

**ORIGINATOR'S SECTION:**

1. College:  CHABSS  CoBA  CoEHHS  CSM  
 Desired Term and Year of Implementation (e.g., Fall 2008):  
 Spring 2016

2. Course is to be considered for G.E.? (If yes, also fill out appropriate GE form\*)  Yes  No

3. Course will be a variable-topics (generic) course?  Yes  No  
 ("generic" is a placeholder for topics)

4. Course abbreviation and Number:\* PHYS 307

5. Title: (Titles using jargon, slang, copyrighted names, trade names, or any non-essential punctuation may not be used.)  
 Physics for Elementary Teachers

6. Abbreviated Title for PeopleSoft:  
 (no more than 25 characters, including spaces)  
 Phys for Elem Teachers

7. Number of Units: 3

8. Catalog Description: (Not to exceed 80 words; language should conform to catalog copy. Please consult the catalog for models of style and format; include all necessary information regarding consent for enrollment, pre- and/or corequisites, repeated enrollment, crosslisting, as detailed below. Such information does not count toward the 80-word limit.)  
 Fundamental physics ideas including conservation of energy, Newton's Laws, and waves. Students will engage in practices of science such as performing experiments, collecting and analyzing data, developing models, and writing and evaluating explanations. Also includes development of ideas about the nature of science and learning science, including elementary students' learning of science. Course content is aligned with content, practices, and cross-cutting concepts of the National Research Council's *Framework for K-12 Science Standards*, and is intended to help prepare future elementary teachers to teach science. *Intended for Liberal Studies majors in the Elementary option. Prerequisite:* Completion of LDGE Area B1.

9. Why is this course being proposed?  
 To better support the science preparation of future elementary teachers in the LBST program by providing a BB course tailored to their needs.

10. Mode of Instruction\*  
 For definitions of the Course Classification Numbers:  
[http://www.csusm.edu/academic\\_programs/curriculumsheduling/catalogcurricula/DOCUMENTS/Curricular\\_Forms\\_Tab/Instructional%20Mode%20Conventions.pdf](http://www.csusm.edu/academic_programs/curriculumsheduling/catalogcurricula/DOCUMENTS/Curricular_Forms_Tab/Instructional%20Mode%20Conventions.pdf)

Type of Instruction	Number of Credit Units	Instructional Mode (Course Classification Number)
Lecture	3	C-02
Activity		
Lab		

11. Grading Method:\*  
 Normal (N) (Allows Letter Grade +/-, and Credit/No Credit)  
 Normal Plus Report-in-Progress (NP) (Allows Letter Grade +/-, Credit/No Credit, and Report-in-Progress)  
 Credit/No Credit Only (C)  
 Credit/No Credit or Report-in-Progress Only (CP)

12. If the (NP) or (CP) grading system was selected, please explain the need for this grade option.

13. Course Requires Consent for Enrollment?  Yes  No  
 Faculty  Credential Analyst  Dean  Program/Department - Director/Chair

14. Course Can be Taken for Credit More than Once?  Yes  No  
 If yes, how many times? (including first offering)

15. Is Course Crosslisted:  Yes  No  
 If yes, indicate which course and check "yes" in item #22 below.

\* If Originator is uncertain of this entry, please consult with Program/Department Director/Chair.

16. Prerequisite(s):  Yes  No *Completion of LDGE B1*

17. Corequisite(s):  Yes  No

18. Documentation attached:  
 Syllabus  Detailed Course Outline

19. If this course has been offered as a topic, please enter topic abbreviation, number, and suffix:\* NA

20. How often will this course be offered once established?\* every semester

**PROGRAM DIRECTOR/CHAIR - COLLEGE CURRICULUM COMMITTEE SECTION:**  
*(Mandatory information – all items in this section must be completed.)*

21. Does this course fulfill a requirement for any major (i.e., core course or elective for a major, majors in other departments, minors in other departments)?  Yes  No

If yes, please specify:  
 For Liberal Studies majors in the Elementary option or Integrated Credential Program

22. Does this course impact other discipline(s)? *(If there is any uncertainty as to whether a particular discipline is affected, check "yes" and obtain signature.)*  Yes  No

If yes, obtain signature(s). Any objections should be stated in writing and attached to this form.

LBST Discipline see attached 3/11/16  Support  Oppose  
 Signature Date

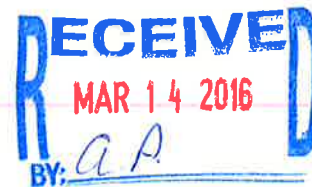
Discipline \_\_\_\_\_ Date \_\_\_\_\_ Support \_\_\_\_\_ Oppose

**SIGNATURES : (COLLEGE LEVEL) :**

- Edward Price February 2, 2016
- 1. Originator (please print or type name) Date
- Edward Price February 2, 2016
- 2. Program Director/Chair Date
- Gerardo Diaz* 3/10/2016
- 3. College Curriculum Committee Date
- Maribel Lopez* 3/10/16
- 4. College Dean (or Designee) Date

**(UNIVERSITY LEVEL)**

- 5. UCC Committee Chair Date
- 6. Vice President for Academic Affairs (or Designee) Date
- 7. President (or Designee) Date



\* If Originator is uncertain of this entry, please consult with Program/Department Director/Chair.

