# San José State University Department of Physics and Astronomy Physics 122: Modern Physics, Spring 2015

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| Instructor: | Ken Wharton |
| Office Location: | SCI 308 |
| Telephone: | (408)-924-5257 |
| Email: | Kenneth.wharton@sjsu.edu |
| Office Hours: | M 9:30-10:30am, MW 11:45am-12:15pm, , or by appointment. |
| Class Days/Time: | MW 10:30-11:45am |
| Classroom: | SCI 242 |
| Prerequisites: | Physics 50,51,52 |

## Faculty Web Page

The course materials such as the syllabus, handouts, etc. may be found on my faculty web page at <http://www.sjsu.edu/people/kenneth.wharton/courses/122/index.html> . It should also be accessible through the Quick Links>Faculty Web Page links on the SJSU home page.

## Course Description

This is a survey course of modern physics for science majors, covering special relativity, basic quantum mechanics, atomic and molecular physics, solid state physics, nuclear and particle physics, and cosmology. The historical foundations of these topics will also be presented.

## Homework and In-Class Work

Solving a vast majority of the homework problems is crucial for success in this course. Homework will be assigned on a weekly basis; in general late homework will not be accepted. See the last page of the greensheet for further advice.

You are also expected to participate in class-based problem-solving, both on your own and in a small group. On occasion you will have to explain your work to the class.

SJSU classes are designed such that in order to be successful, it is expected that students will spend a minimum of forty-five hours for each unit of credit (normally three hours per unit per week), including preparing for class, participating in course activities, completing assignments, and so on. More details about student workload can be found in [University Policy S12-3](http://www.sjsu.edu/senate/docs/S12-3.pdf) at http://www.sjsu.edu/senate/docs/S12-3.pdf.

## Textbook

The required textbook for this course is "Modern Physics for scientists and engineers" (3rd or 4th edition) by Stephen T. Thornton and Andrew Rex, Thomson/Brooks/Cole Publishers.

## Research Project and Seminar:

Each of you will choose a topic that interests you, concerning modern physics, by finding a relevant popular-science article in a notable magazine or newspaper. (New York Times, Discover, Scientific American, etc.) I will then assign a specific project for a short research paper, individually tailored to your topic. All students will then make a short, related presentation to the class. Further details will be forthcoming. **Plagiarism on the Research Project will not be tolerated, and will likely result in an "F" for the course.**

## Course Goals and Student Learning Objectives

Your learning objectives are to be able to set up and solve quantitative problems in modern physics that you have not yet encountered. This includes learning the mathematical approaches necessary for solving such problems.

## Classroom Protocol

I expect you to attend class, as this material is almost impossible to learn directly from a textbook, and there is a very strong relationship between class attendance and performance. Cell phones, of course, must be silenced.

## Dropping and Adding

Students are responsible for understanding the policies and procedures about add/drop, grade forgiveness, etc. Refer to the current semester’s [Catalog Policies](http://info.sjsu.edu/static/catalog/policies.html) section at http://info.sjsu.edu/static/catalog/policies.html. Add/drop deadlines can be found on the [current academic calendar](http://www.sjsu.edu/academic_programs/calendars/academic_calendar/) web page located at http://www.sjsu.edu/academic\_programs/calendars/academic\_calendar/. The [Late Drop Policy](http://www.sjsu.edu/aars/policies/latedrops/policy/) is available at http://www.sjsu.edu/aars/policies/latedrops/policy/**.** Students should be aware of the current deadlines and penalties for dropping classes.

Information about the latest changes and news is available at the [Advising Hub](http://www.sjsu.edu/advising/) at http://www.sjsu.edu/advising/.

## Exams, Assignments and Grading Policy

There will be three midterm exams, a research project, and one comprehensive final exam. The final grade will be determined according to the following:

**Grading:** Homework: 25%

First Midterm 10%

Second and Third Midterm 15% each

Research Project 15%

Final: 20%

The mean score in the class will generally be a B or B-.

# 122 Lecture Schedule, SPRING 2015

Note: The exam dates are subject to change with fair notice.

