

Chemistry 420 – Inorganic Chemistry
Fall 2021
Days: MWF
Time: 10:10 – 11:05
Room: Chemistry 221

Instructor: Dr. Matthew Cranswick
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Study Hours: M/Th 3:30 – 4:30
 T/W 1:25 – 2:20
 Or by appointment

Course Description:

Discussion and applications of inorganic chemistry, including: Atomic theory and periodicity, bond theory, symmetry, thermodynamics of inorganic reactions, coordination chemistry and physical methods.

Prerequisites: CHEM122 (“C” or better) or equivalent. (CHEM301 is recommended)

Student Learning Outcomes (SLOs taken from Course Catalog):

- Understand the concept of and be able to apply the scientific method to problem solution;
- Understand classifications of chemical compounds, general reaction types and quantitative aspects of stoichiometry as applied to chemical reactions;
- Apply basic knowledge of related fields such as mathematics and physics to problem solving, methods of analysis and use numerical data in the chemical sciences;
- Read, think and write critically and review current literature in the chemical sciences; and
- Exhibit a comprehensive knowledge of the fundamental theories, concepts and skills necessary in the chemical sciences.

Course Materials:

- **Text:** Weller et al, 6th or 7th edition, (ISBN: 978-0-19-964182-6), hardcopy available at CSUP Bookstore (\$175.25 new) or 180-day digital rental through VitalSource (\$66.70).
- Non-programmable scientific calculator
- Model kit (optional)

Credit hours and expected student effort:

This is a three credit lecture. This means that we meet for three hours a week and you may need to spend two to three times this amount of time outside of class to keep up with the course materials. Studying this amount of time does not guarantee a grade of C or better, and the amount of time needed to be successful in the course is student dependent.

Grading:

15% Knowledge checks	90 – 100% “A”
25% Homework	80 – 89% “B”
30% Exams (10% each)	70 – 79% “C”
20% Final exam	60 – 69% “D”
10% Participation	< 60% “F”
<hr/> 100%	

Attendance:

Attendance is optional, but highly recommended as participation counts toward 10% of your final grade. ***Although there are currently no COVID-19 restrictions on campus, it is still in your best interest to wear a mask and practice social distancing.*** This will help ensure that this course remains an in-person course. Please adhere to the Centers for Disease Control and Prevention (CDC) guidelines toward COVID-19, especially when dealing with COVID-19 exposure and/or infection. The instructor reserves the right to move the course to synchronous on-line if students and/or the instructor feel at risk due to behaviors exhibited in class and/or local COVID-19 prevalence.

All courses and delivery modes are required to verify student attendance or participation in the first two weeks for No Show reporting. This includes at least one Blackboard login for online courses or students participating remotely.

Final Exam:

The final exam is cumulative and will be held on Monday, December 6th from 10:30 am – 12:50 pm. The final exam may be a standardized American Chemical Society exam or an exam written by the instructor (most likely the former). The final exam format (“in-class” or take home) will be determined prior to finals week, and will count towards 20% of your final grade.

Exams:

Four “in-class” and/or take-home exams will be given during the semester (see schedule below for dates). Three of these exams will count toward 30% of your final grade, as your lowest exam score will be dropped. The exams will be cumulative and cover the material in the book and presented in class. Make-up exams will only be given if you notify me ***prior*** to your absence and the exam must be taken within three days of the scheduled exam date.

Homework:

Homework constitutes 25% of your final grade. Assigned homework will be due at the beginning of the specified class and must consist of completely shown work to receive full credit. **You will be allowed two homework extensions during the semester.** The homework will be due two days after the due date at 5 pm. Late homework will be penalized 50% of the total score for each day it is late – any time after the due date and time is considered a day.

If the course moves on-line, then all homework should be submitted through Blackboard as a .docx or .xlsx file (when applicable). No other file types will be accepted.

Knowledge Checks:

Knowledge checks will be given weekly, either during lecture or posted to Blackboard. These quizzes will count toward 15% of your final grade and will be over the previous week's material.

Diversity Statement

At Colorado State University Pueblo, diversity is more than a symbolic gesture. We value and embrace students from all identities and are committed to the academic success of each student. The University is committed to building a community on and off campus that is supportive and that respects and welcomes diversity. We understand that diversity and inclusion is a critical element necessary to develop an intellectual community characteristic of diverse ideals, beliefs, backgrounds, political conviction, religious belief, gender identity and sexual preference, race and ethnicity, and so much more.

