

**Intermediate Inorganic Chemistry**  
**Chem 3360, Fall 2015**

**Lecture (Laney 101): T and Th 8:00 am – 9:15 am**

**Instructor:** Lei Yang  
Office: Laney Hall 203B  
Phone: 501-852-0711  
Email: lyang@uca.edu

**Office hours: Wednesday-Friday, 3:00pm-5:00pm**

Use this time. It works best if you come to my office prepared with specific questions about lecture, lab or homework. Other times are available by appointment.

**Text:** *Descriptive Inorganic Chemistry (5<sup>th</sup> Ed.)* by G. Rayner-Canham & T. Overton, Freeman 2010

<b>Grading</b>	<b>points</b>
In-class Problems (20 pts/each)	160
Homework Assignments (17.5 pts/each)	140
Group presentations	200
Three Exams (100 pts/each)	300
Final exam ( <b>Dec. 10th, 8:00-10:00 am</b> )	200
<b>TOTAL POSSIBLE</b>	<b>1000</b>

**Grades: A = 900 – 1000 points**  
**B = 800 – 899.99**  
**C = 700 – 799.99**  
**D = 600 – 699.99**  
**F < 599.99**

**Important Dates**    October 30 (Friday)    Last day to drop a course with a W  
                          November 30 (Monday)    Last day to withdraw with a WP or WF

**Course Description**    Extension of principles of chemical structure, periodicity, and applications of inorganic systems to industrial, environmental, and biochemical processes. Three hours of lecture per week. Counts towards the non-ACS chemistry major or a general science major; counts as core inorganic in the ACS-certified biochemistry major. Elective option for the ACS-certified chemistry BS degree: Standard Track. **Prereq: At least a C in CHEM 1451.**

**YouTube channel and in-class problem practice**    Videos will be uploaded to YouTube channel. These videos are either some review topics from College Chemistry II or interesting reactions regarding elements/chemicals. I will remind you to watch the videos before we start the discussion. We will have total seven in-class problem activities (20 pts/each) based on these videos and we work **in small groups. After you finish, turn the group work to me before you leave the class to get credit.** The slides in these videos can also be found in lecture notes.

1. Quantum number (Chapter 1)
2. Lewis structure and VSEPR theory (Chapter 3)
3. Acid and base theories (Chapter 7)
4. Oxidation states (Chapter 8)
5. Water (Chapter 10)
6. Magnesium (Chapter 12)

7. CO, CN<sup>-</sup> and CO<sub>2</sub> (Chapter 14)

8. The Martian (book) (Chapter 15)

**Username:** [chem3360@gmail.com](mailto:chem3360@gmail.com)

**Password:** Inorganic

Course Objectives	Survey the physical and chemical properties of the elements and describe these trends using the laws of periodicity. Use tools from general chemistry—atomic structure, electron configurations, Lewis dot/VSEPR, Lewis acids/bases, thermodynamics ( $K_{eq}$ , $\Delta G$ , $E$ ), and oxidation numbers—to understand the periodic chemistry of the elements. Use the chemistry of representative elements to understand important industrial, biological, and environmental processes.
Exams	<b>Exams (one hour)</b> dates are posted on the syllabus. Plan your schedule accordingly. These dates will not be changed unless any emergency happens. These timed exams typically consist of short answer questions and questions requiring numerical work. The one hour exam can NOT be dropped.
Homework Assignment	Homework problems to work and develop your mastery of material discussed in lecture and the text are posted online. Your success on timed exams is directly related to the effort you spend working and <i>understanding</i> all of these problems.
Group Presentation	From chapter 11 to 19, each group will make a group presentation about “Element/Molecule of the Chapter”. It is a 15 minutes PowerPoint presentation (10 minutes talk and 5 minutes questions). The presentation will be worth 200 points (20 % of your grade). The materials in group presentations will be covered in one-hour exams and final exams.

