

Chemistry 4300 - Physical Chemistry

Spring Semester 2023

Class: TuTh, 11:10 am - 12:30 pm,

Course web site: www.grandinetti.org/chem-4300-physical-chemistry

Carmen: <https://osu.instructure.com/courses/138102>

Instructor: Philip Grandinetti

Email: grandinetti.1@osu.edu

Office Hours: by appointment

Section	Recitation Time	Room	TA	Email
22060	Mo, 8:00-8:55 am	264 Drees Lab	Avik Ojha	ojha.22@osu.edu
22061	Mo, 9:10-10:05 am	140 Baker Systems	Zack Boothe	boothe.42@osu.edu
22062	Tu, 9:10-10:05 am	266 Drees Lab	Lexi McCarthy	mccarthy.677@osu.edu

Lecture Topics

Classical Physics	Quantum Physics
Forces, Energy, and Equations of Motion	Wave Particle Duality
Statistical Distributions	Wave Mechanics
Kinetic Theory of Gases	Free Particles and Tunneling
Rotational Motion	Vibrational Motion of Molecules
Vibrational Motion	Radiating Dipoles in QM
Electrostatic Interactions	Time Independent Perturbation Theory
Wave Motion	Quantum Particle in 3D
Electrodynamics	Rotational Motion of Molecules
Statistical Thermodynamics	Electronic Structure of the Hydrogen Atom
	Magnetism, Angular Momentum, and Spin
	Identical Particles in QM
	Electronic Structure of Atoms
	Electronic Structure of Molecules

You can find pdf files with the syllabus, course textbook, homework assignments, lecture slides, and other related materials on the course web site given above.

Grading

Recitation Quizzes	25%	Fridays on Carmen
First Exam	25%	Friday, Feb. 10, 5:30 pm - 7:30 pm, 1000 Fontana Lab
Second Exam	25%	Friday, Mar. 24, 5:30 pm - 7:30 pm, 1000 Fontana Lab
Final Exam	25%	Monday, May 1, 10:00 am - noon, 1000 Fontana Lab

Recitation quizzes will be given on Fridays on Carmen. Missed Quizzes: There are no make-up quizzes. Only the 10 highest recitation quiz scores will be counted while 11 (or more) quizzes will be offered. Make-up exams will only be given for documented medical reasons, or pre-approved university conflicts. Students with University conflicts should provide the lecturer with their complete course schedule, including the conflict, at least two weeks before the exam so an alternate exam can be scheduled.

Exercises

Exercises are given in the text. They will not be graded. Solutions will be posted on Carmen.

Policies

- Audio or video recording of class is not allowed without permission.
- Posting any course materials online is not permitted.

Advice for doing well in this class

The best piece of advice is work (correctly) through every single exercise in the text, and understand deeply why you got the correct answer. Of course, that's easier said than done, so here are a few other tips to help you succeed:

1. Read through online notes before each lecture. Even better if you can read ahead a few lectures. Note down the things you don't understand in the lecture notes and ask about them in class.
2. Come to class! Statistics show that students who skip class do the worst.
3. Ask questions in class when you don't understand. Don't be embarrassed, chances are quite high that others in the class have the same question in their heads.
4. Don't waste a lot of time working on exercises when you can't get the right answer. If you're still stuck, come see your TA or me during office hours.
5. Start early, and don't fall behind. Students who do well in this course often spend about **10-20 hours each week** (outside of lecture and recitation) reading and re-reading through the notes and text, and asking questions, while they work on the exercises.

Requirements Fulfilled

Chemistry 4300 is a Physical Science course in the Natural Science category of the GE, which has these goals and objectives:

Goals: Students understand the principles, theories, and methods of modern science, the relationship between science and technology, the implications of scientific discoveries and the potential of science and technology to address problems of the contemporary world.

Learning Objectives:

1. Students understand the basic facts, principles, theories and methods of modern science.
2. Students understand key events in the development of science and recognize that science is an evolving body of knowledge.
3. Students describe the inter-dependence of scientific and technological developments.
4. Students recognize social and philosophical implications of scientific discoveries and understand the potential of science and technology to address problems of the contemporary world.

Health and safety requirements:

Due to the ongoing COVID-19 pandemic, all students, faculty and staff are required to comply with and stay up to date on all university safety and health guidance (<https://safeandhealthy.osu.edu>), which includes wearing a face mask in any indoor space and maintaining a safe physical distance at all times. Non-compliance will be warned first and disciplinary actions will be taken for repeated offenses.

Due to the highly interactive nature of the 1.5 hour long problem-solving sessions in Chemistry 4300 and the current Omicron-variant surge in Ohio, I strongly recommend that all students wear a KN95 (or better) quality face mask during class (please, no cloth or surgical masks). I will have a few KN95 masks available during the first week of class for students who could not obtain one in time.

Standards Of Academic Conduct

Any material submitted must represent your own work. Violations of this standard will be referred to the University Committee of Academic Misconduct (COAM) as required by Faculty Rules.

It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term "academic misconduct" includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic

misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct <http://studentlife.osu.edu/csc/>.

Copying, use of “crib” material, or use of stored constants and formulas in calculators on quizzes, examinations or the final exam is regarded as a severe violation of academic standards no matter how small the action. The Department of Chemistry will recommend as the **minimum penalty a grade of E for the course for any such violations**.

Statement on Diversity and Title IX

The Ohio State University affirms the importance and value of diversity in the student body. Our programs and curricula reflect our multicultural society and global economy and seek to provide opportunities for students to learn more about persons who are different from them. We are committed to maintaining a community that recognizes and values the inherent worth and dignity of every person; fosters sensitivity, understanding, and mutual respect among each member of our community; and encourages each individual to strive to reach his or her own potential. Discrimination against any individual based upon protected status, which is defined as age, color, disability, gender identity or expression, national origin, race, religion, sex, sexual orientation, or veteran status, is prohibited.

Your mental health

As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce a student's ability to participate in daily activities. The Ohio State University offers services to assist you with addressing these and other concerns you may be experiencing. If you or someone you know are suffering from any of the aforementioned conditions, you can learn more about the broad range of confidential mental health services available on campus via the Office of Student Life's Counseling and Consultation Service (CCS) by visiting ccs.osu.edu or calling 614-292-5766. CCS is located on the 4th Floor of the Younkin Success Center and 10th Floor of Lincoln Tower. You can reach an on call counselor when CCS is closed at 614-292-5766 and 24 hour emergency help is also available 24/7 by dialing 988 to reach the Suicide and Crisis Lifeline.

Disability Services (ODS)

The University strives to make all learning experiences as accessible as possible. In light of the current pandemic, students seeking to request COVID-related accommodations may do so through the university's request process, managed by Student Life Disability Services. If you anticipate or experience academic barriers based on your disability (including mental health, chronic or temporary medical conditions), please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with Student Life Disability Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. SLDS contact information: slds@osu.edu; 614-292-3307; slds.osu.edu; 098 Baker Hall, 113 W. 12th Avenue.