

Instructor: Dr. Brian J. Bellott "Dr. B"
Currens 332B
Email: b-bellott@wiu.edu

Phone: (309) –298–1760
Fax: (309) –298–2180

Lecture Meeting Times: Currens 202

Monday	12:00 pm –12:50 pm
Wednesday	12:00 pm –12:50 pm
Friday	12:00 pm –12:50 pm

Lab Meeting Times: Currens 419

Lab TA: Bethany Esterlen

Thursday	11:00 am – 01:50 pm (Section 021)
Thursday	02:00 pm – 04:50 pm (Section 022)

Course Credits:

4 semester hours (Three fifty minute lectures plus one three hour lab per week.)

Office Hours:

Monday	08:00 am – 09:00 am
Thursday	09:00 am – 11:00 am
Friday	08:00 am – 09:00 am

Additional office hours can be made by contacting the instructor. I keep an open door policy.

Course Description from WIU Course Catalog:

“Chemistry of transition elements and nontransition elements and their compounds; nomenclature, stereochemistry, symmetry, bonding, solids, and acid-base theories. Laboratory involves synthesis and physicochemical measurements of selected compounds. Writing Instruction in the Discipline (WID) course. Prerequisites: CHEM 332 and CHEM 370 or 374. 3 hrs. lect.; 3 hrs. lab.”

Course Objectives:

- Develop a working knowledge of group theory
- Understand applications of group theory in chemistry
- Introduction to solid state chemistry
- Understand molecular orbital theory
- Understand applications of molecular orbital theory in chemistry
- Develop good laboratory practices
- Develop your communication skills, both written and oral.

Writing Instruction in the Disciplines (WID) course:

“This course has been designated to meet the Writing Instruction in the Disciplines (WID) graduation requirement. WID courses provide instruction in the processes and formats for the writing content and style needed to be an effective professional in a student’s chosen field.”

As such the first two lab reports will be turned in to the instructor and edited in agreement with the WID course designation. After the first report is corrected the student should meet with the instructor to discuss the edits the instructor has suggested. The report will be edited by the student and resubmitted for grading. The next two reports will be submitted first for peer-review wherein the students will be given a classmates lab report and tasked with editing their report. A further discussion of the peer review process will be discussed when the time comes. The final two reports will be graded without assigned rough drafts, but students are encouraged to construct drafts and edit them accordingly.

When guidelines are handed out to students to aid in the construction of the lab reports they are not designed to allow for A credit to be obtained. Fulfilling all of the items on the guidelines sheet to perfection only allows for a 75% grade to be obtained. You must interject your own knowledge, interests, passions, and the like into the report to be eligible for a grade higher than 75%. If there are any questions on this topic please contact the instructor directly during the first week of the semester.

Details for each step of the process will be discussed in lecture at least one week prior to the due date.

Classroom Policies:

- Data storage devices other than the required calculator are not allowed to be used in the classroom or laboratory. Any interruptions caused by an electronic device could result in the removal from the lecture or lab. If the distraction occurs during an exam the student will be asked to leave and their exam will be collected and graded “as is.” If the student is asked to leave during lab the student will be subjected to the lab etiquette rules detailed below.
- All hats, caps, and hoods that cover your ear(s) are not allowed to be worn during a quiz or exam.
- The instructor reserves the right to assign seating for the students during exams and/or any other time necessary.
- Homework/lab reports are due at the start of class. If they are turned in after class begins they will be graded for half credit. If they are turned in after class is over they will be graded for 10% credit. Finally if they are turned in 1 day late or more they will not be graded.

Attendance Policy:

You are expected to attend class regularly and punctually. All students are responsible for all information and materials given in class whether you are present or not. If an exam is missed for an excused absence a time for a makeup exam has to be agreed upon by the instructor. The makeup exam will be different the exam given during the normal lecture time and is designed to be as difficult as the exam given during the regularly scheduled class hours. Attendance is required at all labs. Excused absences may be allowed, but must be discussed with the instructor in order to setup a makeup lab period.

