CHEMISTRY 372 *ADVANCED LAB–INORGANIC*
Fall 2013 course syllabus

COURSE LEARNING GOALS

1. acquire new knowledge on ***coordination compounds***: synthesis, structure, reactivity, redox and excited-state properties
2. reinforce knowledge of ***physical chemistry*** (kinetics, thermodynamics, excited states), ***synthetic methods*** and ***instrumental methods*** (spectroscopy and electroanalytical)
3. improved ***experimental design***: planning, coordinating efforts, identifying and solving problems
4. improved ***data analysis***: drawing tenable conclusions from experimental evidence and identifying magnitude and sources of uncertainty.
5. improved ***writing skills***: producing full lab reports that emulate the format and style of a primary research paper.
6. improved ***laboratory citizenship***: working safely, cooperatively, cleanly, with responsible use of resources and time

INSTRUCTOR

Prof. Scott D. Cummings
Tomsich 314
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OFFICE HOURS

A schedule of where you can find me throughout the week is posted on my office door and on my schedule is posted online (http://chemistry.kenyon.edu/cummings/schedule.htm).
You are welcome and encouraged to meet with me throughout the semester, by appointment or chance.

MEETING TIME

Experimental work is scheduled for Tuesdays from 1:10–4 pm in Tomsich 001 (Advanced Lab Room). The lab may be available at other times during the week for you to continue your work. Some of the instruments used in this course are used by other students for research and other courses, so it important to plan your experiments prior to class and work efficiently. Plan for additional time each week to prepare for upcoming experiments and to analyze data and assemble a results summary.

COURSE REQUIREMENTS

A. Prerequisites:

CHEM 234: *Organic Chemistry Lab II* (or permission of instructor) is a prerequisite. This course is designed to complement the material in *Inorganic Chemistry* (CHEM 343), and *Chemical Kinetics and Thermodynamics* (CHEM 335) and *Instrumental Analysis* (CHEM 341), but not all students in this lab course will have (yet) completed those courses. Your notes and textbooks from these courses may be helpful, though.

B. Attendance:

Attendance is essential part of this course. Students are expected to work for a complete afternoon each week. In the event of an emergency or unavoidable conflict, please notify the instructor and members of your research team as soon as possible. I call your attention to the college policy on class attendance in the *Course of Study*:

> "Absences for reasons of illness are not ordinarily excused: only when a student is declared by the College physician to be infirm (in a hospital or at home) will a health report be sent from the Health and Counseling Center to the dean of students, giving the days when each patient is judged infirm and recommending that the student's class absences be excused."

C. Materials:

1. **CHEM 372 Lab Manual,** available from the Kenyon Bookstore.
2. **laboratory notebook.** A laboratory notebook is one of the most important parts of experimental chemistry. Obtain a lab notebook with carbons, either from a previous chemistry lab course or from the Kenyon Bookstore.
3. **safety goggles** (you purchased for previous chemistry lab courses)
4. **scientific calculator**

D. Assignments:

In addition to the afternoon laboratory session, students are expected to spend time preparing for upcoming work, analyzing and interpreting experimental results, and reviewing background readings and relevant primary research articles. For most experiments, a brief online **Pre-lab Quiz** will be due by 9 pm on the Monday before lab, and a **Result Summary with notebook pages** will be due by 4 pm Friday after lab. Two full **Laboratory Reports** will be due during the semester. Reports will have the format of a primary journal (e.g. *JACS*) article. Please consult the Chemistry Department document "A Brief Guide to Writing in Chemistry." Further details of these assignments and due dates will be given in class.

E. Exam:

A final exam is scheduled for **Thursday, December 19, 1:30-4:30 pm**. Please consult your syllabi from other courses and let me know of any conflicts before the end of the second week of class.

GRADING

Course grade will be based on the following distribution:

pre-lab quizzes:	10%
Results Summaries and notebook pages:	20%
reports (2):	40%
final exam:	20%
effort (preparation, participation, independence and creativity):	10%

The total points earned will be used to assign a letter grade. Assignments in this course are often open-ended. There is no limit to what you are expected to do, so please don't ask "is this enough?" Do your best work and demonstrate that you are learning. This class is NOT graded on a "curve." You are NOT competing against your peers for a grade.

COLLEGE POLICIES

A. **academic honesty**:

I call to your attention the College Policy on Academic Honesty, see the Kenyon College Course of Study. *When writing laboratory reports, please be aware of issues of plagiarism*, especially with respect to experimental co-workers and published research literature.

B. **students with disabilities**:

If you have a hidden or visible disability which may require classroom or test accommodations please see me as soon as possible during a scheduled office hour. If you have not already done so, you must register with the Coordinator of Disability Services (Erin Salva, salvae@kenyon.edu, X5145), who is the individual responsible for coordinating accommodations and services for students with disabilities. All information and documentation of disability is strictly confidential. No accommodations will be granted in this course without notification from the Office of Disability Services.

C. **athletics and extra-curricular activities**:

If your participation in athletics or extra-curricular activities conflicts with a class, scheduled exam time or assignment due date, please let me know as soon as possible.

FALL 2013 SCHEDULE

Experiments:

Part I: Synthesis and reactivity of Pt(II) coordination compounds

A1. Preparation of [Pt(COD)Cl_2]
A2. Preparation of [Pt(terpy)Cl]Cl•2H_2O
C. Kinetics of ligand substitution reactions
D. Molecular Orbital Calculations of $[Pt(terpy)X]^+$

Part II: Ground and excited-state electron-transfer chemistry of tris-bipyridyl Ru(II)

E. Cyclic Voltammetry
M. Steady-state luminescence spectroscopy
Q. Luminescence quenching kinetics

week	date	experiment	
PART I		**TEAM WHITESIDES**	**TEAM LIPPARD**
1	**Sep. 3**	**Introduction to Coordination Compounds**	
2	**Sep. 10**	**A1 (individually)**	**C (two groups)**
3	**Sep. 17**	**A2 (individually)**	**C (two groups)**
4	**Sep. 24**	**C (two groups)**	**A1 (individually)**
5	**Oct. 1**	**C (two groups)**	**A2 (individually)**
6	**Oct. 8**	**D (one group)**	data analysis/writing workshop
7	**Oct. 15**	data analysis/writing workshop	**D (one group)**
8	**Oct. 22**	**D (individually)**	**D (individually)**
PART II		**TEAM BARTON**	**TEAM GRAY**
9	**Oct. 29**	**M (one group)**	**E (one group)**
10	**Nov. 5**	**Q (one group)**	**E (one group)**
11	**Nov. 12**	**Q (one group)**	**M (one group)**
12	**Nov. 19**	**E (one group)**	**Q (one group)**
	Nov. 26	*Thanksgiving Break*	
13	**Dec. 3**	**E (one group)**	**Q (one group)**
14	**Dec. 10**	data analysis/writing workshop	