

CHEM 530: Inorganic Chemistry (Section 001) – 3 credit hours Spring 2021

Class Meetings:

TR 9:30-10:45

Jan. 12 & 14: via [Zoom](#)

Beginning Jan. 19: Face-to-face in Sims 113B

Instructor:

Dr. Robin Lammi

Office: Sims 313A

Phone: 323-4946

E-mail: lammir@winthrop.edu

Virtual Office Hours:

MW 1-2 p.m. and by appointment, via Zoom

Required Course Materials:

Textbook: *Inorganic Chemistry*, 5th ed., Miessler, Fischer, and Tarr

Calculator: Any scientific or graphing calculator

Blackboard: Visit Blackboard regularly to obtain PowerPoints, view answer keys, etc.

Supplemental Materials:

Molecular Model Kits – Highly recommended!

A molecular modeling kit is a very useful tool for performing and recognizing the symmetry operations involved in group theory, particularly for those (like me) who struggle with 3-dimensional visualization. Two “inorganic” kits that permit construction of trigonal bipyramidal and octahedral compounds are available from Darling Models (for ~\$23-\$26 each; see Kits 1 and 4 at <http://www.darlingmodels.com>).

General, Inorganic, and other Chemistry Texts:

This course will build on your earlier exposure to inorganic chemistry, refining knowledge gained in General Chemistry, Introductory Inorganic Chemistry (for some), and other coursework (e.g., Physical Chemistry, Quantitative Analysis, Organic Chemistry). As such, your texts/notes from these courses (and/or other texts available online at Chemistry LibreTexts, <https://chem.libretexts.org/>) are good resources for review.

Course Goal:

To pursue in-depth study of atomic and molecular structure, bonding, crystals, coordination compounds, and current topics in inorganic chemistry

Student Learning Objectives:

- To expand your understanding of bonding in inorganic substances using molecular orbital diagrams, crystal unit cells and band structures;
- To learn the elements of group theory and use them to predict molecular orbital diagrams, orbital representations, and spectroscopic and magnetic properties of inorganic compounds;
- To examine theory and reactions involving coordination and organometallic compounds; and
- To appreciate the breadth and significance of inorganic chemistry through discussion of applied research.

Outline of Topics:

- I. Solid-State Chemistry, Nano- and Semiconductor Technology
- II. Review of Atomic Structure and Simple Bonding Models
- III. Symmetry, Group Theory and Molecular Orbital Theory
- IV. Acid-Base and Donor-Acceptor Chemistry

- V. Structure, Bonding, Spectroscopy and Reactivity of Coordination Compounds
- VI. Current Research (Student Presentations)

Course Requirements (Assignments):

Class Preparation and Discussion:

This is an advanced course that builds on a great deal of the chemical knowledge and intuition you have gained throughout your career. In order to achieve the course goals, it is crucial that we all arrive to class prepared to cover the scheduled topics, and that we engage in as much active in-class discussion as possible.

Toward that end, approximately 1-2 days before each class meeting, I will post **discussion questions** and a PowerPoint outline of material to be covered in Blackboard. **I expect that you will come to class prepared to answer the discussion questions**, which will be the basis for the “Class Preparation and Discussion” portion of your grade.

To promote discussion, I will also expect everyone to **attend class in person in Sims, unless** (1) the entire class is scheduled to meet remotely via Zoom, as is the case for January 12 and 14, or (2) you have an approved excuse to attend remotely. (Based on past experience, it is very difficult to have an effective and engaging class discussion when a few people attend in person and a few others are on Zoom, particularly without more audio capabilities than exist in Sims 113B.)

