Course title: Inorganic Chemistry

Course meeting time and place: Tuesday, Thursday, 11:00-12:15, Van Allen Hall 70
(located on eastern-most end of first floor of VAN, closest to Gilbert St; down stairs or use elevator 3 to basement floor)

Department of Chemistry: https://chem.uiowa.edu

Course ICON site: To access the course site, log into Iowa Courses Online (ICON)
https://icon.uiowa.edu/index.shtml using your Hawk ID and password.
The ICON course name is CHEM:3250:0001 Spr23 Inorganic Chemistry. This site will have copies of class notes, prior midterm and final exams, homework, etc.

Course credit: 3 s.h.: homework, surprise quizzes, midterm and comprehensive final exams

Course home
The College of Liberal Arts and Sciences (CLAS) is the home of this course, and CLAS governs the add and drop deadlines, the “second-grade only” option (SGO), academic misconduct policies, and other undergraduate policies and procedures. Other UI colleges may have different policies.

Instructor: Prof. Lou Messerle

Office location: CB E457: Prof. Messerle is often working in his lab with undergraduate and graduate student researchers in his group, or on his own research, or with responsibilities for the Department, CLAS, and College of Medicine (his secondary faculty appointment). He will generally leave notes on his door stating where he is and how to contact him by phone.

Student drop-in hours: (held in conference room CB E427, on fourth floor directly above Chemistry Center on second floor)
Based on student responses to instructor’s poll last week, with 16 of 80 student responses - these will be revised as more student responses are received
   Tuesday 3:00-5:00 PM
   Wednesday 4:00-5:30 PM
   Thursday 1:00-2:30 PM
Students are invited to drop by during these hours to discuss questions about the course material or concerns. Prof. Messerle is also available by appointment if you are unable to attend his drop-in hours.

   In prior years that Prof. Messerle has taught this course, many students are either uncomfortable or rusty with Principles of Chemistry topics such as Lewis dot structures, VSEPR, etc. Therefore, Prof. Messerle will use the data from collected questionaires from all students to set up several review sessions, not covering new material, once per week for the early part of the semester in a 4:30-5:30 time slot on a day that accomodates the most students.

Phone: 319-331-6212 (personal cell; use in emergency)

E-mail: (being set up with ITS)@uiowa.edu (please place CHEM3250 in title line); checked three times per week. In emergency, please send your question or concern to lou-messerle@uiowa.edu (please place CHEM3250 in title line)
DEO (Department Executive Officer): Prof. Len MacGillivray, Department of Chemistry administrative office, E331 CB, 319-335-1350; len-macgillivray@uiowa.edu

Course description
Modern principles of ionic and covalent chemical bonding theories, molecular symmetry, solid-state and materials chemistries, inorganic stereochemistry, descriptive and reaction chemistries of the main group and transition metal, lanthanide and actinide elements (depending on remaining class time), modern research areas such as organometallic chemistry, homogeneous and heterogeneous catalysis, bioinorganic and medicinal inorganic chemistries

Learning objectives
This course builds on the brief descriptive chemistry taught in introductory Chemistry courses (such as UI's Principles of Chemistry I and II) to introduce students to the concepts, principles, and fascinating contemporary aspects and utility of non-hydrocarbon molecules. The Periodic Table (greatest cheat sheet in science!), trends in periodicity of various properties of the elements and their ions, bonding, and molecular symmetry will be used as unifying principles for a survey of the structures, stereochemistry, solid-state chemistry, uses, and chemistry of main group elements, transition metals, and, depending on time, lanthanides and actinides. Contemporary areas of research, including organometallic chemistry, catalysis, bioinorganic chemistry, inorganic/organometallic chemistry applied to medicine, materials chemistry, and nanochemistry will be surveyed.

Textbook
The required textbook for this course (also used in Advanced Inorganic Chemistry) is:
"Inorganic Chemistry", fifth edition
Gary L. Miessler, Paul J. Fischer, Donald A. Tarr
Publisher: Pearson Copyright Year: 2014
As this is an ICON Direct course, a digital copy (eText) of the book is available from Pearson as part of ICON Direct Textbooks, and approximately $32.55 will be charged to your uBill. The eText allows you to have the textbook with you anywhere that you go digitally. If you wish to opt out, the physical textbook is $327.50; you may find it less expensive from other vendors.

