

# CHEM 530: Inorganic Chemistry (Section 001) – 3 credit hours Spring 2022

## Class Meetings:

TR 9:30-10:45, Sims 113B

## Instructor:

Dr. Robin Lammi  
Office: Sims 313A  
Phone: 323-4946  
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## Office Hours:

M 1-2 p.m., W 10-11 a.m.; you're also welcome to stop by any time, and/or to make an appointment.

## Required Course Materials:

**Textbook:** *Inorganic Chemistry*, 5<sup>th</sup> 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 ~\$24-\$27 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 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.

### **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 **Tuesday, March 1**; 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.

<b>Exam I</b>	<b>Thurs., Feb. 10</b>	<b>9:30-10:45</b>
<b>Exam II</b>	<b>Thurs., Mar. 10</b>	<b>9:30-10:45</b>
<b>Exam III</b>	<b>Thurs., Apr. 14</b>	<b>9:30-10:45</b>
<b>Final Exam</b>	<b>Fri., Apr. 29</b>	<b>11:30-2:00</b>

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
<b>Total</b>	<b>1000 points</b>

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

<b>A</b> 92-100	<b>A-</b> 88-91	<b>B+</b> 85-87	<b>B</b> 79-84	<b>B-</b> 76-78
<b>C+</b> 72-75	<b>C</b> 68-71	<b>C-</b> 65-67	<b>D</b> 56-64	<b>F</b> <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 11**, with the final topic approved by March 25. 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 stop by anytime or 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 may also use Dropbox (in addition to Blackboard) to share literature articles and other materials.

### **COVID-19 Statement:**

During this pandemic period, each student is expected to act in the best interest of the WU community by behaving responsibly to limit the spread of the COVID-19 virus. All students, faculty, and staff must wear masks inside buildings and classrooms, unless alone in a private office. All members of the campus community must follow campus guidance on masking. Please do not attend class if you have a fever or any signs of the COVID virus; do not attend class if your roommate or someone you have close contact with acquires the virus; and be respectful of others' desire to remain COVID-free. Students who violate WU guidelines will be asked to comply. Continued failure to comply may result in referral to the Dean of Students Office as a student conduct violation.

### **COVID-Related Absence:**

Students should contact Health Services regarding a positive test, close contact, or enhanced COVID-like symptoms. Any student who has tested positive, has COVID-like symptoms, or has close contact with someone who has COVID must contact Health Services. Students should log in to the Patient Portal to

schedule a TELEPHONE TRIAGE Appointment with COVID as the reason and upload the positive test result, if applicable. Health Services will communicate with the student on what steps to take next, and the Dean of Students Office will get absence verification for required isolation and quarantine, if necessary. Students who verify their absences through the Dean of Students Office often minimize any academic impact caused by missed class time. Health Services will only provide dates of absence, not medical information. Please note, residential students who test positive or are close contacts are expected to follow their personal COVID Quarantine and Isolation Plans.

**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](mailto: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.