Graded Homework:

Working and re-working problems is the best way to learn chemistry. I will assign homework problems from each textbook chapter (as well as some non-textbook problems) that will be turned in for grading. I strongly suggest that you begin working on the homework as soon as we have covered the relevant material in class, so that you have the earliest indication of questions or difficulties to be addressed. I encourage you to work with your classmates and seek help with any topics you find difficult. **Please start early and ask lots of questions! An in-depth understanding of the homework is by far the best predictor of success on exams.**

Literature Reviews:

I will distribute lists of questions designed to guide reading and discussion of the two literature articles listed on the course schedule. Completion of these assignments should enhance your understanding of complex topics and impart strategies for reading the chemical literature; in addition, once completed, these questions and answers should be excellent summaries of your reading for use in exam preparation.

Presentations on Inorganic Literature:

Students will give presentations and lead class discussion on articles from the current inorganic literature. More details on this assignment will be provided in class.

Group Theory Mini-Exam:

There will be one “mini-exam” (or big quiz) on group theory, to help you gauge your progress with this material in advance of Exam II. The mini-exam is tentatively scheduled for **Thursday, March 4**; I will notify you in class if that date changes.

Exams:

Three midterm exams and a **cumulative** final will be given on the dates below.

Exam I	Thurs., Feb. 11	9:30-10:45
Exam II	Tues., Mar. 16	9:30-10:45
Exam III	Thurs., Apr. 15	9:30-10:45
Final Exam	Fri., Apr. 30	11:30-2:00

If you will be unable to take an exam at the scheduled time due to participation in a University-approved activity (e.g., an athletic meet, scientific conference, etc.), you **must** make arrangements **in advance** to reschedule. If you are absent on the exam date without prior approval and do not provide a written doctor's excuse or proof

of other personal or family crisis, you will receive a zero for that exam. You must take the final exam in order to pass the course.

Grading:

The assignments for this course and their respective point values are shown below. Course grades will be determined based on the percentage of total points earned.

Class Preparation and Discussion	100
Homework	125
Presentation	100
Mini-Exam	50
Exams (3 x 125)	375
Final Exam	250
Total	1000 points

The guaranteed grading scale is shown below; if necessary, it may be adjusted lower to reflect class performance.

A 92-100	A- 88-91	B+ 85-87	B 79-84	B- 76-78
C+ 72-75	C 68-71	C- 65-67	D 56-64	F <56

Additional Requirements for Graduate Credit:

A student wishing to earn graduate credit for this course must additionally write an 8-12-page paper on an instructor-approved topic of current research interest in inorganic chemistry. The student must propose his/her topic no later than **March 12**, with the final topic approved by March 26. The paper must cite at least five scholarly articles as sources. This assignment will contribute up to 200 points to the graduate student's grade.

Getting Help:

I encourage you to contact me frequently with questions. I've listed specific office hours above, but please feel free to make other arrangements. The course material is challenging, and I want to help. (I also enjoy talking about it!)

Attendance:

You are expected to attend all class meetings in their entirety – **please be on time!** – and are responsible for all course material and assignments, regardless of absences. Unexcused absences and/or tardiness will also impact the class-discussion component of your grade.

Phones:

If you keep your phone on during class meetings, please ensure that it is in **silent/vibrate** mode. **With the exception of calculators, all personal electronic devices are prohibited during quizzes and exams.**

E-mail and Dropbox:

Please be sure to **check your Winthrop e-mail frequently**, as I will occasionally share reminders and answers to frequently asked questions. I will also use Dropbox to share literature articles and other materials.

Students with Disabilities:

Winthrop University is committed to providing equal access to education for all students. If you have a disability (e.g., mental health concern, medical condition, learning disability, etc.) and you anticipate or experience academic barriers due to this condition, please contact the Office of Accessibility (OA) at 323-3290 or accessibility@winthrop.edu. Once you receive approval for accommodations through OA, please inform me as soon as possible so that we may implement your accommodations in a timely manner.

Academic Integrity:

Any instances of academic misconduct will be dealt with as outlined in the Student Conduct Code, found in the *Student Handbook* (<https://www.winthrop.edu/studentconduct/winthrop-university-student-handbook.aspx>).

Syllabus Change Policy:

Changes to the policies listed here may be made at the instructor's discretion. You will be notified of any modifications.