**Laurie Schmelzer**

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*LBST support*

**From:** Jocelyn Ahlers  
**Sent:** Friday, March 11, 2016 11:45 AM  
**To:** Laurie Schmelzer  
**Subject:** Re: PHYS 307

Hi Laurie -

Please accept this email as my signature of approval.

Thanks!

Jocelyn

On Mar 11, 2016, at 11:37 AM, Laurie Schmelzer <[lschmelz@csusm.edu](mailto:lschmelz@csusm.edu)> wrote:

Hi Jocelyn,

The Curriculum Committee finally approved and signed the C form for PHYS 307 and I realized that because Ed Price made revisions, I don't have your signature on the new doc. Are you around today or can you send me an electronic approval to attach so that I can deliver this to Academic Programs?

Thanks,  
Laurie

**Laurie Schmelzer, M.Ed.**  
**Student Services Professional**  
**Dean's Office**  
**College of Science & Mathematics**

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Super STEM Saturday | [www.csusm.edu/superstem](http://www.csusm.edu/superstem)  
<image005.jpg>

<image003.jpg> <image004.gif>LGBTQ Safe Zone

## PHYS307: Physics for Elementary Teachers

### INSTRUCTOR

Edward Price, [eprice@csusm.edu](mailto:eprice@csusm.edu)  
Science Hall 2, room 213, phone 750 8040  
Office Hours: TIMES

### WEB PAGE

<http://cc.csusm.edu>

Lecture            Times            and  
   location

### TEXT & REQUIRED MATERIALS

*Next Generation Physics and Everyday Thinking*, Goldberg, et al. This is a workbook - bring to class daily. iClicker (remote) is required – we will use them daily

### COURSE DESCRIPTION

Fundamental physics ideas including conservation of energy, Newton's Laws, and waves. Students will engage in practices of science such as performing experiments, collecting and analyzing data, developing models, and writing and evaluating explanations. Also includes development of ideas about the nature of science and learning science, including elementary students' learning of science. Course content is aligned with content, practices, and cross-cutting concepts of the National Research Council's *Framework for K-12 Science Standards*, and is intended to help prepare future elementary teachers to teach science. *Intended for Liberal Studies majors in the Elementary option.* **Prerequisite:** Completion of LDGE Area B1.

### LEARNING GOALS AND OUTCOMES

We will focus on physics content, practices, and the nature of science and learning. By semester's end, you should have a conceptual understanding of:

#### ***Physics content***

By the end of the course you should be able to understand and apply these ideas to provide a conceptual explanation of physical phenomena including:

1. The relationship between force and motion
2. The nature of energy, energy transformations, and conservation of energy
3. Waves, including mechanical waves and electromagnetic waves.

#### ***Practices of Science***

By the end of the course you will have gained experience in practices of science, including performing experiments, collecting and analyzing data, proposing, testing and revising models, and writing and evaluating explanations.

#### ***The nature of science and learning science***

You will learn the process by which knowledge is developed within a scientific community: that doing science involves using evidence and creative thinking, that knowledge is established through collaboration and consensus, and that science knowledge can change over time. You will also become more aware of how your own science ideas change and develop over time.

## **COURSE FORMAT**

### **Class meetings:**

Classes will feature participatory elements designed to get you actively thinking instead of passively listening and taking notes, as well as lots of demos designed to illustrate physical situations. ***Bring your workbook to every class!***

Class will feature questions to make lectures more interactive and effective; you will participate with class response system (aka “clickers”). Research shows these techniques increase student learning compared to standard lectures. ***To get credit for class participation, you must bring a clicker to class and register it with your email user name.***

This course will include days that will be mainly lecture-discussion, including watching videos of experiments, and days where you will mainly be engaged in performing simple experiments and working with computer simulations. The course content will focus on important physics ideas, as well as ideas about the nature of science and the nature of learning. Some activities will involve viewing videos from elementary classrooms and analyzing the children’s ideas and reasoning. The course is divided into four approximately equal length units:

Unit 1: Models of Magnetism and Static Electricity

Unit 2: Interactions and Energy

Unit 3: Interactions and Forces

Unit 4: Waves, Sound, and Light

The three ‘big ideas’ in physics that we will focus on are the Law of the Conservation of Energy (Unit 2), Newton’s Laws (mainly unit 3), and the wave behavior of sound and light (Unit 4). We will also focus on engaging you in important practices of science, including performing experiments, collecting and analyzing data, proposing, testing and revising models, and writing and evaluating explanations. Unit 1 focuses on model development in the context of magnetism and static electricity. Finally, specific activities will focus your attention on aspects of the nature of science (how scientists’ develop new knowledge) and the nature of learning (both your own learning of science as well as the learning of children). The knowledge and skills you will learn and practice in this course should help you more effectively learn science and teach science to elementary students.

