

CHM 4130, Instrumental Analysis

Fall 2022

Instructor: Dr. Alexander Jacobs, Leigh 202A, phone 352-392-0528,
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Teaching Assistant: Zhongling "Julie" Liang liang.zh@chem.ufl.edu
Office Hours: TBD

Course time: M/W/F 10:40 am-11:30am
Flint 109

Optional textbook:
Fundamentals of Analytical Chemistry 9th Edition Skoog, West, Holler and Crouch

A full Analytical textbook is also available at
http://dpuadweb.depauw.edu/harvey_web/eTextProject/version_2.1.html

Objectives:

Delve further into Analytical Chemistry, placing more focus on instrumentation and covering more exotic and specialized methods of analysis.

Participation

Regular attendance at all class meetings and participation during lectures is expected. The Professor and TA reserve the right to incorporate participation as a part of the grade.

Problem Sets

Four problem sets will be assigned during the semester. Completed problem sets must be turned at 11:59 pm on the day they are due. Late sets are accepted with a valid excuse. Unexcused late assignments will be counted late and lose 10% per day. *It is expected that students submit professional quality (hand written) work, organized neatly and arranged in such a way as to provide evidence of a clear thought process in solution of problems. Problem sets which are sloppy, disorganized, or late will not be accepted for grading.* Solutions will be made available on a per student basis by request during office hours. Each problem set is worth 25 pts (for a total of 100, or 10% of final grade).

Taskmaster

During the semester there will be in class group activities based on the British comedy contest, Taskmaster. You will be split into 6 teams at the start of the semester. There will be 2 tasks per Taskmaster day, a prize task and an in class task. Everyone will be informed of the prize task at the start of the week and the

group will need to decide what item to bring in for the category. At the start of the class, one representative from each group will try to convince me why the group's item fits the category the best. Teams will be assigned points after all 6 groups have gone. After, the in-class task will be given. The task will be read and then given the disclosed amount of time, the teams will complete the task. Points will be given based on the guidelines of the task. At the end of the semester, the team with the most points wins...something completely meaningless. Most tasks will be related to instrumental analysis, but some, mainly prize tasks, may not. More details will be given in class.

Examinations

Exams will be take home exams. On the day of the exam, the exam will be posted on Canvas. You will have 1 week to complete the exam and submit it on Canvas. The exam is all short answer style questions. The exam is open note and you will have access to any resource you want. However you cannot ask another person for help or work with others.

Absence:

If you know ahead that you will have to miss lecture, notify your TA and Dr. Jacobs in advance. If you are sick and cannot reach anyone before lecture, please let us know at your earliest convenience. If you are not feeling well, do not come to lecture.

In response to COVID-19, the following recommendations are in place to maintain your learning environment, to enhance the safety of our in-classroom interactions, and to further the health and safety of ourselves, our neighbors, and our loved ones.

- If you are not vaccinated, get vaccinated. Vaccines are readily available and have been demonstrated to be safe and effective against the COVID-19 virus. Visit one.ufl.edu for screening / testing and vaccination opportunities.
- If you are sick, stay home. Please call your primary care provider if you are ill and need immediate care or the UF Student Health Care Center at 352-392-1161 to be evaluated.
- Course materials will be provided to you with an excused absence, and you will be given a reasonable amount of time to make up work.

Academic Dishonesty

The Honor Code (<http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructors or TAs in this class.

The sale or transfer of graded or ungraded course materials to another student for use in this course (current or future semesters) is in violation of the Honor Code. All violations will be reported.

DRC Accommodations

Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the instructor when requesting accommodation.

Grades

The course grade is based on the total 500 points.

<u>Category</u>	<u>Possible Points</u>
Problem Sets	4·25 pts
Exam 1	100
Exam 2	100
Exam 3	100
Final	<u>100</u>
Total	500

<u>Letter Grade</u>	<u>Percentage</u>	<u>Letter Grade</u>	<u>Percentage</u>	<u>Letter Grade</u>	<u>Percentage</u>
A	≥93	B-	≥80	D+	≥67
A-	≥90	C+	≥77	D	≥64
B+	≥87	C	≥73	E	<60
B	≥83	C-	≥70		

<u>Date</u>	<u>Topic</u>	
8/29 (M)	Course introduction; The Analytical Method	
8/31 (W)	Intro to Optical Spectroscopy	
9/2 (F)	Intro to Optical Spectroscopy	
9/5 (M)	No Class (Labor Day)	
9/7 (W)	Components of Optical Instruments	
9/9 (F)	Components of Optical Instruments	
9/12 (M)	UV-Vis	
9/14 (W)	UV-Vis	
9/16 (F)	Taskmaster In Class 1	
9/19 (M)	IR	
9/21 (W)	Atomic Absorption	
9/23 (F)	AA & Atomic Emission	
9/26 (M)	Atomic Emission	
9/28 (W)	Luminescence	
9/30 (F)	Taskmaster In Class 2	Homework 1 Due
10/3 (M)	Review for Exam 1	
10/5 (W)	Intro to Separations	Exam 1
10/7 (F)	No Class (Homecoming)	
10/10 (M)	Intro to Separations	
10/12 (W)	Liquid Chromatography	Exam 1 Due
10/14 (F)	Liquid Chromatography	
10/17 (M)	Gas Chromatography	
10/19 (W)	Gas Chromatography	
10/21 (F)	Capillary Electrophoresis	
10/24 (M)	Ion Mobility Spectrometry	
10/26 (W)	Taskmaster In class 3	Homework 2 Due

10/28 (F)	Review for Exam 2	
10/31 (M)	Introduction to Mass Spectrometry	Exam 2
11/2 (W)	Mass Spec ionization sources (small and large)	
11/4 (F)	Mass Spec ionization sources (small and large)	
11/7 (M)	Mass Spec ionization sources (specialized)	Exam 2 Due
11/9 (W)	Mass Analyzers Part 1	
11/11 (F)	No Class (Veterans Day)	
11/14 (M)	Mass Analyzers Part 2	
11/16 (W)	Mass Detectors	
11/18 (F)	Taskmaster In Class 4	Homework 3 Due
11/21 (M)	Thanksgiving	
11/23 (W)	Thanksgiving	
11/25 (F)	Thanksgiving	
11/28 (M)	Review for Exam 3	Exam 3
11/30 (W)	Interpreting EI mass spectra	
12/2 (F)	Interpreting EI mass spectra	
12/5 (M)	Taskmaster In Class 5	Exam 3 Due
12/7 (W)	Review for final (Final Posted to Canvas after class)	Homework 4 Due
12/14 (W)	Final due	