

**Syllabus**  
**SCI 440U, AP Physics C**  
**Maine School of Science and Mathematics, Fall Semester 2017**

## **Class Times and Locations**

**Class** MTWF 1:30–2:25 PM,

**Lab** W 1:30–3:25 PM

All class meetings are in room B216.

## **Lecturer**

Richard Barrans, Ph.D., M.Ed.; barransr@mssm.org

Office Hours: M 11:30 AM–12:30 PM, T 8:30–9:30 AM, R 2:30–3:30 PM.

## **Objectives**

After completion of this course, the successful student will be able to:

- Explore and interpret scientific models.
- Identify and describe the physics underlying mechanical and thermodynamic phenomena.

## **Course Content and Approach**

How does the world work? How can we find out? These questions are the basis of the science of physics. This course is the first of a two-semester sequence of calculus-based physics. It addresses mechanics, including kinematics, energy and momentum, circular motion, oscillations, gravitation, and some thermodynamics. Students will learn to analyze physical systems, construct rigorous mathematical models of the systems, and solve the models when mathematically tractable.

## **Course Materials**

**Textbook:** *Fundamentals of Physics*, Sixth Edition, by Walker, Halliday; and Resnick. Wiley, 2014.

## **Grading**

### ***Standards***

Your grade is based on satisfying performance standards. Exercises won't receive numerical scores; instead, each standard assessed receives a letter indication. Possible letters are

- N Not yet assessed
- I Ineligible for reassessment
- E Eligible for reassessment
- P Progressing toward satisfactory, but the standard has not been fully covered.
- S Satisfactory

The only passing score is "S." The other scores indicate what you need to do to get to "S."

## ***Final semester grade***

Final letter grades for the semester are awarded as follows.

F	Requirements for a grade of D are not fulfilled.
D	Satisfy 70% of the standards and pass nine labs.
C	Satisfy 80% of the standards and pass eleven labs.
B	Satisfy 90% of the standards and pass thirteen labs.
A	Satisfy 95% of the standards and pass thirteen labs.

## ***Assessments***

Quizzes and exams assess your performance on one or more standards. If many students do not satisfy a standard when it is assessed, it may be assessed again in a later exercise. There will also be opportunities for students to retest on standards for which their score is “E”. For an “E” rather than “I”, you must not miss an assessment without an excuse, and you must complete on time all assignments and exercises for that standard.

## ***A note about grades***

Your grade in this course reflects only your physics performance over a 15-week period on a limited set of evaluations. Your grade does not reflect your worth as a person or what I think of you. Because of the limited scope of this course, your grade is not a prediction of your future success. In short, do not cause anxiety by making more of your grade than it really is.

## **Course Components**

### ***Class***

Attendance is expected at all classes. Quizzes in class may not be announced beforehand, so don't miss classes.

### **Group Work**

Lectures will include work to be done in groups. This work is important to the class! Please make an effort to solve all class work problems, and to ensure that all members of your group understand each problem and solution.

### **Student Groups**

Student groups for class work are assigned. New groups will form from time to time.

### ***Laboratories***

There are fourteen (14) labs. Laboratory participation is an essential component of the course.

### **Pre-Labs**

Students should be familiar with each lab before it begins. The pre-lab questions are intended to familiarize you with the lab and to review specific skills you will use in the lab. Complete the pre-lab before the lab, and submit it to the instructor when you arrive.

## Lab Reports

Written lab reports are a key component of the course. In a report, you demonstrate your ability to organize and interpret data, to draw inferences, and to communicate conclusions. Each student must complete each lab report individually. Because the laboratory component of the course is not directly evaluated by the AP examination, students should preserve their laboratory reports for possible evaluation by college officials.

## Groups

It is expected that you will work in groups in lab. Many of the experiments require several people just to take the data. Groups may contain **no more than four students**. All group members are responsible for completing all data tables, graphs, and analyses. Your instructor may check the lab sheet of any group member to evaluate the group's work.

## Lab Grades

Labs scores are all-or-nothing. You receive credit for a lab only if your instructor approves all sections of the activity. If you prepare, you can complete most of a lab during the session. Present your completed lab to your instructor for approval when you leave. If any part is unsatisfactory, you may immediately fix what is wrong, or you may arrange a time to meet with your instructor *before* your next lab session to have the completed lab approved. Written lab reports, are due before the beginning of the next lab; deficiencies must be corrected within one week after the graded reports are returned to the students.

## *Homework, Drills, and Practice*

Homework problems will be available before quizzes. These are to help you learn the material and to prepare for the quizzes. They do not count toward your course grade. However, working these problems will very likely maximize your quiz scores, which do count toward your course grade.

