**Course Syllabus: Inorganic Chemistry CHEM 3600 Fall 2021**

**Course Description:** The course will cover the elements of the periodic table that are omitted in general and organic chemistry, mainly the transition (d-block) metals. The complexes formed by these metals will be covered, along with real world applications in catalysis and medicine.

**Goals / Learning Objectives:**

* Analyze molecular bonding based on VSEPR and molecular orbital theories.
* Understand the basics of coordination chemistry.
* Apply crystal field theory.
* Analyze the reactions of coordination and organometallic compounds.
* Apply inorganic concepts to real world uses.

**Instructor:** Dr. Emma Downs

Pronouns: She/her

Department: Biology and Chemistry

Office Location: SCI 327

Office Hours: Monday 11 AM – 12:15 PM, Thursday 9:30 – 10:45 AM Additional times by appointment or drop-in.

E-mail: [edowns1@fitchburgstate.edu](mailto:edowns1@fitchburgstate.edu)

**Book:** Introduction to Inorganic Chemistry Wikibook

<https://en.wikibooks.org/wiki/Introduction_to_Inorganic_Chemistry>

Supplementary:

*Principles of Chemistry – A Molecular Approach*; Nivaldo J. Tro

*Inorganic Chemistry*; Shriver *et al.*

Oxford Chemistry Primers:

*Foundations of Inorganic Chemistry*; Mark J. Winter

*Chemical Bonding*; Mark J. Winter

*d-block Chemistry*; Mark J. Winter

*The Mechanisms of Reactions at Transition Metal Sites*; Richard A. Henderson

**Additional Resources:** Calculator with scientific functions (smartphone not acceptable)

**Lecture Sessions:** Tuesday and Thursday 8:00 AM – 9:15 AM

**Lecture Location:** Antonucci Science Complex 217

**Evaluation:** Class Participation 50 points

Homework and Lit Discussions 150 points

Early Term Exam 100 points

Exams (2) 250 points WHa

Final Exam 150 points

Blog 150 points

Final Presentation 150 points

**Total 1000 points**

Grades are assigned based on percentages, in accordance with the Fitchburg State University guidelines which can be found on the University website.

**COVID STATEMENT**

We are still in a pandemic. One of us or a loved one may get sick. If that happens I will do my best to work with you to succeed in the class. Communication is key to this working out. If you must miss class or assignments, let me know as soon as possible so we can find a way for you to keep up. We may have to move class online if the University decides it is necessary, in which case we will meet OnSync through Google Meet.

***Masks are required in the classroom.*** Students not wearing a face covering will be asked to put one on, and if they do not comply will be asked to leave the classroom for that session. As such, no eating and drinking is allowed in the classroom. If you need to eat or drink or just need a break from your mask, please step outside the classroom quietly and respectfully.

**Class Policies:**

***Attendance at lectures is required*** and your attendance will be monitored. Unexcused absences will lead to point deductions from the class participation portion of a student’s final grade. Please contact the instructor by email BEFORE the lecture session if you are unable to attend because of a legitimate medical reason or personal/family emergency. Makeup exams and late homework will be permitted in exceptional circumstances.

Students are expected to act in a mature and collegial manner in class i.e. be respectful of fellow students and the instructor. ***Students must be on time for class****.* If you are late for class on a regular basis points will be deducted from the class participation portion of your final grade. No talking is permitted while the instructor or a fellow student is addressing the class. Participation in the class is encouraged and students should raise their hand if they have a question.  ***NO ELECTRONIC DEVICES ARE PERMITTED TO BE USED IN THE CLASSROOM***(laptops, cell phones etc.) Students are requested not to wander in and out during class; check texts/emails/messages and use the restrooms before class! Students who do not behave in the required manner will be asked to leave the classroom for that lecture session.

Each student is responsible for completing all course requirements and for keeping up with all course activities whether a student is present at lecture or not.This is an upper level course and the material will be new and challenging.

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**Homework:**

Homework will be assigned approximately weekly and graded on effort and completeness. Homework problems are intended to mirror test problems. Keys for the homework will be posted on Blackboard.

**Elements Project:** This project will focus on communication science both through writing and oral presentation. Students will choose an element from the periodic table to focus on. Throughout the semester students will write blog posts on the element, culminating in an oral presentation summarizing their work.

**Disability Accommodation:**

To support access and inclusion, FSU offers reasonable accommodations to students who have documented disabilities (e.g. physical, learning, psychiatric, sensory, etc.). If you require accommodations for this class, please provide the instructor with a copy of your Accommodation Agreement as soon as possible so that we can discuss your specific needs. Any information that you share will be held in the strictest confidence, unless you give permission to do otherwise.

If you require academic accommodations but do not have an Accommodation Agreement, please contact Disability Services as soon as possible to establish your eligibility for services. For more information, or to schedule an appointment, please call (978) 665 4020. Disability Services is located in the Academic Support Center on the third floor of the Hammond building.

