Course Syllabus

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CHM711

Inorganic Chemistry 1

Fall 2021 MWF 0930-1020

Rm: KG 209
Zoom: 99284342401
Code: Chem1stry!

Instructor: Tendai Gadzikwa (she/her)
E-mail: gadzikwa@ksu.edu

Make an appointment to meet (https://doodle.com/mm/tendaigadzikwa/book-a-time)

Content

Atomic and molecular structure, bonding concepts used in the practice of Inorganic Chemistry. Applications of symmetry and Group Theory to structure, bonding, and spectra.

Course Modality

The course will be taught **In-Person/Face-to-Face in CB209**. All classes will be recorded using Zoom so the class will be available synchronously (link (https://ksu.zoom.us/j/99284342401?pwd=dUE2ZUkyNnowMUhqaUc5T3M3ckxsUT09)) if you are unable to attend. Videos will be posted on Canvas. All exams (except the FINAL, see VIPEr Project) and assignments will be take-home and submitted by uploading online as a PDF. CamScanner is a good app for converting written notes to PDFs.

Texts & Other Resources

There is no required text. However, if you would like one, there are two that I draw material from. **Note:** Housecroft is the primary text for CHM712, with Miessler used for supplementary material. Personally, I think Miessler is a better book for molecular symmetry and group theory which are the more new/difficult concepts we will cover in the course.

- Housecroft & Sharpe Inorganic Chemistry, 5th Ed. ISBN: 9781292134147 (http://catalogue.pearsoned.co.uk/educator/product/Inorganic-Chemistry-5E/9781292134147.page)
- Miessler, Fischer & Tarr Inorganic Chemistry, 5th Ed. ISBN: 9780321811059 (https://www.pearsonhighered.com/miessler5einfo/)

Online resources we will use:

- ChemLibre (Housecroft textbook map) (https://chem.libretexts.org/Textbook_Maps/Inorganic_Chemistry/Map%3A_Inorganic_Chemistry_(Housecroft))
- OpenStax (Chemistry: Atoms First) (https://cnx.org/contents/RTmulxzM@9.1:uXg0kUa-@4/Introduction)
- Otterbein (Symmetry tutorial, gallery & challenges) (http://symmetry.otterbein.edu/)
- ChemTube3D (Visualization of structures: bonding & symmetry) (https://www.chemtube3d.com/)
- Envision (Interactive computational chemistry calculations in a web browser) (https://software.entos.ai/envision)
- VIPEr (Large repository of electronic resources for Inorganic Chemistry) (https://www.ionicviper.org/)

K-State Disability Statement

Students with disabilities who need classroom accommodations, access to technology, or information about emergency building/campus evacuation processes should contact the Student Access Center and/or their instructor. Services are available to students with a wide range of disabilities including, but not limited to, physical disabilities, medical conditions, learning disabilities, attention deficit disorder, depression, and anxiety. If you are a student enrolled in campus/online courses through the Manhattan or Olathe campuses, contact the Student Access Center at accesscenter@k-state.edu (mailto:accesscenter@k-state.edu?subject=Student%20Accommodation) , 785-532-6441; for K-State Polytechnic campus, contact Julie Rowe, Diversity, Inclusion and Access Coordinator, at jarowe@ksu.edu (mailto:jarowe@ksu.edu) or call 785-826-2971.

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Learning Goals

By the end of this course, students should be able to:

- Use concepts from quantum chemistry to understand atomic structure and explain periodic trends
- Use Molecular Orbital Theory and MO diagrams to explain the physical properties of molecules
- Identify point groups of molecules
- Use Group Theory to determine the symmetry labels of IR vibrational normal modes and molecular orbitals
- Use Ligand Field Theory to explain the spectroscopic properties of transition metal complexes
- Use Band Theory to explain the electronic properties of solids
- Identify solid state structures of metals and ionic salts
- Understand how hard-soft acid-base theory relates to coordination chemistry

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Tentative Schedule

Week	Beginning	Topic	Housecroft	Miessler
I-VI	Aug. 23	**I. Basic Concepts**		
		Atomic Structure	Ch. 1	Ch. 2
		Simple Theories of Bonding	Ch. 2	Ch. 3, 5.1-5.3
		Acid-Base Chemistry	Ch. 7	Ch. 6
		Reduction & Oxidation	Ch. 8	Ch. 6
		Take-home exam 1: Fri Oct. 01	Due:	Oct. 06
VII-XII	Oct. 4	**II. Introduction to Group Theory**		
		Molecular Symmetry		
		Group Theory	Ch. 3	Ch. 4
		Molecular Bonding		
		Molecular Vibrations	Ch. 5	Ch. 5.4
		Take-home exam 2: Fri Nov. 12	Due:	Nov. 17
XIII-XVI	Nov. 15	**III. Metallic & Coordination Compounds**		
		Structure & Electronics of Metallic & Ionic Solids	Ch. 6	Ch. 7
	Nov. 22	**Fall-Break**		
		Intro to Coordination Compounds	Ch. 19-20	Ch. 9-10
		Take-home exam 3: Fri Dec. 03	Due:	Dec. 08

