

Syllabus CONCEPTS OF PHYSICS Last revision: August 23rd , 2016

Physics 106

Fall, 2016

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Office Hours: Tu & Th 9:00 – 10:30 a.m.

Also read: ClassPolicies.pdf, and ClassSchedule.pdf

This course will emphasize many of the physics concepts which are taught to children in elementary school. The course is divided into several components which are described below. These components have been developed based on research concerning how elementary education majors and other students who are not majoring in science or engineering like you learn physics. The primary underlying principle is that you learn best by doing, not by sitting quietly and listening to someone else talk. Thus, most of the course is organized around your participation in your own learning process.

Throughout the course we will emphasize conceptual understanding. There will only be a limited amount of simple numerical calculation. Being able to describe a phenomenon and apply that description to a new situation is very important. Quantitative reasoning and numerical calculations will form only a limited part of this class and should be straightforward. You should strive to understand each topic which we discuss and to display that understanding in written and oral communication.

Required materials: **Text:** “Fascination of Physics” Spears and Zollman.

This text is on the course website as a pdf by permission of the authors.

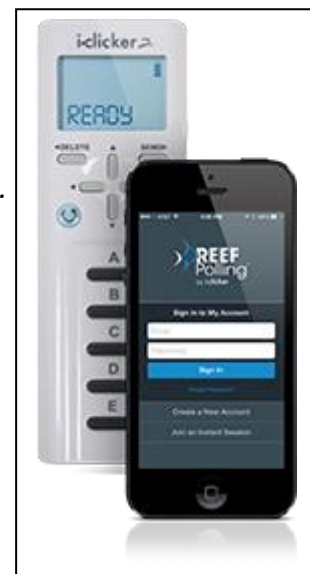
I-clicker 2: Look around for the best price. Compare amazon.com and the bookstore price. If you buy a used one there may be an extra registration fee. Make sure the batteries are functioning before each class.

Formal Learning Components

Classes

The regular class period is Tuesday and Thursday from 2:30 to 3:45 PM. During the class meetings (CW 103) we will discuss physics concepts, review homework and activity assignments and view films and demonstrations. The topics to be covered during each class session are shown in the class schedule – see “Schedule.pdf”.

You are encouraged to attend class and should remember that material not in the text but presented in class and in the activities will be on the tests and final exam. An electronic response system will be used to help you be an active participant in the class. See “I-clicker.pdf” sheet.



Activities

Two assignments to perform activities will be made each week during the semester. An "Activity Sheet" which can be printed from [K-State Online](#) must be completed and turned in by the due date (see "Schedule"). Most of the activities will require equipment which will be available in CW 224. Some will involve computer simulations and can be done anywhere.

This course will have two types of activities.

Exploration activities ask you to explore a new idea *before* we have discussed it in class. The purpose of the exploration is to prepare you to learn about a new idea or concept. All exploration activities will be graded on a Satisfactory/Unsatisfactory basis. You will receive a Satisfactory if you have attempted all experiments and completed the activity sheet. *Each satisfactory is worth 5 points toward your final grade. Exploration activities, once completed, will be discussed in the following class and used to elucidate physics concepts that will be useful in the following Application.*

Application activities enable you to apply new concepts as soon as you have learned them. By completing the application you will see how well you understood the previous class discussion. In the class following the Application some details and extension of the ideas used in the Application will be discussed. The Application will be graded on a 0 - 10 point basis.

Except for the first week, you will turn in Explorations and Applications in CW 224. After the papers have been graded, they will be returned to you.

Activities Schedule: The schedule for completing the Activities is listed on the "Class Schedule.pdf" sheet.

- The equipment for the Explorations and Applications will be available after class as listed in 'ClassSchedule.pdf'. The dues dates/times (2:15 p.m. on the date listed) are also listed in this schedule.
- During the first week we will complete most of the activities in class as a group.

Open times for the Activities Center (CW 224) will be announced in class, posted on the room door and class Web site.

