

**East Tennessee State University**  
**Descriptive Inorganic Chemistry (CHEM 3110-001)**  
**Fall 2018, 9:45 a.m. – 11:05 a.m. TR, 364 Brown Hall**

Professor: Dr. Catherine McCusker  
Telephone: 423-439-4306  
Office hours: T 11:30 am – 12:30 pm  
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Other times available by appointment

**Course Description & Objectives:**

This course is designed to give an introduction to the concepts of electronic structure, bonding, and reactivity in inorganic chemistry. The field is too vast to comprehensively cover every aspect in a single semester, so this class will offer a qualitative overview of inorganic chemistry. Reading and understanding scientific literature is an important skill for any scientist to have, whether you move on to grad school, professional school, or the job market, so relevant literature articles will be incorporated into the class. Over the course of the semester you will also work to develop your scientific communication skills through both reading and writing assignments.

*The objectives for this course are for students to:*

- Identify the chemical principles behind facts and trends learned in general chemistry.
- Use this understanding to predict and explain new chemical phenomena.
- Gain an overview of different areas of inorganic chemistry
- Learn to read and understand primary scientific literature
- Practice effective scientific communication through both reading and writing.

**Prerequisites:**

CHEM 1120/CHEM 1121

**D2L Site:**

A Desire2Learn (D2L) site (<http://elearn.etsu.edu>) for this course is available. All reading assignments, homework assignments, handouts, etc. will be posted to the site.

**Text:**

Catherine E. Housecroft and Alan G. Sharpe, *Inorganic Chemistry*, 4<sup>th</sup> ed.  
ISBN: 978-027374275.

**Additional Materials:**

- Resources such as additional study questions and 3D rotatable molecule structures can be found on the publisher's website. ([http://wps.pearsoned.co.uk/ema\\_uk\\_he\\_housecroft\\_inorgchem\\_4/](http://wps.pearsoned.co.uk/ema_uk_he_housecroft_inorgchem_4/)).
- An introductory inorganic chemistry wikibook, written by Penn State students, can be found here: [https://en.wikibooks.org/wiki/Introduction\\_to\\_Inorganic\\_Chemistry](https://en.wikibooks.org/wiki/Introduction_to_Inorganic_Chemistry)
- Non-programmable scientific calculator

## Course Policies:

- *Attendance* – Attendance for this lecture is not mandatory, but highly recommended. You will be responsible for all material covered during every lecture, regardless of whether it is covered in the assigned readings or homework. You will not be able to make up quizzes missed due to a late arrival or unexcused absence.
- *Classroom* – Be respectful of your fellow students and keep your phones and other electronic devices put away during class unless they are being used for note taking or other classwork. Disruptive behavior during class will result in a warning the first time and by dismissal for the remainder of the class period the second time (please refer to the college catalog for the classroom misconduct policy). **No electronic devices other than non-programmable calculators are allowed during exams.**
- *Make up Policy* – There is **NO** make-up of quizzes and exams for unexcused absences. For an excused absence due to University sponsored event, illness, or other documented reason, the grade for a missed quiz will be replaced by an average of the student's other quiz grades at the end of the semester. For exams, a student participating in a University sponsored event will be responsible for scheduling a time to take the exam early. In the case of unexpected absences, the student is responsible for notifying the professor as soon as possible and arranging a time to take the exam within one week of the scheduled exam time. For all excused absences, the student is responsible for providing documentation. For scheduled events this documentation must be provided two weeks before the absence and for unscheduled absences this documentation must be provided within one week of the absence
- *Academic Integrity* – Cheating in class is a serious offence and will not be tolerated. As stated on the ETSU website: *“Plagiarism, cheating, and other forms of academic dishonesty are prohibited. Students guilty of academic misconduct, either directly or indirectly through participation or assistance, are immediately responsible to the instructor of the class. In addition to other possible disciplinary sanctions which may be imposed through the university’s academic misconduct policy as a result of academic misconduct, the instructor has the authority to assign an “F” or a zero (“0”) for the exercise or examination, or to assign an “F” in the course..”* All students should read the chemistry department’s full academic integrity policy posted on D2L.
- *Disability Accommodations* – It is the policy of ETSU to accommodate students with disabilities, pursuant to federal law, state law and the University’s commitment to equal educational access. Any student with a disability who needs accommodations, for example arrangement for examinations or seating placement, should inform the instructor at the beginning of the course. Faculty accommodation forms are provided to students through Disability Services in the D.P.Culp center, telephone 439-8346.
- *Mental Health* – Students often have questions about mental health resources, whether for themselves or a friend or family member. There are many resources available on the ETSU Campus, including:
  - ETSU Counseling Center (423) 439-3333
  - ETSU Behavioral Health & Wellness Clinic (423) 439-7777
  - ETSU Community Clinic: (423) 439-4187.
  - **If you or a friend are in immediate crisis, call 911.**
  - Available 24 hours per day is the National Suicide Prevention Lifeline: 1-800-273-TALK (8255).