IN-CLASS FINAL: Mon. Dec. 13

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Evaluation

Task	Assigned	Due	Points	Weight
Take-home exam 1	Fri., Oct. 01	Wed., Oct. 06	100	12.5%
Take-home exam 2	Mon., Nov. 12	Wed., Nov. 17	100	12.5%
Take-home exam 3	Fri., Dec. 03	Wed., Dec. 08	100	12.5%
In-class final exam	Mon., Dec. 13	11:50 am	100	12.5%
Weekly Assignments	Week I-XVI			
	Week I-XVI	on going	100 (25 x 4)	12.5%
Exercises	TBD	on going	50	6.25%
Class Participation/Contributions	Week I-XVI	on going	50	6.25%

Total number of assignments, quizzes, and exercises, and therefore pts, may change

Take-home exams: Posted online on Fridays. Must be submitted online as a PDF by midnight the next Wednesday. Late submissions may be accepted, and graded with penalties, at TG's discretion.

Weekly Assignments: Posted online on Fridays. Must be submitted online as a PDF by 5:00 pm the next Wednesday. Late submissions may be accepted, and graded with penalties, at TG's discretion.

Pre-Lecture Quizzes: based on online content watched before class. Full marks (4 pts each) for ***serious*** attempt.

In-Class Exercises: graded (10 pts each).

Class Participation/Contributions: assessed as "You contribute to class discussions, or **upload/post helpful resources**, regularly(A), often(B), occasionally(C), rarely(D), never(F)."

FINAL GRADE
Final grades are based on the total score. Lower limit may be moved down, but never up.

A 85 to 100%
B 70 to 84%
C 60 to 69%
D 50 to 59%
F below 50%

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VIPEr Project

You are being asked to participate in a research study conducted by Barbara Reisner from James Madison University. The purpose of this study is to identify the role that employing evidence based instructional practices in the context of a Community of Practice of inorganic chemistry educators has on student learning in inorganic chemistry.

Research Procedures. Lectures will be video recorded a few times this semester.

Time Required. Participation in this study will not require any time on your part.

Participation & Withdrawal. Your participation is entirely voluntary. You are free to choose not to participate by sitting in a part of the room that will not be included in the film. However, if you choose to participate by sitting in range of the video recording equipment, you will not be able to withdraw from the study.

Final. The final exam will be a standardized **ACS Exam** (https://uwm.edu/acs-exams/instructors/assessment-materials/exams/) (Foundations in Inorganic)

Full Participant Notice (https://k-state.instructure.com/courses/110807/files/18367542/download?download_frd=1)

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COVID-19 Precautions

To reduce risk of exposure:

- Do not come to class if you are not feeling well.
- Those who are uncomfortable with in-person instruction may attend virtually, or access the online recording at their own schedule.
- The eastern door will be ENTRANCE ONLY, while the western door will be EXIT ONLY.
- Do not hang out inside/outside the room before/after class. Class will end a few minutes early for cleaning to take place.

Wearing of Face Coverings

All students are expected to comply with K-State's face mask policy. As of August 2, 2021, everyone must wear face masks over their mouths and noses in all indoor spaces on university property, including while attending in-person classes. This policy is subject to change at the university's discretion. For additional information and the latest on K-State's face covering policy, see **https://www.k-state.edu/covid-19/guidance/health/face-covering.html** (https://www.k-state.edu/covid-19/guidance/health/face-covering.html).

COVID-19 Exposure/Isolation

Students should self-assess their symptoms and should not come to campus if they are sick, **have a temperature over 100.4 degrees F** (https://www.k-state.edu/covid-19/guidance/health/temperature-checks.html), or have other illness symptoms of the coronavirus as listed on the **U.S. Centers for Disease Control and Prevention, or CDC, website** (https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcoronavirus%2F2019-ncov%2Fabout%2Fsymptoms.html). Persons who develop any of these symptoms while on campus should leave and return to their local residence.

Students should follow specific guidance if they have:

- Tested positive for COVID-19.
- A sick family member or roommate at home with COVID-19.
- Been in close contact with another person who has COVID-19.
- Been tested for COVID-19 and are awaiting results.
- Are unvaccinated or not fully unvaccinated and have recently traveled.

There are certain conditions required for returning to campus for each of these circumstances as noted in the FAQs **here** (https://www.k-state.edu/covid-19/guidance/health/covid-19-exposure-protocol.html). The university is following **CDC** (https://www.cdc.gov/coronavirus/2019-nCoV/index.html), **KDHE** (https://www.coronavirus.kdheks.gov/) and local public health agency guidance. Students who are unable to attend class due to the need to isolate or quarantine because of COVID-19 related symptoms, exposure, illness, or travel-related self-quarantine mandates should contact the Office of Student Life, who will inform the student's instructors. Manhattan campus – Complete the form on the **Office of Student Life website** (https://www.k-state.edu/studentlife/heretohelp/absenceverifications/covid19/index.html) or contact them at 785-532-6432 or **stulife@k-state.edu** (mailto:stulife@k-state.edu)

Testing

Currently, ***free on-campus*** symptomatic and asymptomatic COVID-19 testing is available at **Lafene Health Center** (https://www.k-state.edu/lafene/). Symptomatic testing is for individuals who are presenting COVID-19-like symptoms. Voluntary asymptomatic testing is for all enrolled students, regardless of whether they live on-campus or off-campus, and for faculty and staff. Students, faculty and staff may participate in asymptomatic testing once every two weeks.

