Contact Information

Instructor: Dr. Emily Chu  
Office Location: DH 5A  
Telephone: 408-924-1536  
Email: emily.chu@sjsu.edu  
Office Hours: Monday 1:30-2:30pm, Wednesday 10:30-11:30am  
Class Days/Time: Monday and Wednesday 12:00-1:20pm  
Classroom: Duncan Hall 415  
Prerequisites: CHEM 161A and PHYS 52 (with grades of "C" or better; "C-" not accepted).

Course website

Course materials such as syllabus, handouts, notes, assignment instructions, etc. can be found on Canvas: https://sjsu.instructure.com/. You are responsible for regularly checking the site in addition to announcements in class and messages sent through MySJSU.

Course Description

Chem 161A and Physics 72 (or their equivalents), with grades of C or better (C- not accepted). Reminder: prerequisite means that you have already completed the class, and are responsible for knowing the material presented in the class. Note that Chem 161A prerequisite implies that you have had Math 32 (a minimum three semesters of calculus).

Upon successful completion of this course, the student should be fluent in the language of quantum mechanics and able to carry out and interpret the results of a wide variety of quantum mechanical calculations. Additionally, the student should understand a number of concepts involved in the use of molecular spectroscopy and how these techniques can be used to measure atomic and molecular properties.

Course Goals and Learning Objectives

BS/BA Chemistry Program Learning Outcomes Addressed by Chem 161B

PLO #4 Demonstrate understanding of core concepts and to effectively solve problems in physical chemistry.
Course Learning Outcomes For Chem 161B

CLO #1 Upon completion, the student should know how to interpret (and normalize) a wavefunction, calculate a probability using a wavefunction, calculate and interpret an expectation value, utilize and interpret the Heisenberg Uncertainty Principle and understand and utilize the Superposition principle.

CLO #2 The student will apply the essential mathematical relationships to understand quantum mechanical models such as Particle in a Box, Harmonic Oscillator, and Rigid Rotor.

CLO #3 The student will know how to employ quantum mechanical principals and models to interpret topics in the hydrogen atom, polyelectronic atoms, and bonding.

CLO #4 Students will apply essential mathematical relationships to physical problems from group theory to understand molecular behavior and interpret vibrational spectra.

Required Texts/Readings

Textbook

Physical Chemistry, 6th edition, by Ira N. Levine
(ISBN: 978-0-07-253862-5)

Other Readings

Student Solutions Manual to accompany Physical Chemistry, 6th edition
(ISBN: 978-0-07-253863-2)

Course Requirements and Assignments

Office Hour Visits

Each office hour visit or appointment is worth 30 points, for a maximum of 60 points total.

Exams

We will have three 1.25 hour exams during the semester in class (worth 200 points each) and 1 final exam (280 points).

<table>
<thead>
<tr>
<th>Exam</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Wed. Feb. 26</td>
</tr>
<tr>
<td>II</td>
<td>Wed. March 19</td>
</tr>
<tr>
<td>III</td>
<td>Mon. April 21</td>
</tr>
<tr>
<td>Final</td>
<td>Mon. May 19; 9:45am-12:00pm</td>
</tr>
</tbody>
</table>

Grading Policy (940 points total)

- 3 Lecture exams: 600 points
- Final: 280 points
- Participation: 60 points

Grading ranges

A: 100 - 88%  B: 87.9 - 76.0%  C: 75.9-60.0%  D: 59.9-50.0%  F: < 50.0%
Classroom Expectations

Students are expected to come to class on time and prepared to work. Since we may be working on problems in class, please bring your calculator to every class. Cell phone activities, such as talking and texting, are not permitted. You must keep your cell phone in your bag and on silent during class. If you bring your laptop or tablet to class, please do not access websites or programs not relevant to the course (Facebook, YouTube, chat programs, etc.) as it may be distracting to the students sitting near and behind you. Students who persist in any of the above or participate in disruptive behavior will be asked to leave the classroom.

Homework

Problems from the text will be assigned on a regular basis, but homework will not be graded. Answer keys will be posted and anyone needing help with homework assignments should consult with the instructor during office hours or schedule a one-on-one appointment. Homework assignments have been designed to guide you in your study of the material and should be considered the minimum set of problems to do. It is up to you to work as many problems as necessary to clarify your understanding of any particular topic.

Email Etiquette:

Email correspondence will be written in a professional, courteous tone. This includes the following components:

- Proper grammar with no Internet abbreviations (ex: “l8er”).
- Contractions (ex: “can’t”) are allowed for emails.
- Concise, not rambling, description of the question.
- Closing signature (“-Jane Doe”).

Please allow up to 24 hours for a response. Emails sent at the last minute before exams or due assignments may not be opened in time.

The instructor reserves the right to return or refuse emails that do not follow these etiquette guidelines.

University Policies

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 section at http://info.sjsu.edu/static/catalog/policies.html. Add/drop deadlines can be found on the current academic year calendars document on the Academic Calendars webpage at http://www.sjsu.edu/provost/services/academic_calendars/. The Late Drop 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 at [http://www.sjsu.edu/advising/](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.

“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.”

For this class, students may request permission by emailing or talking to the instructor.

“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 Academic Integrity Policy S07-2* at [http://www.sjsu.edu/senate/docs/S07-2.pdf](http://www.sjsu.edu/senate/docs/S07-2.pdf) 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://www.sjsu.edu/studentconduct/) is available at [http://www.sjsu.edu/studentconduct/](http://www.sjsu.edu/studentconduct/).

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 Integrity 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* at [http://www.sjsu.edu/president/docs/directives/PD_1997-03.pdf](http://www.sjsu.edu/president/docs/directives/PD_1997-03.pdf) requires that students with disabilities requesting accommodations must register with the [Accessible Education Center (AEC)](http://www.sjsu.edu/aec) to establish a record of their disability.
SJSU Counseling Services

The SJSU Counseling Services is located on the corner of 7th Street and San Fernando Street, in Room 201, Administration Building. Professional psychologists, social workers, and counselors are available to provide consultations on issues of student mental health, campus climate or psychological and academic issues on an individual, couple, or group basis. To schedule an appointment or learn more information, visit Counseling Services website at http://www.sjsu.edu/counseling.
# Course Schedule

Schedule is subject to change with fair notice by announcements in class and updates to the course calendar.

**Course calendar**: [http://tiny.cc/chem161b_sp2014_chu](http://tiny.cc/chem161b_sp2014_chu)

<table>
<thead>
<tr>
<th>Topic</th>
<th>Chapter(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantum Mechanics</td>
<td>Chapter 17</td>
</tr>
<tr>
<td>• Particle in a Box</td>
<td></td>
</tr>
<tr>
<td>• Harmonic Oscillator</td>
<td></td>
</tr>
<tr>
<td>• Two-Particle Rigid Rotor</td>
<td></td>
</tr>
<tr>
<td>Atomic Structure</td>
<td>18.1-18.8</td>
</tr>
<tr>
<td>• Hydrogen Atom</td>
<td></td>
</tr>
<tr>
<td>• Many Electron Atoms</td>
<td></td>
</tr>
<tr>
<td>Molecular Electronic Structure</td>
<td>19.1-19.8</td>
</tr>
<tr>
<td>• Molecular Orbital Theory and Bonding</td>
<td></td>
</tr>
<tr>
<td>Spectroscopy and Photochemistry</td>
<td>20.1-20.5</td>
</tr>
<tr>
<td>• Rotational and Vibrational Spectroscopy</td>
<td></td>
</tr>
</tbody>
</table>