PHYS1511: College Physics 1
Mechanics, Heat and Sound

Professor Scott Baalrud
Van Allen Hall, LR2 [Clicker channel #46]
MWF 9:30-10:20
What is Physics?

- The natural science concerned with understanding the nature of matter, space, time and energy.
- Includes: mechanics, heat, light, radiation, electricity, magnetism, atomic and nuclear structure
- Based on observation: Experiment
- Fundamental principles, called “laws”, are sought that unify our understanding of many different experiments
  - Allows one to predict what will happen
  - But if the “laws” are inconsistent with observation, then they are incorrect (or incomplete) and must be revised
Relation to other sciences

**Scale of the Universe**
- Parallel Universes?
- Visible Universe
- Milky Way
- Solar System
- Earth
- Human
- Cell
- Atom
- Particle
- String Theory?

**Branches of Science**
- Earth & Space
- Social Science
- Life Science
- Physical Science
- Formal Science

**Hierarchy of Science**
- Sociology
  - law, ethics, economics
- Psychology
  - developmental, cognitive
- Astronomy
  - planetary science, cosmology
- Geoscience
  - climate, geology, oceanography
- Functional Biology
  - physiology, medicine, ecology
- Cellular Biology
  - biochemistry, evolutionary biology
- Chemistry
  - materials, chemical reactions
- Physics
  - particle physics, thermodynamics
- Mathematics
  - computer science, statistics
- Logic
  - reasoning, philosophy
Why Study Physics?

- Understanding unifying principles, or “laws”, gives you a greater understanding of the world around you
  - Reduces complexity
  - Enables quantitative analysis

- Progress in understanding physics has enabled modern technologies
  - Radio, computers, smart phones, GPS, microwave ovens, advanced medical equipment, etc.
  - Must understand physics principles to understand how these work (or to invent new ones!)
Physics in Medicine

See a neat interactive website at:
http://hyperphysics.phy-astr.gsu.edu/hbase/health/healthcon.html
Technology in Medicine

Image from: www.cedars-sinai.edu
Course Goals

- Obtain a basic understanding of the physics principles related to mechanics, fluids, thermodynamics and sound
  - So you can later apply these to enrich your life and your career
- To develop critical thinking skills
- To appreciate the experimental foundation of physics
- To appreciate the quantitative nature of the physical sciences, and the power that this affords
Progression of the course

Must first understand this

To later understand this

\[ mg \sin \theta \]

\[ mg \cos \theta \]

\[ mg \]

Blood Pressure

- Artery
- Lungs
- Heart
- Arterioles and capillaries (tissue)
<table>
<thead>
<tr>
<th><strong>Instructor:</strong></th>
<th>Prof. Scott D. Baalrud</th>
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<tbody>
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<td><strong>Office:</strong></td>
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<td><strong>Office Hours:</strong></td>
<td>Mondays 10:30 am – 12 noon</td>
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<td>Wednesdays 10:30 am – 12 noon</td>
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<td>or by appointment</td>
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| **Department DEO:** | Prof. Fred Skiff, 203 Van Allen Hall |
Textbook and Lab Manual

Lab manual:

Experiments in Mechanics, Wave Motion and Heat

Ed. Williamson, Goree and Moeller

Might get away with an earlier edition - but need WileyPLUS
PHYS:1511 College Physics 1  
Spring 2016  
MWF 9:30-10:20am LR2 VAN

The following is an estimated schedule  
Please check frequently for updates

<table>
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<tr>
<th>#</th>
<th>Date</th>
<th>Topics</th>
<th>Book Sections</th>
<th>Lab Assignment</th>
<th>Homework, Notes, Links</th>
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| 1  | W Jan 20 | Course overview  
Introduction | Preface 1.1   | Week 1: No lab | • Syllabus handed out                         |
| 2  | F Jan 22 | Units  
Mathematical concepts | 1.2-1.8       |                |                                               |
| 3  | M Jan 25 | Displacement  
Velocity  
Acceleration | 2.1-2.3       | Week 2: M1    |                                               |
Welcome!
Posted Jan 18, 2016 2:00 PM
Reminder: Laboratory and Discussion sections will not meet the first week of class. Our first meeting will be Lecture on Wednesday, January 20 at 9:30am in LR2 VAN.

Updates
There are no current updates for PHYS:1511:000A Spr16 College Physics I

Calendar
Tuesday, January 19, 2016
Upcoming events
There are no events to display.
Grading

Grading:

- Homework: 20%
- Labs: 20%
- Midterm 1: 15%
- Midterm 2: 15%
- Final Exam: 30%

Grading will follow CLAS guidelines, as described here:
| Exam Schedule: | Midterm 1: February 26, covers chapters 1–5 |
| | Midterm 2: April 8, covers chapters 6–11 |
| | Final Exam: Finals week (time TBD), covers chapters 1–16 |
Reading assignments for each lecture can be found on the course webpage. Students are strongly advised to read the assigned sections before lecture. This will make for a more efficient use of lecture time, and will facilitate class discussion. The reading assignments represent the most comprehensive presentation of the course material.
Attendance:

Attending lectures and discussions is highly recommended, but not required. Each represents an essential aspect of the course, where concepts are presented and problem solving techniques are explained. These should not be missed. Attendance at exams is required. Attendance at lab is required (10 out of 11 lab scores will count toward that portion of the grade).
Clickers

- For self-assessment and to give me feedback during lecture
- Not required
- Channel 46
- See ITS Helpdesk for technical questions
Labs

- Run by TA’s
- Before lab: read introductory material, experimental procedure and answer pre-lab questions
- Lab reports graded
- Only best 10 of 11 scores will be counted
- No make-up labs
- No lab this week (starts next week)
Discussion

- Run by TAs
- Primary place to learn problem solving techniques
- Problem solving will be essential for success on homework and exams
- No discussion sections this week (start next week)
Homework

- Weekly homework on WileyPLUS, except exam weeks

- Usually posted on Fridays and due the next Friday at 4:00pm

- No late homework will be excepted (electronically enforced)

- May work together, but each student must complete their own assignments

- Can use a calculator
Exams

- Multiple choice
- Assess understanding of concepts and problem solving
- Must bring your student ID to the exam
- Basic calculator allowed (use SAT policy)
- No notes – formula sheets will be provided
- Makeup exams only for verifiable medical excuses or valid conflicting University activities – See Prof. Baalrud early!
Cheating

| Statement on cheating: | Cheating will not be tolerated. Any instance of cheating will be reported for disciplinary action. Cheating includes both copying other students' work as well as allowing other students to copy your work. Collaboration is allowed on homework assignments, but each student must independently perform the calculations and record their own answers in the WileyPLUS system. |
Estimated Workload

- 2 hr/wk outside of class for each semester hour (8 hr/wk) (homework, reading, practice problems)
- Lecture (3 hr/wk), Lab (3 hr/wk), discussion (1 hr/wk)
- Total: 15 hr/wk
Resources

*Free Help!:* The Department runs a tutorial room: 310 VAN.
*Schedule at:* [www.physics.uiowa.edu/resources](http://www.physics.uiowa.edu/resources)
This is a very valuable resource. Take advantage of it.
Advice

- Complete reading assignments before lecture
- PRACTICE!
- Don’t fall behind/procrastinate
  - Course will build on previous material
- Use the resources available to you:
  - Lecture, discussion, lab
  - Tutorial room
  - Office hours
WHICH’LL IT BE -- RHYME OR REASON?