If for any reason you cannot turn in an assignment on the due date, turn it in early. LATE PAPERS WILL NOT BE ACCEPTED.

Necessary Additional Efforts

Readings

The textbook is *The Fascination of Physics* by J.D. Spears and D. Zollman. It is available as a set of PDF files at the class website. Click *Content* then *Textbook*. This book is out-of-print, so if you want a real hard cover copy, search used book web sites. You may be able to pick one up rather cheaply.

The class schedule contains suggested readings that you should complete each week. The learning in the class is organized so that you should complete the Exploration BEFORE you read the text. You will be best served if you read the chapter directly after you complete the

Exploration. Reading assignments will *not* be announced in class, but are listed in the class schedule.

Review questions

Review questions are assigned and recommended to help you assess your own learning and understanding after completing the Application. These review questions will not be graded but answers will be posted so that you can compare your answers with mine. If you are having difficulty with any of the review questions, you can:

- Discuss it with other students
- See Mick O'Shea
- Ask about it during or before class.

Assessment

Tests

Three 1-hour tests will be given – see “Schedule.pdf”. Each test will cover all materials since the last test. Each test will have 33 multiple choice questions worth 3 points each. One point is awarded for printing your name legibly. Total points is 100 for each test.

No make-up or early tests will be given – **if you miss an exam please read “ClassPolicies.pdf”**

Final Examination

The final examination is required and will be comprehensive. Everyone enrolled in the course must take the final exam at the time and place scheduled. The final will have 66 multiple choice questions worth 3 points each. Two points is awarded for printing your name legibly. Total points is 200. The final exam will be given **Monday, December 12, 2016, at 9:40 AM., Cardwell Hall, Room 103**. It will be 1 hour 50 minutes long

The final exam will not be given early or late. If you will miss the final because of other plans, drop the course now

Grades

The maximum number of points in the course is:

Explorations (11 x 5 points)	55 (1 exploration is dropped)
Applications (11 x 10 points)	110 (1 application is dropped)
Class responses (23 x 2 points)	46 (2 classes are dropped)
Tests (3 x 100 points)	300 (None are dropped)
Final Exam (200 pts)	200 (Required)
Total	711 points

To receive credit for class responses, you must respond to all of the questions posed during a class period.

Your course grade will be calculated based on the following scale:

A 711 - 639.9 (90%)	D 497.6 – 426.6 (60%)
B 639.8- 568.8 (80%)	F less than 426.6
C 568.7- 497.7 (70%)	

Other resources

Course Web site

The course web site is maintained at [K-State Online](#) and contains up-to-date information about all aspects of the course. Included on the Web site are:

- Textbook and Activities sheets (see above for details)
- My lecture outlines. These are only outlines – you need to come to class to fill in detail. If you miss class, talk to someone else in the class about what you missed or look at the assigned reading. If you understand (this does not mean memorize answers) all of the exploration and application for that week, this is a good indication that you understand the material for the class you missed.
- Practice exams. About one week before each exam I will post a practice exam. You should use this as a practice to get ready for your exam. **Make sure you review the class material (including labs) before you try the practice exam.** A key for the practice exam will also be posted.
- My answers to review questions. These answers are to help you assess how well you are doing. If you have an answer that is somewhat different from mine and you are not sure if it is correct, ask me or one of the proctors in the Activities Room.

Additional Help

- The proctors in CW 224. These people will help you with the lab activities. They can also help with any other aspect of the course. Talk to them about all parts of the course.
- Physics-Math Help Room (CW041). The people in this room may be able to help you with some of the concepts. Many of them are upper level students who are better at solving numerical problems than talking about concepts. If you find a helper who is good let others know.

Communications

To contact me you can

- Use e-mail. *Be sure to put PHYS 106 in the subject line.* I get too much mail but my mail reader will sort all e-mail with PHYS 106 in the subject line so that it gets preferential treatment. To be sure that the spam filter does not eat your e-mail, it is best to use your KSU account rather than a free e-mail such as g-mail or yahoo.
- Make an appointment. If you need to see me at times other than my office hours, you can just drop by, but it is best to make an appointment. See me before or after class or use e-mail to set up a time.