Examples of excused absences are documented illnesses, documented family medical emergencies, military commitments, WIU required athletic trips. Any other absence must be excused by the instructor whom holds sole discretion over what is and what is not an excused absence. Any excused absence must be submitted to the OARS system at least 2 hours before class. Informal attendance will be taken each day a few minutes into each class period. Although you are not required to attend it is highly recommended you attend class each and every day.

Required Materials: Costs for these materials are the responsibility of the student.

Lecture Text:

“Inorganic Chemistry” by James H. Huheey, Ellen A. Keiter, and Richard L. Keiter, 4th Edition, Harper & Collins College Publishers 1993.

Lab Text:

“Synthesis and Technique in Inorganic Chemistry” by G. S. Girolami, T.B. Rauchfuss, and R.J. Angelici, 3rd Edition, University Science Books, 1999.

Other Materials:

- Laboratory Notebook I recommend a composition notebook (about 4 dollars at the union)
- Molecular Model Set
- Scientific Calculator (All storage in the calculator will be cleared by the instructor prior to each exam)
- Students enrolled in this course are levied a non-refundable laboratory usage fee of \$35 to cover the cost of consumable supplies utilized during the semester.

Supplemental Texts:

- “Chemical Applications of Group Theory” by F. A. Cotton, 3rd Edition, A Wiley Interscience Publication, 1990.
- “Advanced Inorganic Chemistry” by F. A. Cotton, G. Wilkinson, C. A. Murillo, and M. Bochmann, 6th Edition, A Wiley Interscience Publication, 1999.
- “Physical Methods for Chemists” by R. S. Drgao, 2nd Edition, Surfside Scientific Publishers, 1992.

Course Breakdown:

Lecture: 500 points

Exam 1 expected date October 7 th	100 points
Exam 2 expected date November 8 th	100 points
Exam 3 Dec 9 th at 1:00 pm	100 points
<u>Homework disturbed throughout the semester</u>	<u>200 points</u>
Lecture subtotal	500 points

Lab: 200 points

There will be a total of 6 labs worth 60 points each	360 points
<u>Lab etiquette*See the lab section of the syllabus</u>	<u>40 points</u>
Lab subtotal:	400 points
Course Total:	900 points

Note: Since the course is a combined lecture and lab you must obtain at least 240 points in the lab section to pass the course. If you obtain 239 points in the lab section you will fail the entire course.

Final grades for all undergraduates are based on the Plus/Minus grading system and are based on a percentage of the total points earned per the following scheme for undergraduates.

100%	A+
99-93 %	A
<u>93-90%</u>	<u>A-</u>
89-87%	B+
86-83%	B
<u>82-80%</u>	<u>B-</u>
79-77%	C+
76-73%	C
<u>72-70%</u>	<u>C-</u>
69-67%	D+
66-63%	D
<u>62-60%</u>	<u>D-</u>
Less than 59%	F

Final grades for those earning “G” credit will be based on the following scheme. With an extra 150 points added to the course total for the three reports (50 points each). See the next section of the syllabus for more details.

90-100%	A
80-89%	B
70-79%	C
60-69%	D
Below 59%	F

Outside work requirements:

Students are expected to read, review, study, and learn all material discussed in lecture and lab. The expectation is that for every hour spent in lecture at least three hours should be spent outside of lecture reviewing the material. The student is expected to spend significant time on the lab reports and literature searches associated with them. Each homework assignment will require at least two hours to complete.

G and B credit requirements:

To obtain G or B credit in chemistry 401 three formal reports must be written. The three reports written will be due on November 1st, November 8th, and November 15th. The paper due on November 1st must be based on a research paper published in 2018 dealing with catalysis. The student will first review the publication and then discuss in detail the catalytic reaction. The second paper due November 8th requires the student to explore the literature for an innovative use of a physical method. The report will be focused on two items. The first is the physical method being used with a thoughtful section on the theory behind the technique. The second focus of the report will be on the innovation employed by the authors of the publication. The third report will be based on a physical method of characterization of the instructors choosing. Each report is worth 50 points and should be at least 20 pages double spaced with at least 25 current (>2014) references included. I recommend the students who are taking 401 for G or B credit to stop by my office at least 1 month prior to when the reports are due to make sure the objectives for these assignments are clear. In addition to the above requirements the lab reports for the course will be graded at a graduate level. Each lab report should have an introduction section of not less than 6 pages with 20 references.

