SYLLABUS

COURSE: **CHEMISTRY 326**
Physical Chemistry II - Quantum Chemistry and Molecular Spectroscopy
MWF 12:15 – 1:20 pm
Spring 2016 (1st Quad)

INSTRUCTOR: Dr. Ken Martin
Office Hours: MWF 1:30 – 3:30 pm
TR 1:30 – 3:30 and by appointment

TEXT: Physical Chemistry, 3rd Edition, Thomas Engel, San Francisco, Pearson Prentice Hall, 2013.

OBJECTIVES: In his book, "In Search of Schrodinger's Cat," John Cribben has stated that quantum theory is so shocking that "Einstein himself could not bring himself to accept it. [Yet] it is so important that it provides the fundamental underpinning of all modern sciences. Without it, we'd have no nuclear power or nuclear bombs, no lasers, no TV, no computers, no science of molecular biology, no understanding of DNA, no genetic engineering - at all." Our goal is to develop a basic understanding of the use of this "mysterious" and very useful theory and to show its applications in the solution of selected problems of interest to chemists.

After studying the basics of quantum chemistry, we will utilize this theory as we examine one of the chemist's most powerful tools - spectroscopy.

LEARNING OUTCOMES: Students completing this course will:
1. Have developed more sophisticated mental models of atomic structures, chemical bonding, and the basic principles of atomic and molecular spectroscopy as grounded in the fundamentals of quantum theory.
2. Be able to use simple physical systems as models for understanding more complex molecular structures and behaviors.
3, Be able to apply the concepts, methods and techniques of quantum chemistry to simple chemical systems and make predictions for these systems.

HOMEWORK: Much of the material in this course is best learned by working problems; therefore, problem sets will be assigned regularly. Each assignment will be composed of two types of problems, work problems and quiz problems. Work problems will be graded with +, ✓, or -, and students may collaborate on these problems. Quiz problems are mini take-home exams and every student is expected to do these problems individually. The instructor is available to give help with both types of problems.

ATTENDANCE: You are expected to be at all scheduled meetings of the class. Excessive absences will result in a lowering of your grade.

GRADING:

Mid-term exam	30%
Final exam	35%
Homework	30%
Student Presentation	5%

Approximate Grading Scale

A	85-100%
B	75- 85%
C	65- 75%
D	55- 65%
F	0- 55%

LABORATORY: CHE 327 is separate laboratory course related to this material.

CLASS SCHEDULE:

Sessions	**Topics**	**Readings**
Jan 12 (T)	From Classical to Quantum Mechanics	Chapter 1
Jan 13, 15, 20 (W)	The Schrodinger Equation	Chapter 2
Jan 22 (F)	The Quantum Mechanical Postulates	Chapter 3
Jan 25, 27, 29 (F)	Using Quantum Mechanics on Simple Systems	Chapter 4
Feb 1, 3 (W)	The Particle in a Box and the Real World	Chapter 5
Feb 5, 8 (M)	Commuting and Non-commuting Operators	Chapter 6
Feb 12th (F)	**MID-TERM EXAM (Chapters 1-6)**	
Feb 10, Feb 15, 17 (W)	Models for the Vibrations and Rotations of Molecules	Chapter 7
Feb 19, 22, 24 (W)	Vibrational and Rotational Spectroscopy of Diatomics	Chapter 8
Feb 26, 29 (M)	Electronic Spectroscopy & Molecular Symmetry (Selected Topics)	Chapters 14 & 16
Tuesday Mar 1st	**COMPREHENSIVE FINAL EXAM (Tues 1:30 -4:00 pm)**	

OTHER MATTERS:

Student Privacy

Point Loma Nazarene University adheres to the provisions of the student privacy act. Following FERPA guidelines, grades in this class will be communicated to students on an individual basis. However, exams will be returned in class in such a way that scores are not visible. All other graded works will be returned in your lab section. If you are not comfortable with this procedure, please see the instructor to make special arrangements. This request must be made during the first two weeks of the course.

ACADEMIC HONESTY⊛

Students should demonstrate academic honesty by doing original work and by giving appropriate credit to the ideas of others. Academic dishonesty is the act of presenting information, ideas, and/or concepts as one's own when in reality they are the results of another person's creativity and effort. A faculty member who believes a situation involving academic dishonesty has been detected may assign a failing grade for that assignment or examination, or, depending on the seriousness of the offense, for the course. Faculty should follow and students may appeal using the procedure in the university Catalog. See Academic Policies for definitions of kinds of academic dishonesty and for further policy information.

ACADEMIC ACCOMMODATIONS⊛

If you have a diagnosed disability, please contact PLNU's Disability Resource Center (DRC) within the first two weeks of class to demonstrate need and to register for accommodation by phone at 619-849-2486 or by e-mail at DRC@pointloma.edu. See Disability Resource Center for additional information.

ATTENDANCE AND PARTICIPATION⊛

Regular and punctual attendance at all classes is considered essential to optimum academic achievement. If the student is absent from more than 10 percent of class meetings, the faculty member can file a written report which may result in de-enrollment. If the absences exceed 20 percent, the student may be de-enrolled without notice until the university drop date or, after that date, receive the appropriate grade for their work and participation. See Academic Policies in the Undergraduate Academic Catalog.

Spring 2016 Weekly Academic Calendar

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
January	3	4	5	6	7	8	9
	10	11 New Student Orientation	12 Classes Begin (Monday Schedule)	13	14	15	16
	17	18 Priority WebReg Begins for Summer 2016 **Martin Luther King Jr. Day (No Classes)**	19 Last Day to Add Quad I Classes	20	21	22 Department/School Chapels Last Day to Add Semester Classes	23
	24	25	26	27	8	29	30
	31	1 **Spiritual**	2 _____	3 **Renewal**	4 _____	5 Last Day to Drop Quad I Classes Priority WebReg Ends **Week**	6
February	7	8	9	10	11	12 Last Day to Apply for May Graduation	13
	14	15	16	17	18	19	20
	21	22	23	24	25	26	27
	28	29	1 Quad I Ends	2 Quad II Begins	3 Board of Trustees, Spring Meeting	4	5
March	6	7 Spring	8 _____	9 Break	10 _____	11 Week	12
	13	14	15 Last Day to Add Quad II Classes Mid-Semester Grades Distributed	16	17	18 Advising Day Chapel Quad I Grades Due	19
	20	21 Advising Begins	22	23	24 Easter Recess	25 Last Day to Drop Semester Classes	26
	27 **Easter**	28 Easter Recess	29	30 Last Day to Drop Quad II Classes	31	1	2
April	3	4 Priority WebReg Begins for Fall 2016	5	6	7	8	9
	10	11	12	13	14	15 Priority WebReg Ends	16
	17	18	19	20	21	22	23
	24	25	26	27	28	29 Promotion & Tenure Letter of Intent Due Classes End	30
May	1	2 **Final**	3 _____	4 **Exam**	5 _____	6 **Week**	7 Commencement
	8	9	10	11	12	13	14
	15 Final Grades Deadline	16	17	18	19	20	21
	22	23	24	25	26	27	28