

CHEM431 Analytical Chemistry II

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Winter Term 2014
Office Hours: Thu 1-2:00 pm, Fri 10-11:00 am
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Lecture Meetings: Fri 11:00-12:50 pm
Lecture Room: Main Bldg 301

Lab Meeting: Tue 9:00 am -1:00 pm (sec 062)
Wed 9:00 am -1:00 pm (sec 063)
Thu 9:00 am -1:00 pm (sec 061)
Laboratories: Disque 406/409

Course Objectives:

- to secure a basic understanding of the intermolecular interactions underlying separations methods
- to understand the range of available separations techniques and their applicability to different types of chemical analytes
- to obtain hands-on experience with a range of electronic, spectroscopic and separations instrumentation
- to develop proficiency in collecting and critically analyzing chemical data
- to develop proficiency in presenting chemical data in a both a verbal and formal written format

Required Textbook:

Douglas A. Skoog, F. James Holler, Stanley R. Crouch, Principles of Instrumental Analysis, 6th ed., Belmont, CA: Thomson Brooks-Cole, Inc., 2007, ISBN-10: 0-495-01201-7.

Optional Textbook:

Donald T. Sawyer, William R. Heineman, Janice M. Beebe, Chemistry Experiments for Instrumental Methods, New York: John Wiley & Sons, 1984, ISBN-10: 0-471-89303-X.

Note that *selected chapters* from this text will be made available to you on Bb Learn.

Lab Schedule (Tuesday, section 062):

Jan	7	Lab tour/practical	18	Lab
	14	Lab	25	Lab
	21	Lab	Mar	4
	28	Lab		11
Feb	4	Lab		18
	11	Lab		Make-up week (finals week)

Lab Schedule (Wednesday, section 063):

Jan	8	Lab tour/practical	19	Lab
	15	Lab		26
	22	Lab	Mar	5
	29	Lab		12
Feb	5	Lab		19
	12	Lab		Make-up week (finals week)

Lab Schedule (Thursday, section 061):

Jan	9	Lab tour/practical	20	Lab
	16	Lab	27	Lab
	23	Lab	Mar 6	Lab
	30	Lab	13	PPT Presentations/Lab
Feb	6	Lab	20	Make-up week (finals week)
	13	Lab		

Lecture Topic Coverage:

* The chapters listed here are in the textbook by Skoog, Holler and Crouch:

Lab Lecture (LL): Data treatment	
LL: Spectroscopy- UV/visible	
LL: Spectroscopy- AA	
LL: Spectroscopy- fluorescence	
LL: Spectroscopy- FT-IR	
LL: Electronics	
LL: Chromatography- GC/MS	
LL: Chromatography- HPLC	
LL: Electronics/Electrochemistry	
Optical Instrumentation (continuation of CHEM430)	
Introduction to Chromatography	chapter 26*
Gas Chromatography	chapter 27*
High Performance Liquid Chromatography	chapter 28*
Supercritical Fluid Chromatography	chapter 29*
Other Chromatographic Methods	

Note about the lab lectures: I will strive to record the lab lectures for each of the individual experiments over the next couple of weeks; these will be in the form of a screencast available on the experiment Content Page. You will be responsible for viewing the LL prior to the day you are assigned to perform the lab. Further, you may be required to take and pass a short quiz on each lab (available electronically through Bb Learn) prior to the day of the lab.

Course Grading:

1 final exam, one or more problem sets, in-class quizzes	(total 25%)
7 laboratory reports (each worth 100 points), lab practical (25 points)	(total 75%)
Extra credit project	up to 10%

Results for the digital pipet calibration section of the Lab Practical **must** be turned in electronically via Bb Learn by **1/13/14**, or you will lose one letter grade **for the course** for each week it is late. The other sections of the lab practical **must** be turned in electronically via Bb Learn by **1/14/14 (sec 062)**, **1/15/14 (sec 063)** or **1/16/14 (sec 061)**.

CHEM431 is officially specified as a *Writing Intensive Course*. While the course has always required comprehensive written laboratory reports, we must now include several written draft/critique/rewrite cycles for at least one of the writing assignments. Unlike other writing

intensive courses, however, we *will not* be using a writing intensive tutor (WIT) or peer tutor. For each of you the first laboratory experiment (conducted during the second week of the term) will be required to be written up as a *Full Report*. Your first draft must be submitted electronically via Bb Learn by Monday **1/27/14** (this gives you two weekends to work on the report). I will read your submission and provide comments back to you; if you wish to meet about your report we should schedule a meeting for sometime later in the week of **1/27/14**. Your second draft is then due (also electronically through Bb Learn) by Monday, **2/3/14**. After a second critique the final draft is due for grading by Monday **2/10/14**. You should submit each of your other reports at weekly intervals (roughly 2-1/2 weeks after you perform the lab). All lab reports are due by the day of the final examination.

During the last (i.e., tenth) week of the course you are required to present one of your lab reports to the class in the form of a Powerpoint presentation. Details of the *PPT Report* format are provided in the CHEM431 General Information Handout. I will give you an opportunity to submit a draft of the PPT for comments approximately 10 days before the presentation date.

