 25 points.

- Everyone gets 1 point for today!

P101 Lectures

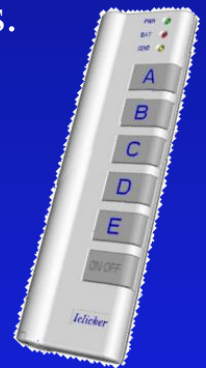- Participation is key!
  - ➔ Come to lecture prepared!
  - ➔ 1 point for each lecture using iclicker
    - » No EX, 28 Lectures: can miss three and still get all 25 points.
    - » Available at bookstore---*register using link on our web page*.
    - » Using multiple clickers is an academic integrity violation.

- Not everything you need for exams!
  - ➔ Concepts, Connections, Motivation   Lecture
  - ➔ Comprehensive Overview   Text
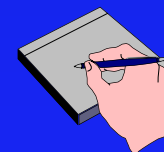 - ➔ Calculations   Homework, Discussion, Problem Sections

  - ➔ Hands-On   Lab

- Taking Notes
  - ➔ Lecture notes will be available on webpage.

P101 Homework

- Web based (byteShelf), immediate feedback

- 100% if done before 6:00 am deadline

- 90% credit on unfinished parts until following Tuesday

- 0% after that

- Always keep 5 significant figures!

- First one is due Tues Sept. 3!

Discussion Sections

- Quiz during last 25 minutes of section;

    11 quizzes, drop lowest score

- First section: math review, dimensional analysis.

P101 Labs

- No "dropped" labs….. Don't miss one!

Email policy

1. Read the course web site before emailing staff.

2. Please DO NOT email physics or homework questions. Use Office hours and Web Board.

3. Send questions on Lectures, Prelectures, and Clickers to Tom Kuhlman.

4. Send questions on Discussion/Quizzes/Exams to Discussion Coordinator.

5. Send questions on Labs to Lab Coordinator.

6. Your E-mail should have Physics 101 in the subject line

Physics Philosophy

- Quantitative approach to describing the natural world

- Action/reaction, reproducible experiment, MATHEMATICAL formulation

- Describe large number of "complicated" observations with a few simple ideas:

    APPROXIMATION

- Exams don't have same problems, but do have same IDEAS

Newton's Laws of Motion

1. NEWTON'S FIRST LAW:

If there is zero net force on an object, then its speed and direction will not change. Inertia

2. NEWTON'S SECOND LAW

If a nonzero net force is applied to an object its motion will change

$$F_{Net} = ma$$

Acceleration

Net Force   Mass

3. NEWTON'S THIRD LAW

The forces that two interacting objects exert on each other are equal in magnitude and opposite in direction.

Example Forces in P101

- Non-Contact ---- Gravity $W = G \dfrac{M_{Earth} m_{object}}{r^2_{Earth}}$

  (Weight)

- G = 6.7×10^{-11} m^3 / (kg s^2)
  - ➔ Earth: Mass = 6×10^{24} kg, radius = 6.4×10^6 m.

- Contact
  - ➔ Normal: Perpendicular to surface
  - ➔ Friction: Parallel to surface
  - ➔ Anything touching the object
    - » Rope: Tension
    - » Spring $F = -kx$

Example: Weight of Object

● Calculate the gravitational force (i.e. weight) on a 3 kg book held 1 meter above the surface of the earth.

$$W = G \ M_{Earth} \ m \ / \ r_{Earth}^2$$

$= (6.7 \times 10^{-11} \ m^3 \ / \ (kg \ s^2)) \ (6 \times 10^{24} \ kg) \ (3 \ kg) / \ (6.4 \times 10^6 + 1)^2 \ m^2$

$= \ 29.4 \ kg \ m/s^2$

$= \ 29.4 \ \text{Newtons (N)}$