

Point Loma Nazarene University
Department of Chemistry

CHE4068 – Advanced Inorganic Chemistry II
Spring Term, 2024

MWF, 7:25 – 8:20 pm in LA 102

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Office hours: MW, 1:30 – 2:30 pm

Sator 206
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Prerequisite

Successful completion of CHE3026 is required.

Course Description

The principles of inorganic chemistry, including symmetry, atomic and molecular structure, bonding theories, energetics, kinetics, and spectroscopy, are developed and applied to a range of inorganic compounds. This is a 3-unit course.

Learning Outcomes

At the completion of this course, students will be able to:

- predict and explain electronic configurations, periodic trends, and structures of simple main-group compounds.
- assign point groups for molecules and ions, and use group theory to build qualitative molecular orbital diagrams and identify Raman and IR active modes.
- apply acid-base and donor-acceptor principles to understand reactivity of inorganic compounds.
- know the fundamentals of coordination chemistry, including nomenclature, isomerism, ligand field theory, molecular orbitals, ligands, and electronic spectroscopy.

Textbook: *Inorganic Chemistry*, Miessler, Fischer, and Tarr, 5th edition, Pearson, 2014.

Lecture Materials. Lecture materials and other useful information will be available on Canvas.

Presentation: Each student will deliver a 15–20 minute presentation discussing one of the prominent inorganic chemists interviewed for the *Voice of Inorganic Chemistry* program. The interviews are available at <http://pubs.acs.org/page/inocaj/multimedia/voices.html>. More details will be forthcoming regarding this assignment.

Problem Sets: Problem sets are due at the beginning of class on the day indicated on the assignment. Late work will not be accepted.

Prelecture Reading Quizzes: A prelecture reading quiz will be available in canvas for each lecture class. The assignment will describe the reading to be completed before the next lecture and ask a few simple questions.

Grading: The final grade will be determined as follows: Problem Sets, 15%; Presentation, 10%; Prelecture Reading Quizzes, 10%; In-Class Activities, 10%, Midterm Exams, 30%; Final Exam, 25%. Letter grades will be assigned according to the following scale: A, 90 – 100%; B, 80 – 90%; C, 70 – 80%, D, 60 – 70%, F, below 60%.

Topics and associated reading (timetable is best estimate of course progress)

Week	Dates	Topic
1	1/8 – 1/12	The Elements, Atomic Structure, and Periodic Properties Reading: Chapter 2
2	1/15 – 1/19	Lewis Structures and Redox Chemistry Reading: Lewis Structures (chapter 3) Reading: Redox chemistry (handout) Martin Luther King Day Holiday on January 15
3	1/22 – 1/26	Redox Chemistry and Ionic Bonding Reading: Chapter 7, sections 1 & 2
4	1/29 – 2/2	Symmetry and Group Theory Reading: Chapter 4
5	2/5 – 2/9	Group Theory & Molecular Orbital Theory Reading: Chapters 4 & 5
6	2/12 – 2/16	Molecular Orbital Theory Reading: Chapter 5
7	2/19 -2/23	Exam 1 Acids & Bases & Introduction to Coordination Chemistry Reading: Chapters 6 & 9
8	2/26 – 3/1	Crystal Field Theory and Ligand Field Theory Reading: Chapter 10
Spring Break 3/4 – 3/8		
9	3/11 – 3/15	Electronic Spectroscopy Reading: Chapter 11
10	3/18 – 3/22	Reactions and Mechanisms Reading: Chapter 12
11	3/25 – 3/29	Organometallic Chemistry Reading: Chapter 13
Easter Break 3/29 – 4/1		
12	4/1 – 4/5	Organometallic Reactions and Catalysis Reading: Chapter 14
13	4/8 – 4/12	Review and Exam 2
14	4/15 – 4/19	Solid State Chemistry and Band Theory
15	4/22 – 4/26	Special Topics
	Final Exam	Monday, April 29, 7:30 – 10:00 am

PLNU Mission
To Teach ~ To Shape ~ To Send

Point Loma Nazarene University exists to provide higher education in a vital Christian community where minds are engaged and challenged, character is modeled and formed, and service is an expression of faith. Being of Wesleyan heritage, we strive to be a learning community where grace is foundational, truth is pursued, and holiness is a way of life.

PLNU FINAL EXAMINATION POLICY. Successful completion of this class requires taking the final examination on its scheduled day. The final examination schedule is posted on the [Traditional Undergraduate Records: Final Exam Schedules](#) site. If you find yourself scheduled for three (3) or more final examinations on the same day, you are authorized to contact each professor to arrange a different time for one of those exams. However, unless you have three (3) or more exams on the same day, no requests for alternative final examinations will be granted.

PLNU COPYRIGHT POLICY. Point Loma Nazarene University, as a non-profit educational institution, is entitled by law to use materials protected by the US Copyright Act for classroom education. Any use of those materials outside the class may violate the law.

STATE AUTHORIZATION. State authorization is a formal determination by a state that Point Loma Nazarene University is approved to conduct activities regulated by that state. In certain states outside California, Point Loma Nazarene University is not authorized to enroll online (distance education) students. If a student moves to another state after admission to the program and/or enrollment in an online course, continuation within the program and/or course will depend on whether Point Loma Nazarene University is authorized to offer distance education courses in that state. It is the student's responsibility to notify the institution of any change in his or her physical location. Refer to the map on [State Authorization](#) to view which states allow online (distance education) outside of California.

INCOMPLETES AND LATE ASSIGNMENTS. All assignments are to be submitted/turned in by the beginning of the class session when they are due—including assignments posted in Canvas. Incompletes will only be assigned in extremely unusual circumstances.

PLNU ACADEMIC HONESTY POLICY. 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.

SPIRITUAL CARE. Please be aware PLNU strives to be a place where you grow as whole persons. To this end, we provide resources for our students to encounter God and grow in their Christian faith. If students have questions, a desire to meet with the chaplain or have prayer requests you can contact the [Office of Spiritual Development](#)

PLNU ACADEMIC ACCOMMODATIONS POLICY. PLNU is committed to providing equal opportunity for participation in all its programs, services, and activities. Students with disabilities may request course-related accommodations by contacting the Educational Access Center (EAC), located in the Bond Academic Center (EAC@pointloma.edu or 619-849-2486). Once a student's eligibility for an accommodation has been determined, the EAC will issue an academic accommodation plan ("AP") to all faculty who teach courses in which the student is enrolled each semester.

PLNU highly recommends that students speak with their professors during the first two weeks of each semester/term about the implementation of their AP in that particular course and/or if they do not wish to utilize some or all of the elements of their AP in that course.

Students who need accommodations for a disability should contact the EAC as early as possible (i.e., ideally before the beginning of the semester) to assure appropriate accommodations can be provided. It is the student's responsibility to make the first contact with the EAC.

ATTENDANCE AND PARTICIPATION POLICY. Regular and punctual attendance at all class sessions is considered essential to optimum academic achievement. If the student is absent for more than 10 percent of class sessions, the faculty member will issue a written warning of de-enrollment. If the absences exceed 20 percent, the student may be de-enrolled without notice until the university withdrawal date or, after that date, receive an "F" grade.