Opt-out option for ICON Direct electronic materials
In order for the University of Iowa to maintain compliance with HEA funding rules in the Code of Federal Regulations, an opt-out mechanism for course fee-funded electronic course materials is provided. Our course has one ICON Direct eText.
By choosing to opt-out of the ICON Direct listing, you will no longer have access to ANY electronic materials provided there.
Please consider that if you choose to opt-out, you will not have eText access. As some homework will come from end-of-chapter questions, opting-out could lower the grade that you could obtain in this course; Prof. Messerle strongly recommends that you do not opt-out. Access to the eText is less expensive, through UI-publisher negotiated course fee, than as a stand-alone product.
After reading the above description, if you still wish to opt out, you can find instructions on how to do so in the Chemistry Center. The opt-out period ends on the last add/drop date of the semester at 6:00 PM. If you have opted-out by mistake, please use the same instructions in our ICON course to opt-back in before that deadline. You cannot change your decision after that date.
**Course reserves**: Optional textbooks will be on reserve at the Science Library. An interesting and fun autobiographical paperback of a budding young chemist in WW II Great Britain, the late Oliver Sacks MD, a famous neurologist, naturalist, and author, of relevance to all chemists and experimental scientists; highly recommended for leisure reading (not for this course): Oliver Sacks, “Uncle Tungsten”, 2001, Knopf

**Recommended molecular models**: Molecular models can help you understand and visualize three-dimensional molecules, their various isomers, and molecular symmetries. A molecular model kit as used in organic chemistry doesn’t cover the more interesting, diverse structures and isomers found in inorganic and organometallic compounds. An inexpensive framework molecular model set (Darling Models), supplemented with additional parts recommended by Prof. Messerle for greater versatility, is better for constructing models of inorganic molecules with their far-greater structural/ geometrical diversity than organic molecules. Contact the Alpha Chi Sigma (AXE) local Chemistry and allied sciences fraternity to order this kit and additional parts; approximate cost for the set plus extra parts is $35-40. If Prof. Messerle can arrange this, AXE will have a table outside of the Chemistry Center during the early part of the semester.

**Academic Honesty and Misconduct**
All students in CLAS courses are expected to abide by the [CLAS Code of Academic Honesty](#). Undergraduate academic misconduct must be reported by instructors to CLAS according to [these procedures](#).

General discussion with classmates on the concepts in problem set homework exercises is encouraged, but all problem set submissions must be independent work and in your own words. In-class quizzes and exams will be closed book and notes.

**Student complaints**
Prof. Messerle strongly encourages you to first meet with him with your concerns about course aspects, lectures, or assignments, and he will make adjustments as appropriate, possible, and fair to all students. You can file complaints and appeals regarding the course and instructor with the Departmental Executive Officer (DEO, Prof. Len MacGillivray) at the Department of Chemistry administrative office, Room E331 CB (319-335-1350). Students should then contact [CLAS Undergraduate Programs](#) for support when the matter is not resolved at the previous levels.

**Drop deadline for this course**
You may drop an individual course before the deadline; after this deadline you will need collegiate approval. You can look up the drop deadline for this course here. When you drop a course, a “W” will appear on your transcript. The mark of “W” is a neutral mark that does not affect your GPA. Directions for adding or dropping a course and other registration changes can be found on the [Registrar’s website](#). Undergraduate students can find policies on dropping and withdrawing here.

**Grading system and the use of +/-**
Final grades will be awarded based approximately on the following ranges, as recommended by CLAS for an intermediate-level class with an average course GPA = 2.63, normalized to 100% for the total number of points on all assignments and exams:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>A+</td>
<td>18%</td>
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<tr>
<td>A</td>
<td>9%</td>
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<tr>
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<td>B+</td>
<td>20%</td>
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<td>C+</td>
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<td>E</td>
<td>10%</td>
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</tbody>
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A mark of “W” is a neutral mark that does not affect your GPA. The GPA for the total number of points on all assignments and exams is 2.63. Normalized to 100%, the following ranges apply:

- A+ 98-100
- A 93-97
- A- 90-92
- B+ 87-89
- B 83-86
- B- 80-82
- C+ 77-79
- C 73-76
- C- 70-72
- D+ 67-69
- D 63-66
- D- 60-62
- F 59-100
Course grades
Final course grades will be assessed based on your performance in the following activities:

- One midterm exam, Thursday March 9 (in class) 20%
- Final exam (comprehensive; date and room announced by Registrar) 40%
- Homework assignments 25%
- In-class quizzes, class participation 15%

Graded exams, after they have been scanned, may be picked up at the Chemistry Center.

