



Cal Poly Pomona, SCI 210 *Physics Concepts and Activities* – SPRING 2016

Instructor: Dr. Nina Abramzon	email: nabramzon@csupomona.edu
Office: Building 8 Room 224	Phone: 869-4021
Office Hours: Office hours: Mon 11:00-12:00, Wed 11:00-12:00 or by appointment	
Materials: <ul style="list-style-type: none">• Text: <i>Inquiry into Physical Science, Volume I</i>, by Roger Nanes, Kendall/Hunt Publishing (ISBN 0-7575-0111-7). NOTE: BRING THIS TEXT TO CLASS EVERYDAY!!• Calculator. NOTE: BRING IT TO CLASS EVERYDAY!! (You should not use your cell phone as a calculator)• Course management system: "blackboard" I will frequently post there assignment, announcements, etc. check it regularly.• An available Cal Poly email account: I will email you important information. It is your responsibility to make sure that your Cal Poly email account is available (and not blocked because you mailbox is full), and checked regularly.	

COURSE DESCRIPTION:

Science 210, *Physics Concepts and Activities*, is a course designed to help you become familiar with some of the central themes and fundamental principles of physics and science, in order to prepare you to teach science. In the course you will investigate concepts including matter, energy, heat and temperature, light and color, and astronomy and explore how these concepts relate to the phenomenon of "Global Warming," an underlying theme of this course. Subject matter is structured after the Next Generation Science Standards and the Common Core. Although the course is officially a separate lecture and lab, it will be conducted as one continuous learning experience by inquiry.

PREREQUISITES: **MAT 191 or equivalent**

COURSE GOALS:

The primary goal of this course is to enhance the future elementary school teacher's knowledge of and enthusiasm for science and teaching science.

Using an activity-based and discussion oriented approach, this course is designed to help you:

- build your understanding of physical science concepts that you can apply to explain phenomena that are interesting, related to real-world experiences and typically included in an elementary school science curriculum;
- develop positive attitudes about science and to help you develop confidence in your ability to *do and teach* science;
- experience *learning by inquiry* and use it once you become a teacher..

INSTRUCTIONAL METHODS:

- **Concepts:**

All the concepts will be taught using the principle of learning by inquiry. Your learning is ultimately your responsibility. Extensive research has shown that people (college students, as well as your future grade school students) learn best by exploring the subject matter themselves, in an interactive setting, rather than by hearing it explained. Therefore, I will seldom, if ever, "lecture" in the traditional sense. Instead, you will learn science as part of an effort to do science, through engagement in meaningful discussions with your lab partner(s), through active participation in class and group discussions and through performing experiments. You will develop and deepen your own understanding of some powerful ideas in physics.



- **The pedagogy of teaching science:**

The pedagogy of teaching science will be presented in collaboration with Dr. Stefanie A. Saccoman from the Teacher Education Department at Cal Poly Pomona.

You will reflect on the pedagogy of teaching science in the following way:

You must determine which of the Next Generation Science Standards (NGSS) apply to each of the activities we do in class and list them at the top of the activity sheet. A copy of these standards can be found at <http://www.nextgenscience.org/>

- **Integration of the concepts and the pedagogy of teaching**

You will present after school enrichment classes to students in the Pomona unified school district. Details on the school visitations will be handed out later.

GRADING POLICY: Absolute grading will be used: No curves and no extra credit. You are not in competition with your classmates, so it is in your best interest to help each other learn in this class.

In class activities (60%)

Class Participation and Preparation including:

Written Lab Activities (10%)

Pre-tests/Post-tests (0%)

NGSS (10%)

In class open book exams including:

Exam1 (10%)

Exam 2 (10%)

Final Exam (20%)

90%– 100%	A
80% – 89.9%	B
65% – 79.9%	C
55% – 64.9%	D
< 55%	F
<i>Plus or minus grades will be within the ranges specified.</i>	

Out of class activities (40%)

HW (15%)

Field experience (20%)

NASA Resource center (5%)

In class activities

A majority of your time in this course will be spent working and thinking in class.

