Fall 2015

CHEM 5310

Steven W. Rick
University of New Orleans

Chemistry 5310 Chemical Bonding and Molecular Spectroscopy
Fall 2015

Instructor: Dr. Steven Rick
Office: CSB 341
Office hours: MWF 8:30-9:00, 10:00-11:00 and by appointment
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Text: Physical Chemistry, 10th Edition by Atkins and de Paulo
Class time: TuTh 12:30-1:45 PM, W 12:00-12:50, SC 2072

The course will cover the fundamentals of quantum mechanics as they relate to chemistry. After completion of this course, students will have demonstrated knowledge of the material described below, with an understanding of how the fundamental principles of quantum mechanics relate to the chemistry. Students taking the course for graduate credit will demonstrate additional mastery of the material through a written assignment. This assignment will show that the student is able to relate the concepts of quantum mechanics to the properties of atoms and molecules.

I. Introduction to quantum theory and exactly solvable systems.
   a. The Hamiltonian, the wavefunction, expectation values.
   b. Translations: the free particle and the particle in a box
   c. Rotations: the rigid rotor
   d. Vibrations: the harmonic oscillator

II. Electronic structure
   a. The hydrogen atom
   b. Many-electron atoms
   c. Approximate methods: perturbation theory and the variational theorem
   d. Chemical bonding

III. Spectroscopy
   a. Rotational and vibrational absorption and Raman spectroscopy
   b. Electronic spectroscopy: fluorescence and phosphorescence
   c. Nuclear magnetic resonance

Grading:

Homework:	20%	4 or 5 homework sets
Midterm exam:	25%	October 8
Paper:	15%	December 4
Final exam:	40%	12:30-2:30 PM Thursday, December 10

Moodle will be used to post selected lecture notes, homework assignments, and additional course material.

Prerequisites:
C or better in CHEM 3310, PHYS 1062 and MATH 2124 or MATH 2112 or MATH 2109

Attendance policy:
Regular attendance during class times is expected.

Academic integrity:
Academic integrity is fundamental to the process of learning and evaluating academic performance. Academic dishonesty will not be tolerated. Academic dishonesty includes, but is not limited to, the following: cheating, plagiarism, tampering with academic records and examinations, falsifying identity, and being an accessory to acts of academic dishonesty. Refer to the Student Code of Conduct for further information. The Code is available online at http://www.studentaffairs.uno.edu.

Disabilities act:
It is University policy to provide, on a flexible and individualized basis,reasonable accommodations to students who have disabilities that may affect their ability to participate in course activities or to meet course requirements. Students who seek accommodations for disabilities must contact the Office of Disability Services prior to discussing their individual needs for accommodation with their instructors.