Instructor:  Jan Florián
Office: Flanner Hall (FH)-314B
Office Hours: Tu, Wed 1:00-2:30 PM or by arrangement
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“Classical Physics did an excellent job accounting for large aggregate states – for the familiar reality that we experience in our everyday lives – but failed to describe the underlying properties of matter and radiation on the atomic level. Quantum Mechanics is an effort to describe this strange yet compelling world in which things are not what they seem to be.”

-Cass Sacket

“Chemistry is essentially about bonding of atoms to form molecules. Since a chemical bond is a purely quantum phenomenon, this alone underscores the importance of quantum mechanics to chemistry.”

-from Physical Chemistry, Keith Laidler, John Meiser, and Brian Sanctuary

“Physical chemistry is not inherently harder than any other technical subject. It is very mathematical, and students who may have formally satisfied the calculus requirements may still find physical chemistry a challenge because it requires to apply the calculus.”

-from Physical Chemistry, David W. Ball

Course Layout and Objectives
Part 1: Quantum Mechanics and Atomic Structure
1. Understand the basic concepts of quantum mechanics and underlying mathematics
2. Apply quantum mechanics to the study of atomic structure

Part 2: The Chemical Bond
3. Apply quantum mechanics to the study of molecular structure

Part 3: Foundations of Chemical Spectroscopy
4. Understand how light interacts with matter on the molecular level
5. Understand the relationship between quantum mechanics and spectroscopy.

Grading: Your grade will be calculated using your scores from three exams and homework assignments. These scores will be weighted as follows: Exams 1 and 2 will contribute maximum of 25 points. Homeworks will contribute 13 points, and the final exam will contribute 50 points. Grades will be assigned using the following scale:
<table>
<thead>
<tr>
<th>Total Points</th>
<th>Letter Grade</th>
<th>Total Percent Score</th>
<th>Letter Grade</th>
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<tbody>
<tr>
<td>&gt; 94</td>
<td>A</td>
<td>64 – 58</td>
<td>C</td>
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<tr>
<td>94 – 88</td>
<td>A-</td>
<td>58 – 50</td>
<td>C-</td>
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<tr>
<td>88 – 82</td>
<td>B+</td>
<td>50 – 45</td>
<td>D+</td>
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<tr>
<td>82 – 76</td>
<td>B</td>
<td>45 – 40</td>
<td>D</td>
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<tr>
<td>76 – 70</td>
<td>B-</td>
<td>40 or less</td>
<td>F</td>
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<tr>
<td>70 – 64</td>
<td>C+</td>
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**Ethical Considerations:**

Students will not collaborate on any exams. Students may collaborate on general solution strategy for homework problems but each student must present his own solution. Only those materials permitted by the instructor may be used to assist in examinations. Students will not represent the work of others as their own. Identical homeworks will receive zero points. Any student caught cheating during an exam will be reported to the Deans office and will receive zero points for the given exam.

**Homework Policy:** Homework will be assigned atThr class. To receive full credit, a student’s homework has to be submitted in person at the beginning of the next lecture (Tue). The homework must also present meaningful steps to solving ALL assigned problems. Since homework contribute extra points over the 100 point base, all late homework (regardless of the circumstances) receive zero points.

**Examinations:** Excused students who cannot attend an exam will be given a replacement exam. Medical or personal reasons for missing exams must be communicated to the instructor prior to the exam, and their proof will be required. Missed unexcused exams will receive zero points. Only non-programmable scientific calculators (TI-30XA) will be allowed during the exam. Students will be able to use pre-prepared hand-written letter-size sheet with formulas of their choice during all exams.

**Course Outline and Reading Assignments:** In order to understand the material presented during lectures and discussions, it is important to come to the class with good background knowledge. This can be achieved by reading (and thinking about) material in the textbook covered during the semester, and by reviewing appropriate material from calculus, physics and general chemistry classes. You will know that you are well prepared if you are able to ask pertinent questions during the class. Such questions are highly encouraged.


**Recommended books:** Student solutions manual, ISBN 0-534-39714-X

Applied Mathematics for Physical Chemistry 3rd ed. by James R. Barrante

**Schedule:** In the typical week, Tuesday and Thursday will feature lectures. On Tuesday, lecture will be followed up by Discussion, during which a set of problems assigned in the previous week will be solved on the board.

- Tu 011208  **First Class Meeting.** We will begin with Chapter 9.
- Tu 021008  **Exam 1, 10:00 - 11:30 am.** The exam will emphasize essential material of chapters 9 and 10.
- Tu 030308  Spring break
- Th 030508  Spring break
- Tu 031008  **Exam 2, 10:00 - 11:30 am.** The exam will emphasize essential material of chapters 11 and 12.
- Th 040908  Easter Holiday
- Th 042308  Last class
- Tu 042808  **Final exam, 1:00 - 3:00 pm.** The exam will be comprehensive, but greater weight will be given to the material of chapters 13-16.