Science Standards & Concepts of Physics

Recently, educational organizations from most states have established standards for science to be taught to children at each grade level from Kindergarten through 12th grade. These standards, called the Next Generation Science Standards, are being used by most state Boards of Education as a foundation for establishing what topics are taught and *how* they are taught. The Standards for Kindergarten through 5th grade have been used to determine the topics that will be covered in Concepts of Physics. Each of the Explorations and Applications begin with a statement from the Physical Science Standards. **Some of these statements can be covered on tests.**

The Next Generation Science Standards advocate that students be actively involved in their learning. The teaching–learning methods used in Concepts of Physics are consistent with that recommendation, modified for the limitations that a large enrollment class creates.

University Policy Statements

1. **[University Statement Regarding Academic Honesty \(Links to an external site.\)](#)**

Kansas State University has an Honor System based on personal integrity, which is presumed to be sufficient assurance that, in academic matters, one's work is performed honestly and without unauthorized assistance. Undergraduate and graduate students, by registration, acknowledge the jurisdiction of the Honor System. The policies and procedures of the Honor System apply to all full and part-time students enrolled in undergraduate and graduate courses on-campus, off-campus, and via distance learning. The honor system website can be reached via the following URL: www.k-state.edu/honor (Links to an external site.). A component vital to the Honor System is the inclusion of the Honor Pledge which applies to all assignments, examinations, or other course work undertaken by students. The Honor Pledge is implied, whether or not it is stated: "On my honor, as a student, I have neither given nor received unauthorized aid on this academic work." A grade of XF can result from a breach of academic honesty. The F indicates failure in the course; the X indicates the reason is an Honor Pledge violation.

2. **[University Statement Regarding Students with Disabilities \(Links to an external site.\)](#)**

Students with disabilities who need classroom accommodations, access to technology, or information about emergency building/campus evacuation processes should contact the Student Access Center and/or their instructor. Services are available to students with a wide range of disabilities including, but not limited to, physical disabilities, medical conditions, learning disabilities, attention deficit disorder, depression, and anxiety. If you are a student enrolled in campus/online courses through the Manhattan or Olathe campuses, contact the [Student Access Center \(Links to an external site.\)](#) at accesscenter@k-state.edu, 785-532-6441; for Salina campus, contact the [Academic and Career Advising Center \(Links to an external site.\)](#) at acac@k-state.edu, 785-826-2649.

3. **University Statement Defining Expectations for Classroom Conduct**

All student activities in the University, including this course, are governed by the [Student Judicial Conduct Code \(Links to an external site.\)](#) as outlined in the Student Governing Association [By Laws \(Links to an external site.\)](#), Article V, Section 3, number 2. Students who engage in behavior that disrupts the learning environment may be asked to leave the class. Academic Freedom Statement

4. **University Statement on Academic Freedom**

Kansas State University is a community of students, faculty, and staff who work together to discover new knowledge, create new ideas, and share the results of their scholarly inquiry with the wider public. Although new ideas or research results may be controversial or challenge established views, the health and growth of any society requires frank intellectual exchange. Academic freedom protects this type of free exchange and is thus essential to any university's mission.

Moreover, academic freedom supports collaborative work in the pursuit of truth and the dissemination of knowledge in an environment of inquiry, respectful debate, and professionalism. Academic freedom is not limited to the classroom or to scientific and scholarly research, but extends to the life of the university as well as to larger social and political questions. It is the right and responsibility of the university community to engage with such issues.

5. **Copyright:** The copyright holder for all aspects of the class belong to Dean Zollman. This copyright extends to the Explorations, Applications and classroom activities. If you record something in class, you do *not* have the rights or permission to post it on any social media or other web site. When you are teaching, you may use materials from Concepts of Physics in your classes.