Physics 122

Early Modern Physics: Relativity, Quantum Mechanics
Introduction to Atomic, Molecular and Solid State Physics.

Section 1, Sci 242, MW 10a30-11a45
Lecturer: Carel Boekema, Sci-303 E>mail: BoekemaC@aol.com
Phone: 924-5260 (office, voice mail) 924-5210 (Physics Dpt Office)
Office Hours: MW 12nn – 12p50, 2p30 – 3p20 or by appointment.

Physics 122 is a three-unit course, whose purpose is for Physics majors and minors to understand and apply concepts of Modern Physics. Our main focus is towards atomic, molecular and solid state physics. Relativistic kinematics and dynamics, particle and wave aspects of radiation and matter, and basic topics in atomic, molecular and solid state physics are discussed. Chapters 1 - 10 of Concepts of Modern Physics by Beiser (6th Edtn) are covered. Also parts of Ch 1- 5, 7, 8 & 11 Modern Physics by Morrison (2nd Edtn) are addressed. Both texts are strongly recommended. Selected contemporary physics topics: magnetism, cuprate superconductivity, frustration in condensed matter & "your choice" are discussed. A student symposium is likely organized.

Grading:

<table>
<thead>
<tr>
<th>Description</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>PeerInstruction (~5 PI's)</td>
<td>10 %</td>
</tr>
<tr>
<td>Proficiency Tests (3 PT's *)</td>
<td>20 %</td>
</tr>
<tr>
<td>Three* Closed Book (CB) eXams</td>
<td>30 %</td>
</tr>
<tr>
<td>Final eXam</td>
<td>40 %</td>
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</tbody>
</table>

* The lowest score of the CB set is dropped. A PT should be retaken, and must be passed with (near) perfect work. Only by prior arrangement and sufficient reason make-up eXams are allowed.

Grading Scale:

<table>
<thead>
<tr>
<th>Letter Grade</th>
<th>% Score</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>100-85 %</td>
<td>Excellent</td>
</tr>
<tr>
<td>B</td>
<td>84-70 %</td>
<td>Good</td>
</tr>
<tr>
<td>C</td>
<td>69-55 %</td>
<td>Satisfactory</td>
</tr>
<tr>
<td>D</td>
<td>54-40 %</td>
<td>Unsatisfactory</td>
</tr>
<tr>
<td>F</td>
<td>39-00 %</td>
<td>Poor/Fail</td>
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</tbody>
</table>

For Physics Majors and Minors, only a B* or better are acceptable as passing grades. There is no curve in my (partial) grading method. This means you do not have to compete with your fellow students for the high grades.
**Academic Integrity Statement:**
Your own commitment to learning, as evidenced by your enrollment at San Jose State University, and the University’s Integrity Policy requires you to be honest in all your academic course work. The policy on academic integrity can be found at:
http://sa.sjsu.edu/judicial_affairs/index.html

*All your eXam work must be your own.*

**Campus policy in compliance with Disabilities Act:**
If you need course adaptations or accommodations because of a disability or if you need special arrangements in case the building must be evacuated, please see me during office hours asap.

**SJSU Catalog:**
You are responsible for understanding the policies and procedures about add/drops, academic renewal, withdrawals, incompletes, classroom behavior, and other policies described in the SJSU catalog. Please read your catalog *thoroughly.*

**Emergencies and Evacuations:**
If you hear a continuous alarm, or are told to evacuate by Emergency Coordinators, walk quickly to the nearest exit via stairways (at the end of each hallway). *Do not use the elevator.* Take your personal belongings, as you may not be immediately allowed to return. Follow instructions of Emergency Coordinators. *Be quiet, so you can hear.* Once outside, move away from the building. Do not return to the building, unless the Police or Emergency Coordinators announce, it is permissible.
Tentative Schedule Phys 122’ Spring 2016, C Boekema