Tentative Course Outline:

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|---|-------------------------|
| 1. Valence Shell Electron Pair Repulsion Theory | HKK Ch 1-2 |
| 2. Group Theory | HKK Ch 3; Cotton Ch 1-4 |
| 3. Applications of Group Theory | HKK Ch 3; Cotton Ch 5 |
| 4. Solid State Chemistry | HKK Ch 4; Cotton 11 |
| 5. Bonding | HKK Ch 5-8; Cotton 6-9 |
| 6. Acid-Base Theory | HKK Ch 9 |
| 7. Chelate Effect | HKK Ch 12 |
| 8. Hybrid Theory | HKK Ch 5-6 |

HKK is short for Huheey, Keiter, and Keiter
Cotton is short for the Cotton group theory text

Tentative Lab Schedule:

1. Tin Chemistry: Coordination Complexes and Organometallic Derivatives
2. Preparation and Aquation of $[\text{Co}(\text{NH}_3)_5\text{Cl}]^{2+}$
3. Optical Resolution of $\text{Co}(\text{en})_3^{3+}$

4. Solid State Chemistry
5. A magnetic complex
6. The Metal–Arene Complex $[1, 3, 5\text{-C}_6\text{H}_3(\text{CH}_3)_3]\text{Mn}(\text{CO})_3$

Lab Policies and Guidelines:

Safety is a chief concern in a laboratory setting. Below are a few guidelines you will follow to ensure a safe working environment for you and others. Failure to comply by these guidelines will result in loss of points (see lab etiquette) and may result in removal from the laboratory setting. If a student is removed from the laboratory setting they will not be allowed to complete the current lab and must submit a report void of the results they did not obtain. If the instructor feels the students actions are interfering with the safety or well-being of other students in the lab you may be removed from the course.

- Pants that cover the entire shin are required in the lab at all times.
- Goggles that are splash proof are required to be worn in the lab at all times. These can be purchased from the chemistry club during the first week of the semester. The sales are located in the chemistry office and are available from 08:00 am till 04:30 pm Monday through Friday.
- Shirts that cover your entire shoulder area are to be worn in the lab at all times.
- All electronic devices other than your calculator are to be stored on silent mode in your backpack
- No type of ear phone or headphone is to be worn inside the lab.
- You must follow clear instructions given to you by the instructor or TA.

The instructor reserves the right to add any inappropriate lab attire to this list at any time during the semester. If lab attire is deemed inappropriate by the instructor the student must leave the lab until they have remedied the situation, no additional laboratory time will be given for the student to complete the lab.

Lab etiquette:

Working in a shared space requires a certain understanding amongst all parties using the space. Below I have outlined a few examples of proper lab etiquette. While this is by no means a complete list it hopefully it will help you be more thoughtful of your lab mates.

- Clean up the balances after you use them. Even if someone is right behind you waiting for the balance do not expect them to want to clean up your mess. This is extended to all shared lab equipment.
- Maintain a clean working space and keep your materials and equipment inside of your designated space.
- Allow others the space to complete their experiments. If you are waiting for the UV-Vis do not hover over the current user.
- Respect others and their property at all times.

- Wear all the required safety equipment at all times. Including long pants, goggles, and closed toed shoes. I ask that students wear pants that cover their entire shin and also shirts with sleeves that go past their shoulders.
- If you make a mess or break something ask your TA or instructor if it is safe to clean up and clean it up as soon as possible.
- If you use the last of something (ie Kimwipes, reagent, ect..) refill it. If you cannot refill it make sure the TAs or instructor know the last one has been used.
- Verse yourself on the hazards of the reagents you will be using prior to coming to lab.
- Complete the prelab requirements prior to arriving to the lab.