**Guidelines:**

1. Ten molecules/chemicals will be assigned to each group in the first class. According to our schedule, the first presentation would be around **Sep. 24**.
2. When you prepare your presentation, feel free to discuss with me anytime you want. Students are highly encouraged to show me the draft of slides **ONE WEEK** before your presentation so I can provide suggestions.
3. Suggested content: Structure, physical and chemical properties, synthesis, environmental impact, and practical applications. You don't have to follow my suggestions. Be creative! You can also add any interesting/cool things you like.
4. The caption of figures and tables should be clearly presented. The sources of the pictures, articles and academic manuscripts should be cited. The citation of manuscripts should follow this format:  
Taki, M.; Akaoka, K.; Iyoshi, S.; Yamamoto, Y. *Inorg. Chem.* **2012**, *51*, 13075

**Grading:**

The students and instructor will give grades (out of 200) for the presentation based on the following grading rubric. The highest and lowest grades will be dropped and the average value will be the final grade of the presentation.

**Grading rubric:**

1. **Chemistry content – 20 points** (goes beyond material covered in book and

lecture; contains relevant structures, properties, reactions, mechanisms and explanations)

**2. Context/background/relevance/interest – 15 points**

(background/purpose/context of presentation is clear; material is relevant and designed to evoke interest).

**3. Visual – 15 points** (good use of figures, pictures, models, videos etc.)

**4. Speaking – 15 points** (clarity, *not reading from notes*)

**5. Organization – 10 points** (flows logically in an understandable fashion; transitions clear, not too short or too long)

**6. References – 10 points** (material is taken from sources other than text; all references cited properly; quality of sources will be taking into account)

**7. Question and answer – 15 points** (questions answered; knowledgeable)

**Grading policies:**

1. The total credit for the presentation project is 200 pts. It contains two parts:

**Part 1: Your presentation graded by the audience (total 100 pts)**

The presentation from each group will be graded by other students and the instructor based on the grading rubric (see above). The highest and lowest grades will be dropped and the average value will be the final grade of the part 1 (out of 100).

**Part 2: Your constructive comments/feedback for other groups (total 100 pts)**

The instructor will grade your constructive comments/feedback for the other eight groups. Credit won't be awarded for simple comments such as "Great job", "Nice presentation" et al. Each grading sheet with constructive comments/feedback is 100 pts/9 = 11.11 pts. You will give constructive comments/feedback for at least **THREE** criteria to get the total 11.11 pts. Extra credit will be awarded for extra constructive comments/feedback in more criteria (2 pts/each criterion, up to 4 pts/per presentation).

2. The grading sheets with constructive comments/feedback will be returned to the group after the presentation. **The names of the graders will be erased by sharpie so they are anonymous to the speakers.**

**Element/Molecule of the Chapter:**

Chapter 11: Lithium in lithium battery

Chapter 12: Magnesium-containing chlorophyll

Chapter 13: Gallium (Ga) in LED

Chapter 14: Tetraethyllead

Chapter 15: Hydroxylapatite ( $\text{Ca}_5(\text{PO}_4)_3(\text{OH})$ ) and bone

Chapter 16: Ozone ( $\text{O}_3$ )

Chapter 17: Phosgene ( $\text{COCl}_2$ )

Chapter 18: Radon (Rn)

Chapter 19: Ferrocene

Chapter 19: Cisplatin

## **Policies 1. Attendance**

People who miss classes typically do poorly in this course. Do not be one of these people. **Three unexcused absences** will result in a WF grade. It is the student's responsibility to obtain information covered during an absence.

## **2. Office Hours**

This time is specifically set aside for you to ask me questions and receive help on course material. Use this time! If you cannot make the scheduled times, make another arrangement with me.