**Other Resources:**

Career Services and Advising:

The Career Services and Advising Center seeks to be a "one stop shop" for all your academic challenges. Find answers to your academic questions or get help navigating academic policies and procedures. Our office can help you set goals, stay organized, review your four-year plan of study, as well as refer you to other campus support services in order to ensure your continued success. <https://www.fitchburgstate.edu/student-support/career-support> or call them at (978) 665-3151

Counseling Services

Counseling Services offers *confidential* individual, group, and couples counseling among other services. If you should go, keep in mind that “Counseling services are confidential and are offered at no charge to all enrolled students.” [https](https://www.fitchburgstate.edu/offices-services-directory/counseling-services/)[://www.fitchburgstate.edu/offices-services-directory/counseling-services/](https://www.fitchburgstate.edu/student-support/health-and-wellness/counseling-services) ) or call them at (978) 665-3152.  
  
Falcon Bazaar

Food insecurity, or the lack of food, can affect student learning. If you need food and you do not have funds, The Falcon Bazaar, located in Hammond G 15 and online ([https://www.fitchburgstate.edu/offices-services-directory/osd/falcon-bazaar/](https://www.fitchburgstate.edu/campus-life/office-student-development/falcon-bazaar)), is a free resource stocked with food, basic necessities, and can provide meal swipes to support all Fitchburg State students experiencing food insecurity for a day or a semester. The university continues to partner with Our Father's House to support student needs and access to food and services.

**Academic Integrity:**

Academic integrity is central to the mission of educational excellence at Fitchburg State University and the Department of Biology and Chemistry. Academic dishonesty includes cheating, fabrication, plagiarism, and the facilitation of academic dishonesty by aiding and abetting any of the aforementioned. Students who are found guilty of dishonesty in this class may receive a zero for the assignment and may be referred to the Office of the Dean of Student Academic Life. Two cases of dishonesty can be grounds for dismissal from the University. If you are working in an instructor authorized group, such as with a lab partner, your answers may resemble those of your partner but it is expected that you will do your work separately from your friends, classmates, family members, and so on. It is not acceptable to use the words or ideas of another source (famous scientist, lab handout, or your lab partner) without proper acknowledgement. This means that you must use appropriate citations to indicate the source of any phrases, sentences, paragraphs or ideas found in published volumes, on the internet, or created by another student. Additional information about academic integrity can be found at: <https://www.fitchburgstate.edu/student-support/office-student-affairs/student-conduct-and-case-management/academic-integrity-policy> Honesty is expected in examinations i.e. no talking, unauthorized materials or aiding fellow students. All books, notes, laptops, cell phones, and other electronic devices are strictly prohibited during exams unless otherwise specified by the instructor.

***Tentative* Lecture Session Schedule:**

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| **Session** | **Topics** | **Advance Reading** |
| Week 1:  September 2 | Introduction and Periodicity | Chapter 1 (1.1) |
| Week 2:  September 7 & 9 | Bonding – Lewis Structures  Bonding – Valence Bond Theory | Chapter 1 (1.2-1.3) |
| Week 3:  September 14 & 16 | Molecular Orbital Theory – Homonuclear  Molecular Orbital Theory- Heteronuclear | Chapter 2 (2.1 – 2.3)  Chapter 2 (2.4 – 2.5) |
| Week 4:  September 21 & 23 | Reading a Research Paper  Literature Discussion and Review | Bonding Article |
| Week 5:  September 28 & 30 | **Exam 1 (September 30)**  Coordination Chemistry Introduction | Chapter 5 (5.1) |
| Week 6:  October 5 & 7 | Naming Coordination Complexes  Complex Geometry and Isomers | Shriver Chapter 7 (supplemental)  Chapter 5 (5.2) |
| Week 7:  October 12 &15 | Crystal Field Theory  Spectrochemical Series | Chapter 5 (5.3 – 5.5) |
| Week 8:  October 19 & 21 | Ligand Field Stabilization Energy  Non-Octahedral Complexes | Chapter 5 (5.6 – 5.7) |
| Week 9:  October 26 & 28 | Ligand Field Theory  Summarizing a research article | Chapter 5 (5.7 – 5.10)  Biomimic Article |
| Week 10:  November 2 & 4 | Literature Discussion and Review  **Exam 2 (November 4)** |  |
| Week 11:  November 9 & 11 | Ligand Substitution Reactions  *No Class November 11 – Veteran’s Day* |  |
| Week 12:  November 16 & 18 | Reaction Mechanisms  Reactions of Square Planar Complexes | Chapter 5 (5.11)  Shriver Chapter 7 (supplemental) |
| Week 13:  November 23 & 25 | Presentation Prep  *No Class November 25 – Thanksgiving Break* |  |
| Week 14:  Nov. 30 & Dec. 2 | Bioinorganic Chemistry  Literature Discussion and Review | Shriver Chapter 26 (supplemental) Iron Article |
| Week 15:  December 7 & 9 | **Exam 3 (December 7)**  Presentation Prep |  |
| Week 16:  Final Exams | **Final Presentations/ Take Home Final Due**  **Thursday December 16th 8:00 – 10:00 AM** |  |