Week 1: Overview of Modern Physics, Relativity (Chapters 1,2)

Week 2: Special Relativity (Chapter 2)

Week 3: Special Relativity (Chapter 2)

Week 4: Special Relativity, Review (Chapter 2) **; MIDTERM #1 (Wed 2/18)**

Week 5: Electrons and Light (Chapter 3)

Week 6: Bohr Atom (Chapter 4), Quantum Mechanics (Chapter 5)

Week 7: Quantum Mechanics, Hydrogen (Chapters 5,6,7)

Week 8: Review for Midterm, **MIDTERM #2: Wed 3/18.**

**-SPRING BREAK-**

Week 9: Periodic Table (Chapter 8), Statistical Physics (Chapter 9),

Week 10: Bonds and Lasers (Chapter 10), Semiconductors (Chapter 11)

Week 11: Nuclear Physics (Chapters 12, 13)

Week 12: Particle Physics, Cosmology (Chapters 14,15,16)

Week 13: **RESEARCH PAPERS DUE 4/27;** Review, **MIDTERM #3: Wed 4/29**

Week 14: Student Research Presentations

Week 15: Presentations, Review

Final Exam on Tues. May 19, 9:45am-Noon.

## University Policies

### Dropping and Adding

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Information about the latest changes and news is available at the [Advising Hub](http://www.sjsu.edu/advising/) at http://www.sjsu.edu/advising/.

### Consent for Recording of Class and Public Sharing of Instructor Material

[University Policy S12-7](http://www.sjsu.edu/senate/docs/S12-7.pdf), http://www.sjsu.edu/senate/docs/S12-7.pdf, requires students to obtain instructor’s permission to record the course and the following items to be included in the syllabus:

* “Common courtesy and professional behavior dictate that you notify someone when you are recording him/her. You must obtain the instructor’s permission to make audio or video recordings in this class. Such permission allows the recordings to be used for your private, study purposes only. The recordings are the intellectual property of the instructor; you have not been given any rights to reproduce or distribute the material.”
  + It is suggested that the greensheet include the instructor’s process for granting permission, whether in writing or orally and whether for the whole semester or on a class by class basis.
  + In classes where active participation of students or guests may be on the recording, permission of those students or guests should be obtained as well.
* “Course material developed by the instructor is the intellectual property of the instructor and cannot be shared publicly without his/her approval. You may not publicly share or upload instructor generated material for this course such as exam questions, lecture notes, or homework solutions without instructor consent.”

### Academic integrity

Your commitment as a student to learning is evidenced by your enrollment at San Jose State University. The [University’s Academic Integrity policy](http://www.sjsu.edu/senate/S07-2.htm), located at http://www.sjsu.edu/senate/S07-2.htm, requires you to be honest in all your academic course work. Faculty members are required to report all infractions to the office of Student Conduct and Ethical Development. The [Student Conduct and Ethical Development website](http://dev.sjsu.edu/studentconduct/) is available at http://www.sa.sjsu.edu/judicial\_affairs/index.html.

Instances of academic dishonesty will not be tolerated. Cheating on exams or plagiarism (presenting the work of another as your own, or the use of another person’s ideas without giving proper credit) will result in a failing grade and sanctions by the University. For this class, all assignments are to be completed by the individual student unless otherwise specified. If you would like to include your assignment or any material you have submitted, or plan to submit for another class, please note that SJSU’s Academic Policy S07-2 requires approval of instructors.

### Campus Policy in Compliance with the American Disabilities Act

If you need course adaptations or accommodations because of a disability, or if you need to make special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. Presidential Directive 97-03 requires that students with disabilities requesting accommodations must register with the [Disability Resource Center](http://www.drc.sjsu.edu/) (DRC) at http://www.drc.sjsu.edu/ to establish a record of their disability.

### Accommodation to Students' Religious Holidays

San José State University shall provide accommodation on any graded class work or activities for students wishing to observe religious holidays when such observances require students to be absent from class. It is the responsibility of the student to inform the instructor, in writing, about such holidays before the add deadline at the start of each semester. If such holidays occur before the add deadline, the student must notify the instructor, in writing, at least three days before the date that he/she will be absent. It is the responsibility of the instructor to make every reasonable effort to honor the student request without penalty, and of the student to make up the work missed. See [University Policy S14-7](http://www.sjsu.edu/senate/docs/S14-7.pdf) at <http://www.sjsu.edu/senate/docs/S14-7.pdf>.

\*\*\* (End of University Boilerplate) \*\*\*

**Peer Assistance / Office Hours**

## Your success in this course almost entirely depends on learning how to do the homework problems, so do whatever it takes to make this happen. For most of you, this is best done in homework groups (although of course all the work you turn in must be your own). Also, please take advantage of my help via email and in office hours (either the posted hours above, or else make an additional appointment) – and not just for solving the homework, but also for understanding the material.