## **3. Makeups**

If student missed homework assignment or in-class problem due to family or medical emergency, make-up will be offered when proper documents with signature are provided. The points for any one-hour exam missed increases the value of the final exam by the appropriate percentage if proper documents are provided (medical note, etc.). **There will be no make-up one-hour exams.**

## **4. Regrade**

All regrade requests on exams, homework and in-class assignments should be made to the instructor within two weeks after the grades are posted on Blackboard. When inquiring about a possible regrade, please do NOT make any marks on the item in question.

## **5. Academic Integrity Statement:**

The University of Central Arkansas affirms its commitment to academic integrity and expects all members of the university community to accept shared responsibility for maintaining academic integrity. Students in this course are subject to the provisions of the university's Academic Integrity Policy, approved by the Board of Trustees as Board Policy No 709 on February 10, 2010, and published in the Student Handbook. Penalties for academic misconduct in this course may include a failing grade on an assignment, a failing grade in the course, or any other course-related sanction the instructor determines to be appropriate. Continued enrollment in this course affirms a student's acceptance of this university policy.

## **6. Disabilities Act Statement:**

The University of Central Arkansas adheres to the requirements of the Americans with Disabilities Act. If you need an accommodation under this Act due to a disability, please contact the UCA Office of Disability Services, 450-3613.

**7. Building Emergency Plan Statement:** An Emergency Procedures Summary (EPS) for the building in which this class is held will be discussed during the first week of this course. EPS documents for most buildings on campus are available at <http://uca.edu/mysafety/bep/>. Every student should be familiar with emergency procedures for any campus building in which he/she spends time for classes or other purposes.

## **8. Title IX Disclosure**

If a student discloses an act of sexual harassment, discrimination, assault, or other sexual misconduct to a faculty member (as it relates to "student-on-student" or "employee-on-student"), the faculty member cannot maintain complete confidentiality and is required to report the act and may be required to reveal the names of the parties involved. Any allegations made by a student may or may not trigger an investigation. Each situation differs and the obligation to conduct an investigation will depend on those specific sets of circumstances. The determination to conduct an investigation will be made by the Title IX Coordinator. For further information, please visit: <https://uca.edu/titleix>.

### Tentative Lecture and Exam Schedule

Date	Topic	Assigned reading
Aug 20 (Th)	Atomic structure, electronic configuration, orbitals	Chapter 1
Aug 25 (T)		
Aug 27 (Th)	Periodic trends	Chapter 2 and 9
Sep 1 (T)	Bonding theory	Chapter 3
Sep 3 (Th)		
Sep 8 (T)	Thermodynamics, acid/base	Chapter 6 and 7
Sep 10 (Th)	Oxidation #, balance redox reaction, Echem	Chapter 8
Sep 15 (T)	<b>Exam 1 (one hour)</b>	
Sep 17 (Th)	Hydrogen	Chapter 10
Sep 22 (T)		
Sep 24 (Th)	Group 1, Li family	Chapter 11
Sep 29 (T)	Group 2, Be family	Chapter 12
Oct 1 (Th)		
Oct 6 (T)	Group 13, B family	Chapter 13
Oct 8 (Th)	<b>Exam 2 (one hour)</b>	
Oct 13 (T)	Group 14, C family	Chapter 14
Oct 15 (Th)		
Oct 20 (T)	Group 15, N family	Chapter 15
Oct 22 (Th)	<b>FALL BREAK</b>	
Oct 27 (T)		
Oct 29 (Th)		
Nov 3 (T)	Group 16, O family	Chapter 16
Nov 5 (Th)		
Nov 10 (T)	<b>Exam 3 (one hour)</b>	
Nov 12 (Th)	Group 17, F family	Chapter 17
Nov 17 (T)	Group 18, He family	Chapter 18
Nov 19 (Th)	Transition metal complex	Chapter 19
Nov 24 (T)		
Nov 26 (Th)	<b>THANKSGIVING BREAK</b>	
Dec 1 (T)		
Dec 3 (Th)		
Dec 10 (Th)	<b>8:00am-10:00am Comprehensive Final Exam</b>	