

(Syllabus)
Chemistry 8551 Quantum Mechanics I
Fall Semester, 2016
TTH 1:00–2:15 pm, Room 121 Smith Hall

James Johns
335 Smith Hall
jjohns@umn.edu

Class Goals: In this course, we will cover the fundamentals of Quantum mechanics, especially as it pertains to chemistry. We will begin by discussing the mathematical rules that govern the behavior of quantum states. Once we have established those rules, we will explore the consequences of these rules in some 1 dimensional systems that may be familiar, and then move on to study the hydrogen atom. We will cover the very nonclassical behavior of angular momentum and spin in quantum mechanics in the context of the H-atom. We will then extend our capabilities by examining strategies to solve difficult problems via approximation. Finally, in the last third of the course, we will talk about molecular dynamics and how molecules interact with light.

By the end of the semester, my goal is to

- I. Bring everyone up to a base level familiarity and comfort level with Quantum Mechanics
- II. Develop a more mathematically sophisticated language for Quantum Mechanics so that students can understand current primary literature
- III. Improve problem solving strategies and increase the size and complexity of problems that students feel comfortable tackling

Prerequisite: Undergraduate quantum mechanics. The level of understanding from

Textbook: “Principals of Quantum Mechanics” by R. Shankar

Recommended: “Modern Quantum Mechanics” by J. J. Sakurai and J. Napolitano

“ Introduction to Quantum Mechanics” by David Griffiths

Office Hours: Thursday from 4-5pm, or by appointment (email).

Moodle: All official course information will be given out through the Moodle Site (<https://ay16.moodle.umn.edu/course/view.php?id=6273>). I will also post links to videos demonstrating how I approach problems in quantum mechanics.

Academic Integrity:

All students enrolled in University courses are expected to complete coursework responsibilities with fairness and honesty. Failure to do so by seeking unfair advantage over others or misrepresenting someone else’s work as your own, can result in disciplinary action. The University Student Conduct Code defines scholastic dishonesty as follows:

Scholastic dishonesty means plagiarizing; cheating on assignments or examinations; engaging in unauthorized collaboration on academic work; taking, acquiring, or using test materials without faculty permission; submitting false or incomplete records of academic achievement; acting alone or in cooperation with another to falsify records or to obtain dishonestly grades, honors, awards, or professional endorsement; altering, forging, or misusing a University academic record; or fabricating or falsifying data, research procedures, or data analysis.

Within this course, a student responsible for scholastic dishonesty can be assigned a penalty up to and including an "F" or "N" for the course. If you have any questions regarding the expectations for a specific assignment or exam, ask. Students should become familiar with the Regent's Policy on Student Conduct, found at:

http://www1.umn.edu/regents/policies/academic/Student_Conduct_Code.pdf

Grading:

Homework (~10 assignments)	25%	
Midterm	35%	(Tues Oct 25 – Thurs Oct 27)
Final Exam	40%	(8:00 – 10:00 AM Dec 19th)

This is a small class, and active class participation is a must. At the end of the semester, if your grade is on the border between two letters, I will student class participation to decide on a final grade.

Sexual Harassment

"Sexual harassment" means unwelcome sexual advances, requests for sexual favors, and/or other verbal or physical conduct of a sexual nature. Such conduct has the purpose or effect of unreasonably interfering with an individual's work or academic performance or creating an intimidating, hostile, or offensive working or academic environment in any University activity or program. Such behavior is not acceptable in the University setting. For additional information, please consult Board of Regents Policy:

<http://regents.umn.edu/sites/default/files/policies/SexHarassment.pdf>

Equity, Diversity, Equal Opportunity, and Affirmative Action:

The University will provide equal access to and opportunity in its programs and facilities, without regard to race, color, creed, religion, national origin, gender, age, marital status, disability, public assistance status, veteran status, sexual orientation, gender identity, or gender expression. For more information, please consult Board of Regents Policy:

http://regents.umn.edu/sites/default/files/policies/Equity_Diversity_EO_AA.pdf

I will gladly honor your request to address you by an alternate name or gender pronoun. Please advise me of this change via the notecard I pass out at the beginning of the semester, via email or in person. Please advise me of this early in the semester so that I may make appropriate changes to how I might address you in or outside of class.