

Class: Chem 324 – Advanced Chemistry Laboratory II

Instructors: Jeffrey Peloquin, Michael McCormick, Eric Brown

Meeting Times:

Monday 2:40 – 3:30 pm

Lab Thursday, 12:40 – 5:30 pm, Science and Nursing 362

Goals:

The upper division Advanced Chemistry Laboratory series has two general goals: 1) to provide chemistry majors with instruction in more sophisticated synthetic and analytical procedures than was provided in the lower division classes; 2) to provide a laboratory environment where the students can transition from pre-designed and formalized experiments to experiments where the students take on some, and ultimately all, of the responsibility for their design and execution.

Instead of performing weekly independent labs, the labs will span multiple weeks. This expansion in time will allow instructors to provide a simple hypothesis/goal for the lab and only a brief amount of introduction. The students will be expected to execute preliminary tests to optimize experimental conditions and then perform a final experiment based upon these tests. Experimental reports, posters or presentations will focus on data reporting and presentation. The experimental procedure will be reported both as it would in a published paper/progress report as well as a set of procedural instructions sufficiently detailed to be used in a laboratory environment.

Specifically, the Adv. Lab II course is meant to place the student in greater control of the experimental progress. Students will be given scientific papers that describe the experiment to be carried out and they will be required to develop the exact experimental procedure needed to carry out the experiment. This will include: 1) list of materials and equipment needed; 2) identification of techniques in which they need training; 3) identification of what test would be used to determine that they successfully completed the experiment.

Five experiments are scheduled:

- A. Jacobsen Asymmetric Epoxidation
- B. Energy of Combustion of Breakfast Cereals
- C. Spectroscopy/Kinetics Lab
- D. Air-Sensitive Sandwich Complex Nickelocene Synthesis
- E. Making a Better Cup of Coffee

See the laboratory schedule below for important dates in the class. The Epoxidation lab will run from Jan. 25 to Mar. 22. During this time, each group will be required to complete the Energy of Combustion lab and Spectroscopy/Kinetics lab (each lab will require a full lab period to complete). In order to prevent scheduling conflicts, each group will reserve one lab period between Feb. 1 and Feb. 22 for the Energy of Combustion lab and between Feb. 29 and Mar. 15 for the Spectroscopy/Kinetics lab. The Nickelocene lab is scheduled from Apr. 5 to Apr. 26. Finally, the Making a Better Cup of Coffee lab will be done throughout the semester concurrently with your other labs. Your group will work on this lab when you have periods in which you are waiting around. **Use your time efficiently and do not put off the lab until the end of the semester!**

Lab Safety:

1. ANSI approved goggles or safety glasses will be required at all times. Side shields or wrap around sunglasses **will not** be accepted as a substitute for proper eyewear.
2. Closed toe shoes will need to be worn.
3. The wearing of shorts or shirts without sleeves is strongly discouraged.

4. You will be required to take the online safety quiz. You will need to receive a score of 8 or higher and if you are one of the actors in the quiz then you will need to get a perfect 10. Failure to abide by the tenets of the protocol will result in dismissal from the lab and a failing grade in the class.

Grading:

Grades will be based on your performance in six areas:

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| 1. Lab Reports (Breakfast Cereal Lab, Spectroscopy/Kinetics and Nickelocene Lab) | 15 % |
| 2. Poster Presentation for Epoxidation Lab | 15% |
| 3. Notebook Pages | 10 % |
| 4. Lab Conduct and Cleanliness | 5 % |
| 5. Literature Assignment and Paper | 10 % |

Final grades will be assigned accordingly to the following scale.

94-100%, A; 90-93%, A-; 87-89%, B+; 83-86%, B; 80-82%, B-; 77-79%, C+; 73-76%, C; 70-72, C-; 67-69%, D+; 63-66%, D; 60-62%, D-; <59, F.

Literature:

The literature assignment for this term will continue on from Advanced Lab I. Each week you will read an article and hand in a 10 line minimum abstract of the article (the original abstract from the paper should also be included). At the end of the semester, you will then write a 3-page paper summarizing your topic. **The due date for the paper will be Thursday April 19.** The theme for this semester will be *metals in biological systems*. You will be assigned a transition metal at the beginning of the semester and each week you will be expected to read at least one article from the library corresponding to your assigned metal. The articles do not necessarily need to be related to one another but they should be related enough so you can write a coherent summary.

Each summary will be worth 10 points. Late summaries will be accepted up to 2:00 pm the next Tuesday but a late penalty will be applied. The first late summary will be penalized 1 point, the second will be penalized 1 point, the third 2 points, the fourth 3 points, the fifth 5 points and so on. This reading assignment is required every week whether an instructor remembers to remind you or not or whether Monday class is held. If no class is held on Monday then the assignment is due the following Monday with that week's assignment.

Notebooks:

You will be required to maintain a notebook throughout the semester. The notebook must contain carbon copy pages. At the end of each lab period you will hand in the carbon copy pages for that day's work. It will be the student's responsibility to determine what goes in the lab book but feedback will be provided in order to improve the utility of the notebook. Each set of notes will be worth 10 points. Late hand-ins will receive 0 points.

Experimental Reports, Poster and Presentation:

The format of all reports will be given with the lab instructions for a given week. Currently it is anticipated that there will be 3 lab reports for the semester. Lab reports will be worth 50 points each. **Lab reports will be due 2 weeks after your group completes the lab.** Late lab reports will be penalized 10 points for every day late. The format for the poster and oral presentations will be given later in the semester.

Lab Conduct and Cleanliness:

During the course of the semester you will be utilizing equipment whose total worth exceeds \$1,000,000. In order to ensure proper use of the equipment, a class wide conduct grade of 5 points will be assessed each week. The number of points assessed will be diminished if samples are left in instruments, chemicals are not properly disposed of or put away, scales are dirty, etc. Even if the sloppiness is the result of single person, the points are assessed the same to everyone in the class. Also, the points assessed will be diminished if the class as a whole shows a lack of adherence to the start and end times of the lab.

Blackboard:

A blackboard account has been created for this class. Lab handouts will be available here the Monday prior to the experiment. It is expected that you will download the handouts for a particular week prior to class on Monday. You will also be able to track your course grade as well.

Student Conduct and Academic Dishonesty:

Article 3, Section 1 of the Student Code of Conduct states:

Cheating or plagiarism in any form is unacceptable. The University functions to promote the cognitive and psychosocial development of all students. Therefore, all work submitted by a student must represent her/his own ideas, concepts, and current understanding. Academic dishonesty also includes submitting substantial portions of the same academic course work to more than one course for credit without prior permission of the instructor(s).

Further information can be found at: <http://www2.boisestate.edu/studentconduct/>

Laboratory Schedule

<i>Week of</i>	<i>Experiment</i>	<i>Experiment</i>	<i>Experiment</i>	<i>Experiment</i>
Jan. 18	Safety Training, Lab Overview, Synthesis Planning			
Jan. 25	Jacobsen Epoxidation			Making a Better Cup of Coffee
Feb. 1		Energy of Combustion of Breakfast Cereals		
Feb. 8				
Feb. 15				
Feb. 22				
Feb. 29			Spectroscopy/Kinetics	
Mar. 1				
Mar. 8				
Mar. 15				
Mar. 22	Poster Preparation for Epoxidation Lab			
Mar. 29	Spring Break			
April 5	Nickelocene Lab			
April 12				
April 19	Literature Paper Due			
April 26				
May 3	Nickelocene Report Due / Lab Cleanup			Coffee Presentation