## Assignments and Grading:

### *Reading Assignments:*

The reading assignments are designed to provide important background information and prepare you for the day's lecture topic. The schedule of lecture topics and their associated reading assignments will be posted on D2L. It is expected that you will have completed the assigned readings before lecture.

### *Exams:*

*55% of total grade*

There will be three exams during the semester (150 points each). These exams will be mainly focused on applying the concepts discussed in lecture to solving problems. The final exam will have two components: A cumulative take-home exam (100 points) and the ACS final exam (100 points) during the scheduled final exam period. Grades on the ACS final will be scaled so that the highest grade in the class is an A.

### *In-class Activities:*

*15% of total grade*

In-class activities may include, but are not limited to, in class or group problem sets and projects, class discussions, and presentations. These activities may require preparation before class. Your grade will be based on your active participation in group work, scores on assignments, presence and participation in class discussions, and/or attentiveness during presentations and participation in the question session after presentations.

### *Critical Book Review:*

*10% of total grade*

Over the course of the semester you will choose and read a non-fiction book on a chemistry or chemistry-related topic, written for a general audience. After reading the book, you will write a critical review of the book including summary of the book's content, an analysis of the book's strengths and weaknesses, including the book's appropriateness for an audience without a science background, and your opinion of the book. All book choices must be approved, and any book may be chosen only once. More details, including a list of suggested books, will be posted to D2L.

### *Quizzes:*

*10% of total grade*

All quizzes will be unannounced and will be given in the first 10-15 minutes of lecture. Quizzes will cover the assigned reading material, previous homework or exam questions, or review a concept discussed in a previous lecture. Completion of surveys during the semester will also count for one quiz grade. Because everyone has a bad day now and then, the lowest quiz score will be dropped at the end of the semester.

### *Homework Assignments:*

*10% of total grade*

Homework assignments will be a combination of problems from the textbook and "exam-style" problems aimed at helping you apply the concepts discussed in lecture. You are encouraged to work with other students to better understand the material, but every student is expected to hand in their own original work. Homework submitted within 48 hours after the due date will be given up to 50% credit. In the case of an excused absence, homework submitted within 48 hours of the due date will be accepted with no grade penalty. Answer keys will be provided 48 hours after the homework due date and no credit will be given for homework submitted after the answer key is provided.

## Exam Dates:

September 20

October 25

December 4

December 13 (**ACS Final Exam: 8-10 am**)

## Grading:

Your grade in the class will be determined by the overall percentage of total points you earn, weighted as described above. At the end of the semester a scaling factor will be applied (if necessary) to ensure the highest grades in the class are A's. For borderline scores, positive factors such as regular class attendance, asking and answering questions in class, or seeking extra help as needed will also be considered when assigning a letter grade

A = 90 – 100%

B<sup>+</sup> = 82 – 85.5%

C<sup>+</sup> = 70 – 73.5%

D<sup>+</sup> = 58 – 61.5%

A<sup>-</sup> = 86 – 89.5%

B = 78 – 81.5%

C = 66 – 69.5%

D = 54 -57.5%

B<sup>-</sup> = 74 – 77.5%

C<sup>-</sup> = 62 – 65.5%

F = <53.5%

## Course Outline:

Our textbook covers many aspects of inorganic chemistry in great detail. Due to time limitations, we will only cover selected sections and topics from the textbook. The class will roughly be divided into three sections as shown below. A detailed course schedule will be posted to D2L.

### ***Atomic and Molecular Structure and Bonding***

- Chapter 1: Basic Concepts: Atoms
- Chapter 2: Basic Concepts: Molecules
- Chapter 3: Introduction to Molecular Symmetry
- Chapter 5: Bonding in Polyatomic Molecules
- Chapter 6: Structures and Energetics of Metallic and Ionic Solids

### ***Main Group Chemistry and Reactivity***

- Chapter 7: Acids, Bases, and Ions in Aqueous Solutions
- Chapter 8: Reduction and Oxidation
- Chapter 9: Non-Aqueous Media

### ***Transition Metal Bonding and Reactivity***

- Chapter 19: d-Block Metal Chemistry: General Considerations
- Chapter 20: d-Block Metal Chemistry: Coordination Complexes
- Chapter 21: d-Block Metal Chemistry: The First Row Metals
- Chapter 22: d-Block Metal Chemistry: The Heavier Metals
- Chapter 24: Organometallic Compounds of d-Block Elements
- Chapter 26: d-Block Metal Complexes: Reaction Mechanisms
- Chapter 29: The Trace Metals of Life