As a University we seek to improve campus climate by positively impacting our campus community through the facilitation of a shared learning experience that engage our campus in dialogue, challenge barriers, build collaborative relationships, and provide educational opportunities. Which enable our campus community to explore all dimensions of diversity and the intersections of identity that they explore.

As a Hispanic Serving institution (HSI) Colorado State University Pueblo will produce an environment to develop positive, challenging, inclusive leaders who have a global understanding of multiculturalism and who are accountable to our society as a whole.

Blackboard:

I will use Blackboard throughout the semester to post the syllabus, class notes, homework, and any necessary announcements. It is **your** responsibility to check Blackboard for updates.

Electronic Devices and Behavior:

Please do not use electronic devices during class other than for note taking. If your use of an electronic device is deemed distracting to others you will be asked to leave class, and/or you will lose up to 10% of your exam points when final grades are tabulated.

Students will be held to the Code of Conduct in the Student Handbook.

Academic Misconduct:

Any form of cheating that results in students giving or receiving unauthorized assistance in an academic exercise or receiving credit for work which is not their own.

- a. **Cheating:** intentionally using or attempting to use unauthorized materials, information, or study aids in any academic exercise. The term academic exercise includes all forms of work submitted for credit or hours.
- b. **Fabrication:** intentional or unauthorized falsification or invention of any information or citation in an academic exercise; or of documentation meant to excuse or justify adjustments related to attendance or completion of work (exams, exercises, etc.)
- c. **Facilitating Academic Misconduct:** intentionally or knowingly helping or attempting to help another commit academic misconduct.
- d. **Plagiarism:** the deliberate adoption or reproduction of ideas, words, or statements of another person as one's own without acknowledgment.
- e. **Unauthorized Collaboration:** intentionally sharing information or working together in an academic exercise when such actions are not approved by the course instructor

Academic misconduct is a behavioral issue, not an issue of academic performance. As such, it is considered an act of misconduct and is also subject to the University disciplinary process as defined in the CSU-Pueblo Student Code of Conduct Policies and Procedures Manual. Whether or not punitive action has been implemented by the faculty, a report of the infraction should be submitted to the Dean of Student Services and Enrollment Management who may initiate additional disciplinary action. A student may appeal a grade through the Academic Appeals Board. The Dean of Student Services and Enrollment Management's decision may be appealed through the process outlined in the Student Code of Conduct Policies and Procedures Manual.

Accommodations:

If you have a documented disability that may impact your work in this class and for which you may require accommodations, please see the Disability Resource & Support Center (DRSC) as soon as possible to arrange services. The DRSC is located in LARC 169, and can be reached by phone (719-549-2648) and email (dro@csupueblo.edu).

Mandatory Reporting:

Colorado State University-Pueblo is committed to maintaining respectful, safe, and nonthreatening educational, working, and living environments. As part of this commitment, and in order to comply with federal law, the University has adopted a Policy on Discrimination, Protected Class Harassment, Sexual Misconduct, Intimate Partner Violence, Stalking, & Retaliation. You can find information regarding this policy, how to report violations of this policy, and resources available to you, on the Office of Institutional Equity's website (www.csupueblo.edu/institutional-equity).

Please familiarize yourself with the reporting requirements of this policy. Because I am a faculty member, I am a "Responsible Employee." That means I have to report to the Director of the Office of Institutional Equity if you tell me that you were subjected to, or engaged in, of any of the following acts: *discrimination, protected class harassment, sexual misconduct, intimate partner violence, stalking, and retaliation*.

Early Performance Survey:

This course participates in the Starfish student success program. Early in the semester, information about student performance in this class will be communicated to each student by email and/or text from Starfish. Attention to suggested actions is encouraged. This information is also available to academic advisors and others involved in supporting student success. Your advisor may then ask to meet with you to discuss your plans for success. The program is designed to promote success among students through proactive advising, and through referral to appropriate resources. Efforts to inform and assist students continues throughout the semester with a mid-semester survey, and instructor concerns or kudos can be posted to Starfish at any time.