## *Quizzes*

Some quizzes will be administered in class. Subject to convenience and availability, some may be administered on-line. They must be completed in one sitting during the allotted time period. All quizzes will be open-note and open-book. Calculators are permitted. You are also permitted to access the internet during on-line quizzes.

However, any means of communication, consultation, or collaboration with any person (other than the instructor) while taking a quiz is not allowed. By way of example, and in no way intended to limit the scope of what is considered "communication," forbidden means of communication include speech, writing, any visible sign or symbol, vocal utterances, overheard speech, sound generated by any means, gestures including sign language, e-mail, text-messages, postings to message boards, or any other means of transferring information to another mind, whether or not known to the instructor or available at the time of publication of this syllabus. If you finish a quiz before a classmate, you may not communicate about the quiz with the classmate until (s)he also finishes.

Sharing of any materials, including textbooks, calculators, and computers, with classmates during exams is prohibited.

## **Resources**

### **Instructor**

During my listed office hours, I will be physically in my room, or I will leave a note on my desk stating where I can be found nearby (lab, main office, maker space...). You are also invited to see me in my room at other times—if the door is open, please come in.

If visiting me is inconvenient, the very best way to contact me is by e-mail. I can pretty much guarantee that I will forget any conversation in class. If I have my wits about me when you speak to me in class, I will ask you to send me an e-mail to remind me of what we discussed. If I forget, please send the e-mail anyway.

The hour immediately before a class is not a good time to contact me, because I will be concentrating on preparing for class. After class is usually better, unless I am in a hurry to tidy up before the next class.

### **Textbook**

The textbook is your first source of information. The assigned sections of the text are to be read by each student before class.

### **Class web site**

Course information and other resources will be posted on the class web site at [www.barransclass.com/sci404u](http://www.barransclass.com/sci404u). There also ought to be material on Infinite Campus and Canvas, which I will figure out as I go along.

## **Absences**

Quizzes missed due to an excused absence may be made up. Arrangements for make-up quizzes must be made within seven calendar days of your return to school. If you miss a quiz or make-up quiz without an excuse, you will not be allowed any further make-ups for the covered standard(s).

If you are unable to attend a lab due to an excused absence, contact me. I may either schedule a make-up at another time or pro-rate your missed lab.

## **Ethical Expectations**

Students are expected to respect others' opinions and abilities, and to help each other during group work, discussion, and laboratory. Those who disrupt the class or interfere with other students' opportunity to learn will be asked to leave the class. If you have a mobile phone or any other distracting equipment, turn it off or silence it and refrain from non-class use during class.

Academic honesty develops respect between faculty and students, ensures fair and effective grading, and creates an environment that fosters learning. Students are expected to work

together on group work and labs, and encouraged to study together. However, all submissions must represent your OWN work.

Academic dishonesty is forbidden. Academic dishonesty primarily involves a student representing another's work as his own or assisting another student to represent another's work as his own. This includes, but is not limited to, signing an absent student's name to a sign-in sheet, submitting material for grading that is also submitted to another class, "dry-labbing" or recording data in lab that you did not actually observe, submitting material created by another without proper attribution, and receiving or giving assistance on evaluations.

You are far better off learning physics than pretending to. Physics is great fun. Any involvement in a case of academic misconduct is not.

## Disclaimer

Information in the syllabus was, to the best of the instructor's knowledge, correct when distributed at the beginning of the term. However, the instructor reserves the right to make changes in the course content or instructional techniques during the term. If any changes to the syllabus become necessary, students will be notified orally in class and by e-mail.

## Tentative Schedule

Week of	Reading and Topics	Notes
Aug 21	Ch 1: Measurement and Quantities	Solar eclipse 08/21, REB returns 08/23
Aug 28	Ch 2: 1-D Motion	
Sep 4	Ch 3–4: 2-D and 3-D Motion	
Sep 11	Ch 4: Uniform Circular Motion	Compressed schedule 09/15
Sep 18	Ch 5: Newton's Laws	Break; Classes resume 09/20
Sep 25	Ch 6: More Force and Motion	
Oct 2	Ch 7: Kinetic Energy and Work	
Oct 9	Ch 8: Conservation of Energy	Parent conferences 10/13
Oct 16	Ch 9: Momentum	Break; Classes resume 10/18
Oct 23	Ch 10: Rotation	
Oct 30	Ch 11: Angular Momentum	
Nov 6	Ch 15: Oscillations	
Nov 13	Ch 12–13: Elasticity, Gravity	
Nov 20		Thanksgiving Break
Nov 27	Ch. 18: Heat and Temperature	
Dec 4	Ch. 20: Thermodynamics	
Dec 11		Final exam week