All experimental work **must** be finished prior to the end of the quarter. An incomplete in the course will only be given for writing up the lab reports. Exceptions to this rule will generally not be granted without significant extenuating circumstances; these exceptions **must** be requested in writing. In order to receive an incomplete you will be required to sign an incomplete contract (available for download on Bb Learn) listing the materials outstanding and a date by which they will be completed. *According to the university rules, you are expected to complete the work for an incomplete no later than one calendar year after the end of the course. However, to encourage timely completion, a penalty of 1/3 of a grade step (e.g., an A will be lowered to an A-) will be assigned for each quarter your incomplete is outstanding (note that you will be allowed one "free" extra quarter to complete your reports). Also note that no INC will be allowed to extend beyond the expected date of graduation listed on the INC contract. If you do not complete and submit all of your reports by the 7th week of the term you are scheduled to graduate, a final and irreversible grade of D for the course will be entered at that time.*

Extra Credit Project:

CHEM431 will likely take a good deal of your time, both in lab and outside. However, if you desire to earn extra credit we have a number of projects that you may work on. In many cases these are either modifications to existing labs or new labs that we wish to "try out" but have not found time to do so ourselves. The amount of effort required is approximately that of performing a single lab experiment. It will include approximately 4 hours of laboratory work and a write-up of the results that you obtain in the *Full Report* lab report format. All extra credit laboratory work must be done before the end of the term. You should see me as early as possible in the term to set up the project if you are interested.

Additional Reading:

H.A. Strobel & W.R. Heineman, Chemical Instrumentation: A Systematic Approach, 3rd ed., New York: John Wiley & Sons, Inc., 1989.

H.H. Willard, L.L. Merritt, Jr., J.A. Dean, F.A. Settle, Jr., Instrumental Methods of Analysis, 7th ed., New York: D. Van Nostrand & Co., 1988.

G.D. Christian, J.E. O'Reilly, Instrumental Analysis, 2nd ed., Boston, MA: Allyn & Bacon, Inc., 1986.

D.G. Peters, J.M. Hayes, G.M. Hieftje, Chemical Separations and Measurements, Philadelphia, PA: W.B. Saunders Co., 1974.

In addition to the general texts given above there are a number of suggested readings for each experiment, as listed on the individual experiment Content Pages on Bb Learn. You may wish to peruse a copy of the instruction/operation manual for the instrument you will be using prior to the lab period- you can read the copy located in the lab. You are responsible for having read this material **PRIOR** to entering the laboratory.

Recorded Lectures:

The lectures for this class will be recorded; the screencasts will be made available on the *Lecture Archive* page available on the course homepage on Bb Learn. Every effort will be made to have the screencasts posted within 48 hours of the class. They will be available in both Shockwave (Flash) and zipped Ipad (*.m4v) format. In some cases additional material will be assigned as recorded lectures only. You are responsible for the material presented in those lectures as well.

Attendance/Lateness Policy

Your attendance at all of the laboratory meetings is **required**; you are also expected to arrive to lab on-time. If you know you must miss a laboratory meeting due to attendance at a conference, a pre-scheduled off-site interview (as for a coop position), or some other event, you must indicate this to me in writing at least 48 hours prior to the lab period (although earlier notice is appreciated to facilitate rescheduling). Missing a lab period due to sickness or injury will require a doctor's note. As you are working in pairs on these experiments your timely arrival to lab affects not only yourself but your partner. Lateness of more than 20 minutes will result in loss of the 10 points allotted for that lab meeting for *Laboratory Technique and Notebook*. While I do not require attendance at the lectures (as they are recorded and posted on Bb Learn), I highly encourage you to attend in order to be able to ask questions and help shape the course of the lecture. You are, of course, responsible for the material covered or assigned in the lecture, even if you choose to watch one or more of them afterwards.

Academic Integrity

As you are working towards becoming a chemical professional, you are expected to maintain the highest degree of integrity in your work, as reflected by the Ethical & Professional Guidelines as published by the American Chemical Society (available at the ACS website under Careers, Professional Development, Ethics and Professional Guidelines). Your efforts as a student here at Drexel are covered by the academic dishonesty policy found at http://www.drexel.edu/provost/policies/academic_dishonesty.asp.

Course Drop/Withdrawal

Courses may only be dropped during the "drop period" lasting from the beginning of the enrollment period through the end of the second week of the quarter. Dropping a course results in the course being removed from the student's academic record without a "W" appearing on the transcript; i.e., neither the course nor the grade of "W" appears on the student's transcript. Students may withdraw from a course during the "withdrawal period" lasting from the beginning of the third week through the end of the seventh week of the quarter. Withdrawing from a course causes both the name of the course and the grade of "W" to appear on the student's transcript. Before withdrawing from a course, students should

consult with the instructor. You should consult the information found on the Provost's office website http://www.drexel.edu/provost/policies/academic_transactions.asp for complete details.

Disability Services

Students with disabilities who wish to request accommodations and services at Drexel University need to present a current accommodation verification letter ("AVL") to the instructor before accommodations can be made. AVL's are issued by the Office of Disability Resources, which is based in the Office of Equality & Diversity (see <http://www.drexel.edu/oed/disabilityResources/>).

Bb Learn

We will be using Bb Learn, Drexel's on-line Course Management System, extensively to enhance communication in CHEM431. The instructions below tell you how to log on and begin using Bb Learn:

- 1) Login through DrexelOne at <http://one.drexel.edu>.
- 2) Enter your Drexel domain ID and password, click on **Login**.
- 3) Click on the **Students** Tab.
- 4) Click on the **My Courses** link.

or

- 1) Enter the Drexel Bb Learn website directly at <https://learn.dcollege.net/>.
- 2) Enter your Drexel domain ID and password, click on **OK**.

If you enter these correctly you will now be on your Bb Learn dashboard. Select **Analytical Chemistry I CHEM431** from the list of courses in the center pane of the screen under the heading **My Courses**. You will now be on the course homepage. Please note that there is a Content Page dedicated to each experiment you will perform on the homepage. The calendar will be used for lab schedules, lab report reminders, etc.

Communication

It is assumed that all students have a Drexel computer account for email and easy access to the Internet and to the Drexel University network.

Syllabus Modification

I reserve the right to modify the syllabus, including the course schedule and list of topics, at anytime during the course. I will announce any changes both in lecture and by posting on Bb Learn.

Rev 1/2/14 kgo