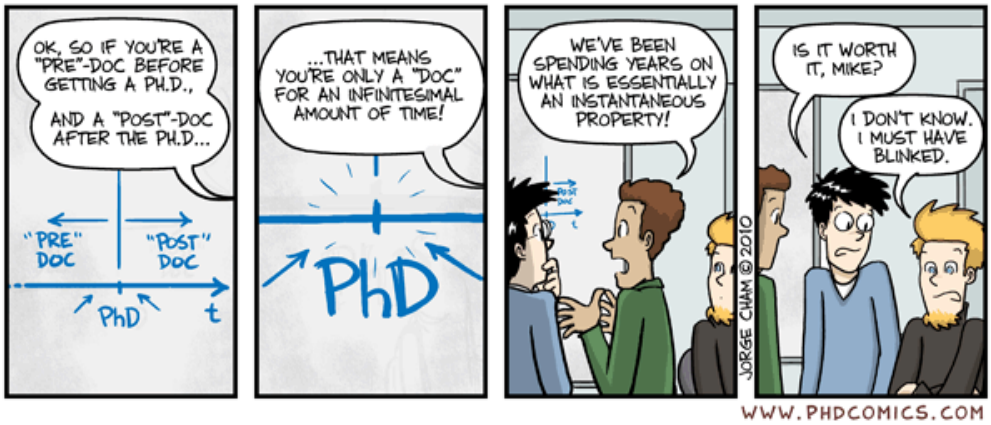
Chemistry 544: Applied Spectroscopy
Fall Semester 2021

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 prerequesite: To obtain a good working 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 books 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: *Principles of Instrumental Analysis*, 7th ed (2018) Skoog, Holler, and Crouch and *Spectrochemical Analysis*, Ingle and Crouch, Prentice-Hall 1988, 1st ed. I will provide the pdf of Ingle and Crouch. The hard cover is nice and used versions are 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 Skoog and other literature when needed.



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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, reading 20 %
3. Exams (2) 40 %
4. Course paper 10 %
5. Final Exam 20 %

COVID-related items

- Mask use is required within the classroom and laboratory
- Students should not congregate outside the classroom before and after class
- Specific seating arrangements will be used to ensure social distancing and support contact tracing efforts
- Drinking liquids and eating food is not permitted within the classroom or laboratory
- Stay home if you feel sick and/or if exhibiting COVID-19 symptoms
- See the UM Coronavirus Website for updates: https://www.umt.edu/coronavirus

	Chemistry 544 ***Fall 2021 Lecture Schedule***	
Week Date	**Lecture subject**	**Ingle and Crouch Chapter**
1 Aug 30	**course overview, spectroscopy overview, optics intro**	**1,2,3**
2 Sept 6	**optics: reflection, refraction, interference**	**3**
3 Sept 13	**optics: polarization, ORD, CD**	**3**
4 Sept 20	**optics: mirrors, lenses, fiber optics**	**3**
5 Sept 27	**optics: filters, prisms, diffraction gratings**	**3**
6 Oct 4	**optics: monochromators, interferometers**	**3**
7 Oct 11	**light sources, detectors**	**4**
8 Oct 18	**noise sources, atomic spectrochemical methods**	**5,7-11**
9 Oct 25	**atomic spectrochemical methods**	**7-11**
10 Nov 1	**atomic spectrochemical methods**	**7-11**
11 Nov 8	**UV/VIS spectrophotometry**	**13**
12 Nov 15	**IR spectrophotometry**	**14**
13 Nov 22	**fluorescence spectrophotometry**	**15**
14 Nov 29	**molecular scattering (Raman)**	**16**
15 Dec 6	**other methods**	**res. papers**
16 Dec 13	**final exam week (10:10 Tue Dec. 14)**	