Make-up quizzes and exams will be given for documented (for fairness to other students) cases of illness, family emergencies, mandatory religious obligations, military service, and authorized University activities (e.g., participation in intercollegiate sports, when accompanied by a request from the Athletics Department). Please contact Prof. Messerle by email at the course email address before the missed work or exam.

Any questions about grades and scores received for exams and assignments should be directed first to Prof. Messerle. Federal privacy rules mandate that your scores and grades cannot be posted publicly. General class grade distributions will be posted as soon as feasible on the ICON web site after each exam, quiz, and homework assignment, and individual cumulative scores and an estimated midterm grade may be obtained directly from Prof. Messerle.

Quizzes: To ensure that students are completing the course readings and understanding the material, regular quizzes, covering assigned readings and administered on ICON Quizzes, will be given at roughly three-week intervals. They will evaluate key information presented in the course readings for the time covered by the quiz. The dates of quizzes will not be announced.

Regular and prompt attendance is mandatory for this course. Since a substantial percentage of your grade will be based on class attendance and quizzes/participation (15%), it is in your interest to attend every class and to arrive with significant contributions to make to discussions.

Exams: Two exams, a midterm exam on Thursday March 9 and a comprehensive final exam (date, time, and room provided by Registrar later this semester), worth twice the number of points, will be given. The midterm exam will cover material from approximately the first half of the course, up to and including material presented in class on March 2, including information presented in lecture and the assigned readings. The exams will test student’s knowledge of basic concepts, terms, and general trends discussed in the course. Suggested study techniques for the exam are for the student to complete all the assigned readings for the exam and then to use course notes, readings, and PowerPoint slides to be sure that they are familiar with all the terms and concepts outlined on the study guide.

Date and time of the Final Exam
The final examination date and time will be announced by the Registrar generally by the fifth week of classes, and it will be announced on the course ICON site once it is known. Do not plan your end of the semester travel plans until the final exam schedule is made public. It is your responsibility to know the date, time, and place of the final exam. According to the Registrar's final exam policy, students have a maximum of two weeks after the announced final exam schedule to request a change if an exam conflict exists or if a student has more than two exams in one day (see the policy here).
Tentative lecture and exam schedule (subject to change in order to accommodate student questions in class and book chapters):
Tuesday January 17    course overview, definitions of inorganic chemistry
Thursday January 19   relationships to other branches of chemistry; applications of inorganic chemistry; molecular and electronic structures, 
Tuesday January 24    electronic structure, MO theory, chemical bonding
Thursday January 26   heteronuclear diatomic, polyatomic MO bonding
Tuesday January 31    polyatomics
Thursday February 2    point group symmetry
Tuesday February 7    point group symmetry
Thursday February 9    point group symmetry
Tuesday February 14   point group symmetry
Thursday February 16   acid-base chemistry
Tuesday February 21   acid-base chemistry
Thursday February 23   donor-acceptor chemistry
Tuesday February 28   donor-acceptor chemistry
Thursday March 2      experimental methods
Tuesday March 7       hydrogen, and where it should be placed in Periodic Table
Thursday March 9      Midterm Exam (covers up to/inclusive of March 2 lecture)

