

**PHYS 220, Introductory Physics I**  
**Spring 2014**  
**MTWF 8:00 – 8:50 a.m.**

**Instructor:** Wendy Adams  
**Office:** Office 0232C Ross Hall  
**Hours:** MTWF 9:00 – 10:00  
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**Course Website:** <http://www.unco.edu/nhs/physics/faculty/adams/Phys220home.htm> Check it often!!  
**MasteringPhysics:** Course ID: MPADAMSS14

**Objectives:**

In pursuit of the why.

This course will emphasize *conceptual understanding* along with problem solving skills. We will begin with a study of force and motion (mechanics) associated with the world-changing ideas and discoveries of Galileo and Newton. Then we will learn that conservation laws (e.g. energy and momentum) provide a wonderful and powerful alternative for understanding physics and solving problems. The majority of the semester will be spent understanding motion using the *particle model*, treating all objects, whether they're made of wood or water, as point masses. Towards the end of the semester we'll focus on the properties of matter. There are times that the difference between wood and metal is crucial and we will study those in terms of thermal properties of matter and the behavior of fluids.

This course provides content necessary to enable teacher licensure students to address [K-12 Colorado Model Content Standards in Science](#).

**Prerequisite:**

No explicit physics background is required. Algebra and basic trigonometry are assumed. This course involves intensive problem solving and a working knowledge of algebra is required.

**Required Materials:**

1. College Physics: A Strategic Approach Technology Update with MasteringPhysics, 2/E by Randall Knight, Brian Jones and Stuart Field.
2. Student Workbook for College Physics: A Strategic Approach Volume 1 (Chs. 1-16), 2/E
3. Scientific calculator – must have scientific notation and trig functions
4. Pencil and a BIG eraser

**Class time:**

*Pre-Reading*

You are expected to read the assigned material *before* class each day. Class time will be used to answer students' questions and to practice difficult concepts and problems. It will not but used to "cover the material." All class notes/worksheets/examples/clicker questions will be posted on the course calendar so you don't have to focus your attention on playing the role of a scribe. During class you'll be working with other students to make sense out of and practice physics.

*Clickers*

2.5% of your in class grade will be earned through answering clicker questions. Most will simply be for participation but a few times during the semester the clicker questions will be graded for correctness. When the questions are graded, it will be announced in advance. The points you've earned from clicker questions will not be applied towards your grade until you return an i>clicker (if you lose the one given out in class, buy another one). Register your i>clicker at [iclicker.com](http://iclicker.com).

**Recitation:**

The three hours on Tuesday which is identified as "lab" will actually be two different things. The first hour and a half will be devoted to activities that are designed to enhance your understanding of key ideas dealt with in class. You'll work through worksheets in small groups at your own pace. It's important for you to understand the material. You must take responsibility for your own learning! If you find yourself ahead of your partners, try to explain some physics to them. (Explainers always learn more than listeners.)

**Lab:**

The three hours on Tuesday which is identified as “lab” will actually be two different things. The first hour and a half will be Recitation as described above. The second hour and a half will be a short hands-on lab experiment related to the concepts that were addressed in the recitation.

**Homework:**

Homework assignments will be assigned weekly and will generally be due each Tuesday *before* class begins. Late assignments will receive half credit if received before class begins on the following class day. No credit will be given for assignments after that.

Homework assignments will be a combination of MasteringPhysics and problems that are done long hand and turned in. Long hand problems will be graded on work shown. Answers will be provided in advance for the long hand problems.

**This course encourages collaborative teamwork on homeworks and recitation worksheets, a skill that is an essential feature of science,** and valued by most employers.

**Quizzes:**

There will be some online quizzes or workbook assignments that serve as pre-reading assignments. There will also be a minimum of one quiz per week. One of each type of quiz will be dropped – no exceptions.

Online quizzes will be posted at least a day in advance of the deadline. It is advised that you complete the quiz with time to spare, as technical difficulties may arise and prevent you from completing the quiz on time.

You are responsible for verifying that you are getting credit for online work. It will not be possible to correct several missing items that were discovered at the end of the semester. Only one of each type of quiz will be dropped.

