

**CHEM 91/131, FALL 2007**  
**ADVANCED INORGANIC CHEMISTRY: CATALYSIS**  
**GENERAL INFORMATION AND SYLLABUS**

**Instructor:** David Glueck (305 Burke) 6-1568  
**Office Hours:** by appointment

**Course goals**

If this course is successful, at the end you should know:

1. how a variety of catalytic processes work
2. general concepts applicable to these and other reactions
3. how to use 1 and 2 to improve existing catalytic reactions and to devise new ones

**Prerequisites** Formally, Chem 90/130 (organometallic chemistry) or permission of the instructor. *In reality, MOST students in past classes have taken only an introductory inorganic chemistry course (Chem 64) or its equivalent, and this seems to work. We will begin with a brief review of results from Chem 64 and Chem 90/130. Please ASK if you are unsure about taking the class for this reason.*

**Text:** (a) van Leeuwen, P. W. N. M., *Homogeneous Catalysis: Understanding the Art*. Kluwer Academic Publishers, Boston. (b) lecture notes, to be handed out (c) additional textbooks on reserve in Kresge

**Lectures:** M,W,F 10-11:05, Burke 309

**WEB:** [www.dartmouth.edu/~chem131/](http://www.dartmouth.edu/~chem131/)

Homework assignments and some useful links will be available at this site.

**Exams:** There will be a midterm exam and a final.

Midterm: Tuesday Oct. 31, time TBA.

Final: Monday, December 5, nominally 8 AM

**Problem sets:** ten of these throughout the term, approximately one per week, due Mondays. Get these from the web page, see above.

**Proposal/presentation:** Every student must write a proposal (5 pages, similar format to the "third year proposal"). Topic: catalysis by metals. Sample general topics include mechanistic study of a known reaction, improvement of a known reaction, or development of a new reaction. Please ask for details.

The topic must be cleared with me by November 5; the written proposal is due by November 30. **An oral presentation of each proposal (15 minutes plus discussion) will be scheduled during the last week of class.**

**Grades:**

Problem sets: 30%

Midterm exam: 25%

Final exam: 25%

proposal/presentation: 20%

(a) Undergraduates will be graded according to the usual A-E scale.

(b) Graduate students can get high pass, pass, low pass, or fail grades. Note that the grade of Low Pass (LP) does *not* suffice for graduate credit.

**Topics**

See attached outline

**Students with Disabilities:** “Students with learning, physical, or psychiatric disabilities enrolled in this course that may need disability-related classroom accommodations are encouraged to make an office appointment to see me before the end of the second week of the term. All discussions will remain confidential, although the Student Disability Services office may be consulted to discuss appropriate implementation of any accommodation requested.”

**The Honor Principle applies to all these assignments, and you must complete them without assistance from other students. I will be available for consultation if you have any problems in completing an assignment.**

### Special honor principle notes

1. This class was offered in 2000, 2003 and 2005. Some of the homework and exam questions (and answers!) will be recycled. Please don't look at the homework and exams from the earlier classes.

2. The homework questions are from the literature, so one way to answer them is to look up the original papers. Although effective, this defeats the purpose of the homework. Please try to answer the questions on your own; ask me for help if needed. Look up the answers only as a last resort; if this is necessary, be sure to reference the appropriate papers on your homework.

### Chem 131 2007 Schedule

There are 28 scheduled lectures, MWF 10-11:05.

Subject	How many lectures? (Approximate!)	When?
1. Intro and review	1	
2. Additions to olefins	4	
3. CO chemistry	3	
4. Polyolefins	4	
5. olefin chemistry	3	
		<b>Exam 10/31</b>
6. oxidation	2	<b>Proposal topic due 11-5</b>
7. palladium	4	
8. asymmetric catalysis	3	
9. heterogeneous catalysis	4	<b>Proposal due 11/30</b>
		<b>Final Exam 12/5 (nominally 8 AM)</b>

Notes: classes start Wednesday 9/26 and end Tuesday 12/4. The Thanksgiving holiday runs from 11/21 through 11/23.

The midterm exam will come around the middle of the class, Tuesday October 31, time TBA.

Student proposal presentations will also be scheduled for the last week of class. The exact timing will depend on the enrollment.