Being successful in this class:

1. Attend class.
2. Keep up on the material. This includes reading the chapters and completing the homework on time. Do not procrastinate! We will cover a lot of material in a short amount of time, especially with regards to CHEM122. If you don't remember your CHEM122 material, it is your responsibility to review it.
3. **Ask questions, ask questions, ask questions.** If you do not understand something in lecture, do not be afraid to ask a question about it. If it is about

- CHEM122 material, I will be very melodramatic and may or may not answer your question.
4. Visit my office hours to ask for help or discuss topics covered in this course. A ten minute discussion can go a long way towards helping your understanding of the material.
 5. Find peers to study with. Study groups can help you learn the material by discussing it together.
 6. **Math Learning Center (MLC):** The MLC is here to help YOU with your math homework. The MLC will be opening on Monday, August 23rd and will remain open through the last day of finals, Friday, December 10th. The MLC will be closed during fall break. The MLC offers walk-in tutoring in a face-to-face setting Monday-Friday 9:00-3:30. Additional after hours appointments for online tutoring are available Monday-Thursday 5:00pm-7:00pm and Sunday 3:00pm-6:00pm. Appointments can be made at <https://csupueblo.mywconline.com/>. A video overview of utilizing WC Online can be found here: <https://youtu.be/NFtYh1W6Nx8>.
 7. **SCIENCE LEARNING CENTER (SLC):** The SLC is YOUR tutoring center for Biology, Chemistry, and Physics courses! The SLC will be open day one of the semester to support you, and will remain open through Finals Week. The SLC will be open for in-person tutoring (drop in and appointment) Monday-Thursday 9am-4pm and Fridays 9am-3pm, and available for online “after hours” tutoring Monday-Thursday 5-8pm and Sundays 3-6pm. Students are statistically more likely to pass their science classes when they utilize the SLC regularly for support. Students can drop in for tutoring, or make appointments and access online support by logging onto PAWS and accessing the ‘Tutoring’ Portal. The SLC is located in Life Science Room 122, and can be reached by calling 719-549-2652, or by emailing Abby.Davidson@csupueblo.edu
Tutoring appointments can be made at <https://csupueblo.mywconline.com/>. A video overview of utilizing WC Online can be found here: <https://youtu.be/NFtYh1W6Nx8>
 8. Attend study hours, either drop-in or by appointment.

The instructor reserves the right to make changes to the syllabus. Any changes will be announced in class and/or on Blackboard.

Tentative fall 2021 Schedule. This schedule is subject to change without notice.

Week	Dates	Topics
1	08.23 – 08.27	<ul style="list-style-type: none"> • Introduction and syllabus • Chapter 1 – The elements, hydrogenic atoms, many-electron atoms, orbitals
2	08.30 – 09.03	<ul style="list-style-type: none"> • Chapter 1 – The periodic table and atomic properties • Chapter 2 – Valence bond theory and molecular orbital theory
3	09.06 – 09.10	<ul style="list-style-type: none"> • End of drop period (09.07) • Chapter 2 – Molecular orbital theory, bond properties, ΔH_{rxn}, kinetics
4	09.13 – 09.17	<ul style="list-style-type: none"> • Exam 1 (09.16) • Chapter 3 – Symmetry elements and operations, characters and character tables, applications of symmetry
5	09.20 – 09.24	<ul style="list-style-type: none"> • Chapter 3 – Symmetry applications cont'd
6	09.27 – 10.01	<ul style="list-style-type: none"> • Chapter 4 – Crystal systems, coordinates, close packing and holes, metals and alloys
7	10.04 – 10.08	<ul style="list-style-type: none"> • Chapter 4 – Descriptions of ionic solids, lattice enthalpies, defects and nonstoichiometry, band theory
8	10.11 – 10.15	<ul style="list-style-type: none"> • Exam 2 (10.16) • Chapter 5 – Acid-base definitions, Brønsted acids and bases, Lewis acids and bases
9	10.18 – 10.22	<ul style="list-style-type: none"> • Last day to withdraw with "W" (10.23) • Chapter 5 – Hard-soft acid-base theory, nonaqueous solvents, applications of acid-base chemistry
10	10.25 – 10.29	<ul style="list-style-type: none"> • Chapter 6 – Reduction potentials, cell potentials, electrochemical series, reactions in water
11	11.01 – 11.05	<ul style="list-style-type: none"> • Exam 3 (11.04) • Chapter 6 – Redox potential diagrams, chemical extraction of the elements
12	11.08 – 11.12	<ul style="list-style-type: none"> • Chapter 7 – Compound vs. complex, ligands, nomenclature, constitution and geometry, formation constants
13	11.15 – 11.19	<ul style="list-style-type: none"> • Chapter 8 – Physical Methods in Chemistry
14	11.22 – 11.26	Thanksgiving Break
15	11.29 – 12.03	<ul style="list-style-type: none"> • Exam 4 (12.02) • Other topics of interest?
The final exam will be held on Monday, December 6 th from 10:30 am – 12:50 pm.		