Chemistry 430, Structural Analysis of Organic Molecules
Spring 2011

Course Days & Time: Monday, Wednesday, and Friday, 11:15 a.m. – 12:05 p.m.
Course Location: 101 Osmond

Lecturer:
Dr. Kate Masters
Office: 218 Whitmore Lab
Phone: 863-3319
E-mail: kmasters@psu.edu
Office Hours: By appointment on Tuesday or Thursday afternoons

Website: ANGEL, Chem 430, Section 001 Sp11


Course Content

This course is designed to teach you how to interpret spectral data for the purpose of elucidating structures of organic molecules. Some theoretical background will be given for various spectroscopic/identification methods, but the emphasis will be placed on solving problems, that is, interpreting and annotating the spectral data for pure compounds and for mixtures/impure compounds. Essentially, the goal is to give you an idea of what a synthetic organic chemist faces when analyzing compounds. Thus, this course will be taught from a very practical standpoint. Identification methods to be covered include UV/Vis spectroscopy, IR spectroscopy, mass spectrometry, and NMR spectroscopy. Concurrent: Chem 212

Course Topics, in order:

1. UV/Vis Spectroscopy (Chapter 7, Pavia text)
2. Infrared Spectroscopy (IR) (Chapter 2)
3. Mass Spectrometry (MS) (Chapter 8)
4. 1D Nuclear Magnetic Resonance (NMR) (Chapters 3-6)
5. 2D NMR (Chapter 10)

For each of these topics, you are encouraged to read the appropriate chapters indicated above. At the end of these chapters you will find *starred* problems. These problems’ answers are given near the end of the book, in the “ANS-1” section. You are encouraged to answer as many of these problems for practice; try to refrain from looking at the answer until you are satisfied with your answer.

In Pavia’s text, you will also find relevant and useful appendices, which may be useful for interpretation of data. The information in these appendices may or may not be given in the lecture notes; be aware that they are in the textbook, and you can use them during quizzes and on the final exam.
Practice Problems

In addition to the problems found in Pavia’s text, the following websites contain practice spectral problems:

- Organic Structure Elucidation: [http://www.nd.edu/~smithgrp/structure/workbook.html](http://www.nd.edu/~smithgrp/structure/workbook.html)
- Organic Spectral Analysis Problems: [http://home.millsaps.edu/kramewh/Fertig/startspecpage.html](http://home.millsaps.edu/kramewh/Fertig/startspecpage.html)

Grades

Earned points are accumulated by the following: group questions (weighted to equal 20% of the final grade), in-class quizzes (seven in total, weighted to equal 60% of final grade), and a comprehensive, final exam (weighted to equal 20% of the final grade). The typical overall average in this course is a grade of B. Class participation is important and will be considered in cases where a student is close to a grade cutoff.

Group Questions (20% of Final Grade)

The purpose of group questions is to get students to participate in the class and for the instructor to get frequent feedback on student understanding of concepts. Groups of three or four students will form by the end of the second week of the semester. Questions will be handed out, worked on, and then collected during lecture. The questions will be worth varying points; they (in total) are weighted to equal 20% of the final grade. Each group will get one grade for these questions, thus it is important that everyone in the group participates equally and shows up for lecture! The lowest three (3) grades (in %) for each individual person will be dropped. Thus, if you miss three (3) group questions for any reason or if your group gets low scores on three (3) group question assigned (and you've attended each lecture), those three lowest scores will be dropped and will not be factored into the 20% of your final grade.

Note: There are no make-ups for group questions.

Quizzes (60% of Final Grade): Seven In-Class Quizzes

Quizzes will be given during regular class time and will consist of a one to three questions. You will have 55 minutes to take the quizzes and will be given correlation charts to assist in answer questions. You are to work independently on the quizzes. The quizzes will be worth varying points; they (in total) are weighted to equal 60% of the final grade. If you miss a quiz for a legitimate reason, there will be a comprehensive quiz held near the end of the semester.

Tentative Quiz Schedule & Content:
Quiz 1 on UV/Vis - Monday, January 24
Quiz 2 on IR - Friday, February 4
Quiz 3 on IR, MS - Monday, February 14
Quiz 4 on IR, MS - Wednesday, March 2
Quiz 5 on IR, MS, NMR - Friday, March 25
Quiz 6 on IR, MS, NMR - Friday, April 8
Quiz 7 on IR, MS, NMR - Wednesday, April 27
Comprehensive Final Exam (20% of Final Grade)

The final exam will be comprehensive in that it can contain problems that test you on all spectroscopic methods covered during the semester. The final exam’s day/time and location will be determined by the university’s scheduling system.

Procedures & Policies

All late-drop students will receive WN designations on their transcripts.

Registrar Dates

- Drop Period: January 10 – January 19
- Add Period: January 10 – January 20 (8 am)
- Final Exam Conflict Filing Period: February 14 – March 6
- Late Drop Period: January 20 – April 8

Academic Integrity: Instructors are now asked (Senate Rule 49-20) to provide at the beginning of a course a statement to "clarify the application of academic integrity criteria to that course". The Senate Rule includes the following:

Academic dishonesty includes, but is not limited to, cheating, plagiarizing, fabrication of information or citations, facilitating acts of academic dishonesty by others, having unauthorized possession of examinations, submitting work of another person or work previously used without informing the instructor, or tampering with the academic work of other students.

(You should also be aware of the extensive parts of this Rule that describe procedures for handling alleged instances of academic dishonesty.) Specific instances of academic dishonesty in this course would include (but not limited to) copying or helping someone else copy during an examination, using unauthorized materials during an examination, stealing or destroying course materials or another student's examination paper, altering answers or grades on graded examinations, having someone take an examination for you, and attempting to do any of the above. Such infractions are considered cause, at the least, for awarding a grade of "0" on the exam in question (and not allowing the student to drop the class).