<table>
<thead>
<tr>
<th>Week</th>
<th>Ch Beiser</th>
<th>Xm Material</th>
<th>eXam</th>
</tr>
</thead>
<tbody>
<tr>
<td>02/01 - 02/05</td>
<td>Intro</td>
<td>Review your Univ Phys!</td>
<td>O*1</td>
</tr>
<tr>
<td>02/08 - 02/12</td>
<td>2, 3,</td>
<td></td>
<td></td>
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<tr>
<td>02/15 - 02/19</td>
<td>3, 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>02/22 - 02/26</td>
<td>4, 1</td>
<td>Ch 2 &amp; 3</td>
<td>CBX I</td>
</tr>
<tr>
<td>02/29 - 03/04</td>
<td>1, 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>03/07 - 03/11</td>
<td>S.eqn! 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>03/14 - 03/18</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>03/21 - 03/25</td>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>04/04 - 04/08</td>
<td>8</td>
<td>Ch 1 - 6</td>
<td>CBX II</td>
</tr>
<tr>
<td>04/11 - 04/15</td>
<td>8</td>
<td></td>
<td></td>
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<tr>
<td>04/18 - 04/22</td>
<td>9</td>
<td></td>
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<tr>
<td>04/25 - 04/29</td>
<td>10</td>
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<tr>
<td>05/02 - 05/06</td>
<td>Topics**</td>
<td></td>
<td></td>
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<tr>
<td>05/09 - 05/13</td>
<td>Review, Topics** &amp; Symposium</td>
<td></td>
<td></td>
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<tr>
<td>05/16</td>
<td>Ch 1 – 10</td>
<td></td>
<td>FHX</td>
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</table>

*1 O: a diagnostic test! This test is not an eXam. The result of this test will indicate, how much you will have to review. (Use summaries, questions and examples of Univ Phys Chapters.)

eXam dates:

CB eXam I Ch 2 & 3 Feb 22 *3
CB eXam II Ch 1 - 6 Apr 04 *3
FHX Ch 1 - 10, May 16
Final eXam Ch 1 – 10 & Topics*2 May 24 9a45 – 12nn

*2 Selected eXtra 122’ material -- also, a potential Student Symposium.

*3 These are tentative dates.

** Relevant parts covered at Student Symposium and in class.
1) Your guide to understanding the essential lecture material will be your short notes made in class and the suggested homework. Not all topics and sections of the recommended MP Chapters are covered.

2) In lecture transparencies are used besides powerpoint & board presentations. This method is beneficial for those students, who prepare for class and read ahead the Chapter to-be-discussed as a first and essential step in their study.

3) A list of Questions is handed out. Attempts to answer these questions tend to improve critical thinking and physical insight. They are an excellent source for classroom discussion and clarification of the physics concepts involved. Answer these suggested questions, while preparing for the chapter under discussion. These questions are a part of the suggested HomeWork and PeerInstruction. Most of these are addressed in class, and may show up on eXams.

4) The closed book eXams are based upon the suggested HomeWork and material of the chapters discussed. Also questions and easy problems of the "Chapter to-be-discussed" are posed.

5) For CBX I & II neat summary notes are allowed. See B2 below. For FHX and the Final eXam "no notes and closed book" is the rule.
A. How To Study:
To succeed in (not only) my courses, the following guidelines are strongly suggested: As Physics Majors and Minors, you may have developed a solid study method for success in your studies. These guidelines are offered, especially when your method yields a C+ or lower, instead of the expected B- or better in any Physics course:

1. Study the discussed and recommended text;
2. Read the chapter to-be-lectured-on in advance;
3. Make short notes while attending class; summarize (see B2);
4. (Attempt to) solve the suggested homework;
5. (You are encouraged to) discuss the physics concepts and difficulties in your course work with (and seek help from) your fellow students and lecturer;
6. Visit your lecturer during office hours, whenever you think an office visit is necessary;
7. Form study-homework groups; students who suffer alone -- do just that! Don’t!
8. Discover your motivation to succeed in this course.

B. On Suggested HomeWork, PI's, PT's and Exams:
1. Sometimes, suggested homework may be assigned at least one week ahead; the due date will be given. Late homework is penalized 20% per each day late.
2. CB and Final Exams are "closed book" and are announced. Neat and organized summaries (max 5 single-sided pages) are allowed at the first two closed-book Exams. These sheets are part of the Exam, graded and worth 10% of the Exam score.
3. PeerInstruction is based upon suggested HomeWork, is done in class, and in collaboration, preferably within your HomeWork study group. When you have prepared suggested homework in advance, you can discuss the issues involved, learn to “talk physics,” and profit from PI!
4. Proficiency tests are taken in class, closed book, and take about 25 minutes. If unsatisfactory, these tests must be retaken (in class or during OH's) till (near) perfect work is presented. The Phys122’ Proficiency policy is as follows:

<table>
<thead>
<tr>
<th>#of Passed PrfncY tests</th>
<th>Maximum possible 122’Lc Grade</th>
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<tbody>
<tr>
<td>all three (near perfect)</td>
<td>A+</td>
</tr>
<tr>
<td>two (one imperfect)</td>
<td>B+</td>
</tr>
<tr>
<td>one (two imperfect)</td>
<td>B-</td>
</tr>
<tr>
<td>zero (all 3 imperfect)</td>
<td>C</td>
</tr>
</tbody>
</table>
C. **On Test Taking:**
1. Be sure, what is covered on the test.
2. During class, listen for clues for the test.
3. Set up a study schedule to prepare for a test  
   a) Catch up on missed, suggested homework; "clean up"
   b) Organize, summarize your notes (see d below and B2)
   c) Review (your) old tests (see Cb)
   d) Make yourself study aids:  
      summaries (see B2) lists of main concepts, outlines, etc ...
4. A few days before the test, reread, review important material,  
   class notes and your own study aids, and test yourself.

   **At the Test:**
I. Read the test completely to get a sense of what the test covers.
II. On your second reading, underline, mark key words.
III. Do the easiest problems and questions first.
     Mark those you have finished, or plan to return to, accordingly.
IV. Proofread your test to check for obvious errors, to make sure you  
     have at least started, reformulated all problems (partial credit)!

   **After the Test:**
   a. Discuss your corrected test with your peers and/or lecturer.
   b. Save your corrected test, use it as a study aid for the next tests.

D. **eXtra Assistance:** The following services and resources are available,  
   to assist you to strive for academic success:

   * The learning Assistance resource Center (LARC) is located in the Student Services center. Their tutors are trained and nationally certified and provide content-based tutoring in many lower division courses (some upper division) as well as writing and study skills assistance. Small group, individual, and drop-in tutoring are available. Please visit the LARC website for more information (http://www.sisu.edu/larc/).

   * Student Technology Resources: Computer labs for student use are available in the Academic Success Center located on the 1st floor of Clark Hall and on the 2nd floor of the Student Union. Computers are also available in the MLK Library.

   * SJSU Writing Center: this Center in Clark Hall 126 offers tutoring services to students. Writing specialists assist in all writing areas, including grammar, organization, paragraph development, coherence, syntax, and documentation styles. For more information, visit the Writing Center website at http://www.sjsu.edu/writingcenter, or call 924-2308.
Physics 122’ Spring 2016: Suggested Homework & Questions

**HomeWork Suggested:**

From Beiser text:
Ch1: 1, 6, 18, 23, 26, 31, 39, 42, 56
Ch2: 1, 6, 11, 16, 21, 22, 29, 38, 41, 44, 53
Ch3: 3, 6, 15, 22, 26, 29, 30, 34, 38
Ch4: 2, 7, 8, 16, 21, 29, 31
Ch5: 2, 8, 12, 19, 23, 25, 27
Ch6: 1, 6, 7, 11, 14, 15, 17, 19, 29
Ch7: 5, 17, 20, 22, 37
Ch8: 1, 2
Ch9: 1, 8, 12, 28
Ch10: 9, 12, 13, 24

*more to come?!*

The question set has been handed out in the 2nd week of class. More Physics questions are added with each topic.
Physics 122’ Contract                   Date: __________
Statement by
                                       ______________________(Last Name, 1st)
                                       ______________________(Last 4, SJSU id#)

Undersigned has read carefully and completely understood the green sheets and this statement for Physics 122’ class, Spring 2016. *Enough time* outside class shall be spent on this Lecture course. Undersigned shall as much as possible join, and collaborate within, a *homework study group* for this class. *Exams* shall reflect own work and understanding.

If the predicted grade of undersigned falls below a B+, undersigned shall find assistance to improve scores and grade. If this predicted grade falls below a C+, undersigned shall visit Office Hours *at least once a week*.

If at any time after April 11, 2016, the average overall CBX & PT grade falls below 40 %, undersigned shall receive a "WU" (Withdrawal Unauthorized) as final Lecture grade, and shall *not* be allowed to participate in the Final *Exams*, May 2016.

Comments (*if any*) and motivation (*optional*):

Signed:
Name (Print): _______________________

Read and initialed by Prof C Boekema: _______