### **Structure of class meetings**

Each class period is 75 minutes in duration. At the beginning of the semester you will be assigned to a group of three or four students, and you will be expected to sit and work together during class. To make the process efficient, your group will be assigned seats as well. The instructor may call on your team at any time to share answers to questions with the whole class. During the semester we will change groups and/or reassign seating of groups within the classroom.

During the portions of the course that are mainly lecture-discussion, you will work through two lessons each class period, guided by the instructor. Each lesson consists of three sections with different aims.

Purpose This provides a short introduction describing the aims of the lesson and how it ties in to the topic. It also poses the key question(s) for the lesson.

Predictions, Observations and Making Sense This is the main section of the lesson. Here is where you will record your answers to questions in the lesson sheets (including some questions that you respond to with your *clicker*), record data and describe your observations from videos of demonstrations or computer simulations, summarize your interpretations of why you think certain things happen, and take notes from class discussions.

*Summarizing Questions* In the last part of a lesson you will answer questions that draw on the ideas developed during the lesson, including some that may be clicker questions. The last question will ask you to reflect on the key question(s) for the lesson; because of time constraints you should plan on answering this question at home as a review of the lesson.

During the portions of the course that are mainly hands-on, your group will be given some materials and you will spend most of the class time carrying out simple experiments, recording and analyzing data, and sharing your results with the rest of the class. One or two members of your group will also need to bring a laptop computer, and your group will spend part of the class time working with special computer simulations that will be related to the experiments you do. The instructor will provide some guidance during these periods, will occasionally show videos of experiments that are difficult to do during class, and will organize whole class discussions of results.

### **HOMEWORK ASSIGNMENTS**

***Online homework*** Homework will be assigned for most lessons and due before the next class meeting. Homework will be online through Cougar Courses. There is more info about the HW on Cougar Courses.

Since we will work through more than one lesson in a typical class period, you may have more than one homework assignment to do for each class period. Each homework has two major parts. In the first part you will be guided through some material to read, some movies or computer simulations to view, and a series of questions to answer. This may be online or on paper. The second part of each homework assignment is a quiz, which you will take on Cougar Courses. In the quiz, you will be asked a few questions (usually between 3 and 5) relevant to the content of the homework, and your answers will be graded and reported to the instructor.

I encourage you to work together, however, you are responsible for ensuring that you learn from the experience. You will learn very little by copying someone else's work, plus it's cheating. ***You must answer the graded homework questions on your own.***

### **EXAMS**

Four, closed-book quizzes will be given; one after each unit. The final will be a closed-book exam and cover **all** course material. **No makeup exams will be allowed. Be sure you are available for the final!**

Each unit quiz will consist of 10-20 multiple-choice questions. On days when you take a quiz, we will start the class by going through one lesson, and then you will work through the quiz during the last 30-35 minutes.

The final exam will consist of about 35-50 multiple-choice questions plus written explanation for you to write; it will cover the material from the entire semester (all four units). For each quiz and the final exam you will need to bring a #2 pencil and the appropriate scantron test form for recording your answers.

## COURSE GRADE

You are not in competition with each other for grades. Instead, your grade will depend on how well you complete the assignments and exams, which will count towards your course grade as follows:

Course component	Point value	Tentative Dates
Unit 1 Quiz	10 points	
Unit 2 Quiz	10 points	
Unit 3 Quiz	10 points	
Unit 4 Quiz	10 points	
Final Exam (Units 1-4)	30 points	
Participation	5 points	
Regular homework (total points scaled to 20)	25 points	Before next class period
<b>Total points =</b>	<b>100 points</b>	

Letter grades will be approximately follow this scale: A > 88 > B > 76 > C > 64 > D > 52  
Plus and minus indications will be used.

### ACADEMIC HONESTY POLICY: DON'T CHEAT (YOURSELVES)!

Students are responsible for the honest completion and representation of their work, and will be expected to adhere to the standards of academic honesty and integrity outlined in the CSUSM Student Academic Honesty Policy. All assignments must be the student's own original work, clear and error-free. All ideas/materials that are borrowed from other sources must have appropriate references to the original sources.

In this class, cheating includes submitting another person's work as your own or claiming credit for work you did not do (including class participation and homework), copying from another student on exams (or knowingly allowing another student to copy from you), and use of unauthorized materials during an Exam. Cheating also includes inappropriate clicker use and attempts to manipulate grades unfairly.