If a student is demonstrating improper lab etiquette the instructor or TA will immediately discuss the situation with the student. After the initial warning each violation will result in the loss of five points. Once 40 points have been lost the student will be banned from the lab and must meet with the instructor and department chair prior to being allowed back into the lab.

Lab Notebook:

You are required to purchase a lab notebook for use in this lab. The only requirements for the notebook are that it is bound and lined. Prior to starting each lab the student will be required to fill out a prelab section in their lab notebook and have it approved by the instructor or TA. The notebook will be used to record results and observations during the lab period. All lab notebooks must be filled out in pen and any mistakes are removed by putting one line through the text. Care should be taken to ensure the lab notebook is as neat as possible. At the completion of each day of lab work your lab notebook must be time stamped by the TA or instructor. An example of an acceptable lab notebook page will be given out prior to the first lab. A photocopy of the pertinent lab notebook pages must be turned in with each lab report. The lab notebook portion of the lab reports will be worth at least 5 points.

Lab Reports:

Lab reports are due one week after each lab is completed. Each lab report is worth a total of 60 points. Each report will contain 5 sections with each section worth 11 points. The final 5 points are earned from the lab notebook. The first section is the introduction. The second section of the lab report will consist of the results and discussion. In this section you will present all the results you obtained from the experiment and discuss how these results agree with literature values and also the significance of the results. The next section is the experimental section where you will include the sources of reagents and synthetic details. The fourth section is the conclusion section where the student will summarize the report. The final section of the report is the reference section. The reference section is to include only peer-reviewed publications (ie *J. Am. Chem. Soc.*, *Inorg. Chem.*, ect...) and not online reports (ie Wikipedia, CNN, ect...). If a suitable reference cannot be found in the literature please meet with the instructor to discuss other options. All references must be entered into an endnote library. Copies of the full lab report, photocopied lab notebook pages, and the endnote library text file must be uploaded to Western Online, lab reports will not be graded until all the materials are turned in. Photocopies of the student's time stamped lab notebook pages will be attached to the end of the report. The grading system for each report may change based on a rubric handed out prior to completion of the experiment. The lab report must be stapled prior to arriving to class failure to do so will result in the loss of five points.

University Policies:

Student rights and responsibilities <http://www.wiu.edu/provost/students.php>

Academic Integrity Policy <http://www.wiu.edu/policies/acintegrity.php>

Emergency Preparedness:

The WIU Office of Risk Management and Emergency Preparedness provides resources on how to respond to emergency situations. Please view www.wiu.edu/rmep/ for more details.

Student Conduct Code:

Please review the student conduct code at <http://www.wiu.edu/policies/acintegrity.php> violation of the student conduct code can result in a failing grade and may be subject to further academic penalties.

See also

http://www.wiu.edu/student_services/student_development_office/current/absencepolicy.php

Students with Disabilities:

“Students with disabilities: In accordance with University values and disability law, students with disabilities may request academic accommodations where there are aspects of a course that result in barriers to inclusion or accurate assessment of achievement. To file an official request for disability-related accommodations, please contact the Disability Resource Center at 309-298-2512, disability@wiu.edu or in 143 Memorial Hall. Please notify the instructor as soon as possible to ensure that this course is accessible to you in a timely manner.”

University Values:

University values, Title IX, and other federal and state laws prohibit sex discrimination, including sexual assault/misconduct, dating/domestic violence, and stalking. If you, or someone you know, has been the victim of any of these offenses, we encourage you to report this to the Title IX Coordinator at 309-298-1977 or anonymously online at: http://www.wiu.edu/equal_opportunity_and_access/request_form/index.php. If you disclose an incident to a faculty member, the faculty member must notify the Title IX Coordinator. The complete Title IX policy is available at: <http://www.wiu.edu/vpas/policies/titleIX.php>.

Any situation, condition, or circumstance not covered in the syllabus is subject to the decisions of the instructor only.