Syllabus

CHEM 401 Inorganic Chemistry III Section 001 **Fall 2012**

Instructor: Brian J. Bellott
Currens 332B
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TAs:

Nathan Fritts (Lecture and Lab) and Bartlomiej Redlinski (Lab)

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 427

Tuesday 11:00 am – 1:50 pm (Section 21)
Thursday 11:00 am – 1:50 pm (Section 22)

Course Credits:

4 semester hours (Three 50 min lectures plus a three hour lab per week.)

Office Hours:

Monday and Wednesday 2:00 pm – 3:00 pm
Friday 1:00 pm – 3:00 pm
Additional office hours can be made by contacting the instructor.

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 sound laboratory practices

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 each report is corrected the student will 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 second lab report will be reviewed by your peers. The instructor will randomly assign each student a peer to exchange lab reports with. Each student will have one week to read the lab report and suggest changes to the report. The student will have one week to edit their papers before they are due for grading. More details on this process will be given out prior to the third lab.

B and G designation:

CHEM 401 can serve as a bridge course for students enrolled in the Integrated BS-MS degree programs (IBMP). Also the School of Graduate Studies has designated CHEM 401 as "G" credit eligible. In order to achieve "B" credit or "G" credit the student must complete requirements in addition to the normal course load of CHEM 401.

The extra requirements for CHEM 401 are listed below.

- Lab reports will be graded with more stringent requirements and additional information will be required for each lab. The additional information required for each lab will be assigned prior to completion of each lab.

- More information will be expected from the student in free response questions both in the homework and on the exams.

- Also the student will write a paper of at least 10 pages in length. The topic of the paper will be based on a current journal article containing significant NMR, IR, or magnetic results. The student will analyze the results and draw their own conclusions based on the information discussed in CHEM 401. Topics for the paper are due on October 17th at the start of class.

Classroom Policies:

- Data storage devises other than the required calculator are not allowed to be used in the classroom. 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 a lab the student will have to schedule a time to complete the lab.

- 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.

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 is designed to be as difficult as the missed exam.

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.

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 two 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.

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, electronic or otherwise, in the calculator will be cleared by the instructor prior to each exam). A cell phone is not an acceptable scientific calculator.

Supplemental Texts:

- "Chemical Applications of Group Theory" by F. A. Cotton, 3rd Edition, A Wiley Interscience Publication, 1990. This book is on reserve in the Physical Sciences library.
- "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.

Tentative Course Outline:

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

Course Breakdown:

Lecture: 400 points	
Exam 1 Tentative date October 5th	100 points
Exam 2 Tentative date November 17th	100 points
Exam 3 to be given during finals week	100 points
Homework disturbed throughout the semester	100 points
Lecture subtotal	400 points
Lab: 260 points	
There will be a total of 6 labs worth 40 points each	240 points
Lab etiquette*See the lab section of the syllabus	20 points
Lab subtotal:	260 points
Course Total:	**660 points**
"G" or "B" credit: 50 points	
Term Paper	50 points
Amended Course Total:	**710 points**

Note: Since the course is a combined lecture and lab you must obtain at least 156 points in the lab section to pass the course. If you obtain 155 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.

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

Final grades for those earning "G" credit will be based on the following scheme.

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

Lab Policies and Guidelines:

Safety is the 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.
- 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.

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.

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 propriety 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 that go past their shoulders.
- If you make a mess or break something ask your TA or instructor on how to proceed.
- If you use the last of something (ie Kimwipes®, reagent, grease, 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 20 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 line. 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 time stamped by 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. Any student taking this course for "G' credit must have their lab notebook approved by the instructor only.

Lab Reports:

Lab reports are due two weeks after each lab is completed unless otherwise stated. Each lab report is worth a total of 40 points. Each report will contain 5 sections with each section worth 6 points. 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. Also contained in the experimental section is a copy of the student's time stamped lab notebook pages. 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. An example lab report will be handed out prior to completion of the first lab. The final 10 points will be assigned based on the overall report.

Tentative Lab Schedule:

1. Preparation and Aquation of $[Co(NH_3)_5Cl]^{2+}$
2. Tin Chemistry: Coordination Complexes and Organometallic Derivatives
3. Optical Resolution of $Co(en)_3^{3+}$
4. Metal-Metal Quadruple Bonds
5. The Paramagnetic Complex $Mn(acac)_3$
6. The Metal–Arene Complex $[1, 3, 5\text{–}C_6H_3(CH_3)_3]Mn(CO)_3$

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_and_orientation/current/absencepolicy.php

Students with Disabilities:

Americans with Disabilities Act:

"In accordance with University policy and the Americans with Disabilities Act (ADA), academic accommodations may be made for any student who notifies the instructor of the need for an accommodation. For the instructor to provide the proper accommodation(s) you must obtain documentation of the need for an accommodation through Disability Resource Center (DRC) and provide it to the instructor. It is imperative that you take the initiative to bring such needs to the instructor's attention, as he/she is not legally permitted to inquire about such particular needs of students. Students who may require special assistance in emergency evacuations (i.e. fire, tornado, etc.) should contact the instructor as to the most appropriate procedures to follow in such an emergency. Contact Disability Resource Center (DRC) at 298-2512 for additional services."

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