**Exams:**

Exams will consist of an in class and take home portion. The in class portion of each exam will be a combination of multiple choice questions and long-hand type problems and graded on the work shown. For this reason, I strongly recommend that you carefully work out each MasteringPhysics problem set on paper as if you were going to turn in your work. This work can be used as future reference and is necessary practice for the quizzes and exams. Equations will be given on each exam. Exams are closed book closed note; however, equations and constants will be provided on the exam.

The take home portion of each exam will contain mainly conceptual questions which require short essay answers. This gives you an opportunity to practice expressing scientific information in a written format. Something rarely asked for as a science major but required of every science related job. You are encouraged to work together on the take home portion of exams but you must turn in your own work.

**Final Exam:**

The final exam is cumulative and scheduled for Friday, May 9, 2014 from 8:00 AM to 10:30 AM. Students will be expected to take the exam at this time and should **NOT** make plans that conflict.

**Grading:**

Method of Assessment	Approximate weight
Home Work	10%
Quizzes/In Class Activities	10%
Exams	40%
Final exam	20%
Recitation	10%
Lab	10%

The majority of grades will use the solid scale. I use + / - grades only for the few percent of the class that are on a border.

Minimum Final Exam Scores: You must receive a minimum of 60% on the final exam to receive a C or higher regardless of your overall course percentage. You must receive a minimum of 50% on the final to receive a D regardless of your overall course percentage.

You must **show all your work** for credit on homework, quizzes and exams.

**Student Expectations:**

- Students are expected to work an average of 2-3 hours outside of class for each hour spent in class.
- Students are expected to read assignments in text and related literature.
- Students are expected to turn in assignments on announced due dates.
- Students are expected to take tests and quizzes on the days they are given
- Students are expected to be responsible for their own work and be thoughtful of others.
- Students are expected to follow UNC's Honor Code and Student Code of Conduct  
<http://www.unco.edu/dos/communityStandards/index.html>

**How to succeed in this course:** Being "good" at physics comes with practice. Homework problems often involve two steps: deciding which *principles* of physics apply, then determining the answer (which may involve calculations.) Recitation, in class group activities and take home portions of exams concentrate even more on principles and concepts, and your ability to explain what you're doing. You are encouraged to talk about physics with your friends. The thing to talk about is not which number to put where (the calculation is the easy part), but the reasoning that helps you decide what to do with the numbers. Please, get help *early* if you are struggling with any aspect of the course (from Dr. Adams/Connor/study group/tutor...) We're here to help!

**Disabilities:**

Students with disabilities who believe they may need accommodations in this class are encouraged to contact Disability Support Services (970) 351-2289 as soon as possible to better ensure that accommodations are implemented in a timely fashion. Students with accommodations must provide the disability access form at least 3 days before accommodations are needed.

***There will be no make-up exams or quizzes! If you are going to miss class, arrangements must be made in advance.***

Everything on this syllabus is subject to revision throughout the semester; however, adequate notice will be given.

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CONSENT FORM FOR HUMAN PARTICIPANTS IN RESEARCH  
UNIVERSITY OF NORTHERN COLORADO

Project Title: Adams' Course Data

Researcher: Wendy Adams, Ph.D., School of Earth Sciences and Physics.

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The purpose of the proposed project is to better understand effective teaching methods for promoting student understanding of the content, student perceptions of the discipline and student understanding of the nature of science. Specifically I am using teaching methods that are considered best practices learned from education research. As part of my own evaluation of these teaching methods, I will be asking you about your views of science, physics and the nature of science. In addition I will ask you to complete a survey at the end of the semester about your opinion as to the value of various aspects of the course for learning.

To evaluate the effectiveness of the course, I will look at all the data from the course in aggregate, without students' names or other individual identifiers. The course data includes in class questions, quizzes, exam results and student responses to the surveys that are offered at the beginning and the end of the semester.

The risks, discomforts and benefits are the same as those encountered by students taking a typical college level physics course.

Participation is voluntary. You may decide not to participate in this study and if you begin participation you may still decide to stop and withdraw at any time. Your decision will be respected and will not result in loss of benefits to which you are otherwise entitled. Having read the above and having had an opportunity to ask any questions, please complete the survey. By completing the survey, you will give permission for your participation. You may keep this form for future reference. If you have any concerns about your treatment as a research participant, please contact the Office of Sponsored Programs, Kepner Hall, University of Northern Colorado Greeley, CO 80639; 970-351-2161.