

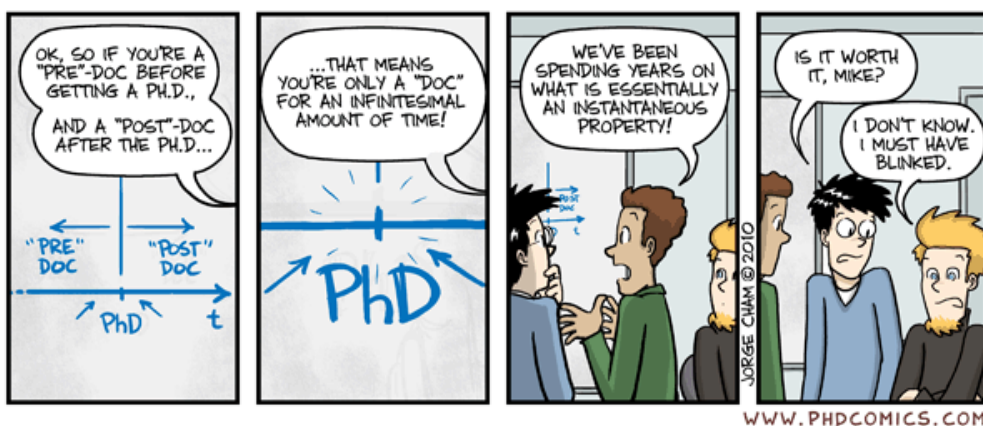
## Chemistry 544: Applied Spectroscopy Fall Semester 2019

**Professor:** Mike DeGrandpre, Chemistry Building 318. Office hours: Drop in anytime or phone (243-4118) or email (michael.degrandpre@umontana.edu) to make an appointment.

**Course objective and prerequisite:** To obtain an in depth knowledge of spectrochemical methods and general optical instrumentation. I assume you have taken instrumental analysis at the undergraduate level.

**Course overview:** This course will present an in-depth look at spectrochemical instrumentation and methods, focusing on optical spectroscopy, i.e. the UV to IR spectral region. We will discuss optics and other components commonly used in optical spectroscopy centered around the chapters in the book along with application papers taken from the literature. During the first half of the course, we will discuss optics and other components such as light sources and detectors. Later in the semester we will focus on specific types of atomic and molecular spectroscopic methods (see schedule on back). A few labs are included to help develop a practical understanding of optics and spectrochemical measurements. Lastly, a review paper is also required (see grade breakdown below).

**Text:** *Spectrochemical Analysis*, Ingle and Crouch, Prentice-Hall 1988, 1st ed. They have converted Ingle and Crouch to a soft cover. The hard cover is much nicer and used versions should be available on-line. This text is an excellent in-depth treatise on this subject but is now out-dated in some critical areas. We will supplement with research papers when needed.



(continued on back)

**Final grades will be on the +/- scale (A, A-, B+, B, B-, etc) and broken down as follows:**

- |                        |      |
|------------------------|------|
| 1. Class participation | 10 % |
| 2. Homework, labs      | 15 % |
| 3. Exams (2)           | 40 % |
| 4. Course paper        | 15 % |
| 5. Final Exam          | 20 % |

<b><i>Chemistry 544</i></b>		
<b><i>Fall 2019 Lecture Schedule</i></b>		
<b>Week Date</b>	<b>Lecture subject</b>	<b>Chapter</b>
1 Aug 26	course overview, spectroscopy overview, optics intro	1,2,3
2 Sept 2	optics: reflection, refraction, interference	3
3 Sept 9	optics: polarization, ORD, CD	3
4 Sept 16	optics: mirrors, lenses, fiber optics	3
5 Sept 23	optics: filters, prisms, diffraction gratings	3
6 Sept 30	optics: monochromators, interferometers	3
7 Oct 7	light sources, detectors	4
8 Oct 14	noise sources, atomic spectrochemical methods	5,7-11
9 Oct 21	atomic spectrochemical methods	7-11
10 Oct 28	atomic spectrochemical methods	7-11
11 Nov 4	UV/VIS spectrophotometry	13
12 Nov 11	IR spectrophotometry	14
13 Nov 18	fluorescence spectrophotometry	15
14 Nov 25	molecular scattering (Raman)	16
15 Dec 2	other methods	res. papers
16 Dec 9	final exam week (10:10 Wed. Dec. 11)	