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Academic Integrity & Honor System

Kansas State University has an Honor and Integrity System based on personal integrity, which is presumed to be sufficient assurance that, in academic matters, one's work is performed honestly and without unauthorized assistance. Undergraduate and graduate students, by registration, acknowledge the jurisdiction of the Honor and Integrity System. The policies and procedures of the **Honor and Integrity System** (https://www.k-state.edu/honor/) apply to all full and part-time students enrolled in undergraduate and graduate courses on-campus, off-campus, and via distance learning. A component vital to the Honor and Integrity System is the inclusion of the Honor Pledge which applies to all assignments, examinations, or other course work undertaken by students. The Honor Pledge is implied, whether or not it is stated: "On my honor, as a student, I have neither given nor received unauthorized aid on this academic work." A grade of XF can result from a breach of academic honesty. The F indicates failure in the course; the X indicates the reason is an Honor Pledge violation.

Expectations for Classroom Conduct

All student activities in the University, including this course, are governed by the **Student Judicial Conduct Code** (https://www.k-state.edu/sga/judicial/) as outlined in the Student Governing Association **By Laws** (https://www.k-state.edu/sga/old_files/sgadocs/ByLaws.pdf), Article V, Section 3, number 2. Students who engage in behavior that disrupts the learning environment may be asked to leave the class.

Mutual Respect & Inclusion

At K-State, faculty and staff are committed to creating and maintaining an inclusive and supportive learning environment for students from diverse backgrounds and perspectives. K-State courses, labs, and other virtual and physical learning spaces promote equitable opportunity to learn, participate, contribute, and succeed, regardless of age, race, color, ethnicity, nationality, genetic information, ancestry, disability, socioeconomic status, military or veteran status, immigration status, Indigenous identity, gender identity, gender expression, sexuality, religion, culture, as well as other social identities.

Faculty and staff are committed to promoting equity and believe the success of an inclusive learning environment relies on the participation, support, and understanding of all students. Students are encouraged to share their views and lived experiences as they relate to the course or their course experience, while recognizing they are doing so in a learning environment in which all are expected to engage with respect to honor the rights, safety, and dignity of others in keeping with the K-State Principles of Community **https://www.k-state.edu/about/values/community/** (https://www.k-state.edu/about/values/community/).

If you feel uncomfortable because of comments or behavior encountered in this class, you may bring it to the attention of your instructor, advisors, and/or mentors. If you have questions about how to proceed with a confidential process to resolve concerns, please contact the Student Ombudsperson Office. Violations of the **student code of conduct** (https://www.k-state.edu/sga/judicial/student-code-of-conduct.html) can be reported here **https://www.k-state.edu/sga/judicial/student-code-of-conduct.html** (https://www.k-state.edu/sga/judicial/student-code-of-conduct.html). If you experience bias or discrimination, it can be reported here **https://www.k-state.edu/report/discrimination/** (https://www.k-state.edu/report/discrimination/).

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Student Resources

K-State has many resources to help contribute to student success. These resources include accommodations for academics, paying for college, student life, health and safety, and others found at **www.k-state.edu/onestop (https://www.k-state.edu/onestop)**

Mental Health

Your mental health and good relationships are vital to your overall well-being. Symptoms of mental health issues may include excessive sadness or worry, thoughts of death or self-harm, inability to concentrate, lack of motivation, or substance abuse. Although problems can occur anytime for anyone, you should pay extra attention to your mental health if you are feeling academic or financial stress, discrimination, or have experienced a traumatic event, such as loss of a friend or family member, sexual assault or other physical or emotional abuse.

If you are struggling with these issues, do not wait to seek assistance.

- Kansas State University Counseling Services (**k-state.edu/counseling/ (https://www.k-state.edu/provost/resources/teaching/k-state.edu/counseling/)**) offers free and confidential services to assist you to meet these challenges.
- Lafene Health Center (**https://www.k-state.edu/lafene (https://www.k-state.edu/lafene)**) has specialized nurse practitioners to assist with mental health.
- The Office of Student Life (**k-state.edu/studentlife (https://www.k-state.edu/provost/resources/teaching/k-state.edu/studentlife)**) can direct you to additional resources.
- K-State Family Center offers individual, couple, and family counseling services on a sliding fee scale (**https://www.hhs.k-state.edu/familycenter/ (https://www.hhs.k-state.edu/familycenter/)**).
- Center for Advocacy, Response, and Education (CARE) provides free and confidential assistance for those in our K-State community who have been victimized by violence (**https://www.k-state.edu/care/ (https://www.k-state.edu/care/)**).