Written Lab Activities: During class you will be working on activity worksheets that you complete as you work through the experiments. *At the end of each class period* you will show me these worksheets. I will try to return them during the class period, however, if there is not enough time for me to grade all of them, they will be available in my office on the following day. Worksheets will receive either a check (✓) or a minus (-). Letter grades will not be given on lab reports. *Do not leave questions unanswered as you work through the activities!*

Pre-tests/Post-tests : Several times during the semester, you will be asked to complete a “pre-test” or “post-test”. The purpose of these tests is to give me insight into student thinking about certain concepts before and after providing instruction that will likely change that thinking. **The pre-/post-tests will not be graded and will not be included in computing your grade for the course!**

NGSS Activities: You must determine which of NGSS standards apply to each of the HW and activities we do in class and list them at the top of the activity sheet.

Examinations: There will be two midterm exams, each worth 10%, and a final exam worth 20%. No make up exams will be given.

Out of class activities

Homework: A majority of your time in this course will be spent working and thinking in class. However, there will be assignments that you will be expected to work on and complete outside of class. These assignments may involve completing laboratory activity sheets not completed during class time, and will also include special assignments referred to as "Making Connections."



“Making Connections”

They pose questions and problems that are intended to focus your thinking and help you to formulate your understanding of the “big ideas” that will help to make connections between specific activities and discussion that take place in class. These assignments allow you to practice the skills that you develop in class and develop independent answers to particular questions. You may discuss these assignments with your classmates, but your answers should be written independently and stated in your own words.

Keep in mind that this is a writing class. You should use complete sentences, appropriate grammar, and correct spelling. Maximum credit will be given for concise, well-written answers. The work you submit should reflect your best effort and demonstrate your developing understanding of the topic. In explaining your reasoning, you should try to do it carefully and clearly, including all the logical steps that are required to arrive at your answer. I encourage you to discuss homework with classmates and the instructor.

NASA Resource center submit a report. More information about this activity will be provided during the quarter.

Field experience: You will present a lesson at a local school. You are required to keep a journal describing your school visits. These journals are to include a description of what activities were done in the class (content, delivery, and how they related to the class curriculum), as well as your general opinions of how the activities were received by the students, what the students’ interest level was, and what they (and you) learned or otherwise gained from the experience. More details will be discussed in class

ATTENDANCE POLICY: Because you will play such an important role in your own learning and the learning of your classmates, your attendance is essential. You are expected to be in class and working for the full three hours, i.e., arriving late and leaving early will not be allowed (we will have a short 10-15 minute break in the middle of class). Roll will be taken five minutes after the start of class and five minutes prior to the end of class. If you miss one of the two roll calls, you will be counted “late.” If you miss them both, you will be counted “absent.”

- Two absences or four “lates” will result in a 5% grade reduction (A to A– or B+, for ex.)
- Three absences or five “lates” will result in a 10% grade reduction (A to B, for ex.)
- Four absences or six “lates” will result in a 20% grade reduction.
- More than four absences or six “lates” will result in “F” for the course.

Absences and “lates” are not excused without proper documentation (e.g. doctor’s note, record of a tow, etc.)

COURSE RULES:

- Safety in class is of the utmost importance. We will be using hot liquids and heavy objects during the course, so please act responsibly in class. All K-12 teachers are required to follow safety precautions in their own class and must model safe laboratory behavior. In addition to these generic rules, there is one more specific rule necessary to safeguard you in class: **No food in class!** If you are hungry, or will get hungry between 8:00-11:00am, eat something before you come to class.
- **Absolutely NO cell phones, personal computers, or iPods.**

ACADEMIC INTEGRITY: Every student is expected to be familiar with the university policy on academic integrity. Copying and cheating are serious offenses.

SPECIAL LEARNING NEEDS

Any student who feels s/he may need an accommodation based on the impact of a disability should contact me privately to discuss your specific needs. Please contact Disable Student Services at 909-869-3333 in room 126 of the University Library to coordinate reasonable accommodations for students with documented.