SPRING BREAK (March 11-19)
Tuesday March 21     s-block elements
Thursday March 23    p-block elements
Tuesday March 28     p-block elements
Thursday March 30    p-block elements; ligands
Tuesday April 4      transition metal electronic, periodic properties
Thursday April 6     crystal field and ligand field theories, high spin vs low spin, magnetism, angular overlap model for understanding metal-ligand bonding
Tuesday April 11     transition metal chemistry: first period
Thursday April 13    transition metal chemistry: second, third periods
Tuesday April 18     inorganic reaction mechanisms
Thursday April 20    main group, transition metal organometallic chemistries
Tuesday April 25     transition metal organometallic chemistry, homogeneous and heterogeneous catalysis
Thursday April 27    solid-state, material, and nanomaterial chemistries
Tuesday May 2        bioinorganic chemistry: metalloenzymes, transport proteins; inorganic chemistry in medicine: diagnostics, therapeutics
Thursday May 4       lanthanide and actinide chemistries
Friday May 5         close of classes

Review sessions: mutually convenient days and times during final week of class and/or during final exam period, depending on date of final exam, and not overlapping with other Chemistry exams

FINAL EXAM: day, time, and room determined by Registrar at a later date
**Miscellaneous**

Please feel free to discuss with Prof. Messerle any aspect of the course that is of concern or causing you difficulties. DON’T HESITATE to come to office hours to ask questions that are not covered during class. My office hours are designed to help YOU! If you require course adaptations or accommodations because of a recognized disability, please contact Prof. Messerle, who will make every effort to accommodate your needs.

Please write down notes on either paper, PDF printouts, or tablets. Notes from ICON will have **missing info that must be added by you during class**. Cell phones MUST be put into silent mode and stored in your pocket, purse, backpack, or other belongings. This rule is for the sole purpose of keeping you engaged during class, helping you to be an active note taker, and not disturbing other students. The only exception to cell phone use, to be announced at certain times by Prof. Messerle, is for recording video of a classroom demonstration for your own use or, if worthwhile, posting on social media if you wish.

**Course administration**

Please go to the Chemistry Center, E225 CB, for drop/add signatures, submission of exam excuse forms, dropping off homework by due date, and scheduling of make-up exams.

M–F, 8:00 AM-12:00, 1:00-5:00 PM (F, 4:30 PM).
Manager: Trent Tappan (319-335-1341, trent-tappan@uiowa.edu)
College of Liberal Arts and Sciences (CLAS) Course Policies

**Attendance and Absences**
Class attendance is expected, and as required by the Registrar in the first few weeks of the class start date, Prof. Messerle will take attendance. For class absences, please use the CLAS absence form on ICON under Student Tools. Make-up quizzes and exams will be given for documented (in fairness to other students) cases of illness, family emergencies, mandatory religious obligations, military service, and authorized University activities (e.g., participation in intercollegiate sports, when accompanied by a request from the Athletics Department). Please contact Prof. Messerle by email at the course email address before the missed work or exam. University regulations require that students be allowed to make up examinations which have been missed due to illness or other unavoidable circumstances. Students with mandatory religious or military obligations or UI authorized activities must discuss their absences with Prof. Messerle as soon as possible. Religious obligations must be communicated within the first three weeks of classes.

**Exam Policies**
In-class quizzes and exams will be closed book and notes.

**Communication: UI Email**
Students are responsible for all official correspondences sent to their UI email address (uiowa.edu) and must use this address for any communication with instructors or staff in the UI community.

**Other Expectations of Student Performance**
Students have the fundamental right to a distraction-free learning environment. In general, instructors expect civil behavior and can administer reprimands, including expulsion of the offending student from the classroom, for any disturbances of the class, especially use of technology that can distract those students sitting by the user. When disruptive activity occurs, Prof. Messerle has authority to change classroom seating or request that a student exit the classroom immediately for the remainder of the class period. One-day suspensions are reported to Department, College, and Student Services personnel (Office of the VP for Student Services and Dean of Students).

Students are expected to help each other learn and to contribute overall to the learning environment of the course. Arriving prepared for class is part of this expectation.

**Where to Get Help**
https://tutor.uiowa.edu/

**University Policies (links)**
- [Accommodations for Students with Disabilities](#)
- [Basic Needs and Support for Students](#)
- [Classroom Expectations](#)
- [Exam Make-up Owing to Absence](#)
- [Free Speech and Expression](#)
- [Mental Health](#)
- [Military Service Obligations](#)
- [Non-discrimination](#)
- [Religious Holy Days](#)
- [Sexual Harassment/Misconduct and Supportive Measures](#)
- [Sharing of Class Recordings](#)