



# CHM4411L: Physical Chemistry Laboratory

Fall 2018 (August 22 – August 14)  
(2 Credit Hours)

## Course Website

**Course Materials and “Manual:”** All course materials will be available through our secure course website, listed above, which is a Canvas LMS site hosted by Instructure. There is no printed textbook or lab manual.

**Instructor: Adam Mansell**

**Office Hours:** LEI 232

Monday: 12:00 pm – 1:00 pm

Tuesday: 11:00 am – 12:00 pm

Wednesday: 11:00 am – 12:00 pm

## Contact:

**Office Hours:** Individual office hours are listed above. Office hours will also be given by appointment if you have a conflict with the ones listed.

**Email:** Email should be sent through the Canvas messaging tool, and should include your section number and group designation. Occasionally, we will use the announcement tool on Canvas to disseminate information to the entire class. Please ensure that your Canvas account is configured to send notifications to your preferred communication/ email method.

## Weekly Lecture Period:

Thurs: 4<sup>th</sup> period (10:40 – 11:30 am) Attendance is mandatory.

## Lab Sessions: LEI 248

**11965:** Tues. 6<sup>th</sup> - 10<sup>th</sup> periods (12:50 – 6:00 pm)

**11966:** Wed. 6<sup>th</sup> - 10<sup>th</sup> periods (12:50 – 6:00 pm)

- It is your responsibility to come prepared each week. The specific requirements will be unique for each experiment, which means you will need to attend the weekly lecture and read the material provided online in order to know what is expected of you.
- There will be pre-lab quizzes for some of the experiments throughout the semester.
- Your TAs will check your material and knowledge of the experiment at the beginning of each lab session to ensure you are adequately prepared (including proper clothing). If they are not satisfied, they may turn you away.
- Contact your instructors and group members well in

## FALL SEMESTER 2018

	S	M	T	W	T	F	S
Aug.	12	13	14	15	16	17	18
			Registration	-----	Drop/Add	-----	
	19	20	21	22	23	24	25
		Drop/Add	-----				
	26	27	28	29	30	31	
Sept.							1
		Holiday					
	2	3	4	5	6	7	8
	9	10	11	12	13	14	15
	16	17	18	19	20	21	22
	23	24	25	26	27	28	29
	30						
Oct.		1	2	3	4	5	6
	7	8	9	10	11	12	13
	14	15	16	17	18	19	20
	21	22	23	24	25	26	27
	28	29	30	31			
Nov.					1	2	3
						Homecoming	
	4	5	6	7	8	9	10
	11	Holiday	12	13	14	15	16
	18	19	20	21	22	23	24
			Tent.				
	25	26	27	28	29	30	
Dec.							1
					Reading Days		
	2	3	4	5	6	7	8
						Commencement	
	9	10	11	12	13	14	15
	16	Grades Due	17	18	19	20	21
	23		Holiday	24	25	26	27
				28	29		

IDENTIFICATION SYMBOL:

Classes

Exams

advance of any anticipated absence so alternative scheduling can be made. For some weeks your lab group may be assigned a specific time of arrival.

## Course Objectives

- Create publication-quality scientific reports.
- Analyze and present experimental data graphically, cogently, and succinctly.
- Keep a professional scientific notebook.
- Perform reliable and accurate measurements.
- Interpret and expand scientific protocols and experimental design.
- Give a professional presentation on scientific work performed in the lab.

## Lab Safety

All safety procedures must be strictly obeyed. Safety glasses must be worn at all times in the laboratory. Wear long-sleeved and -legged clothes to protect your skin against spills, or bring a lab “kittel.” Closed-toed shoes are mandatory. Remove all pendant jewelry when working in the lab. If you have long hair, you may not let it hang loose but should tuck it away safely so that it doesn’t present a potential hazard for you. Refer to the [ACS safety manual](#) (click on the link or find under Files → Resources on Canvas) which regulates all safety procedures in the lab.

## Ethics

Students are expected to conduct themselves professionally in this course. This includes following the UF Honor Code (see below) and a complete understanding of academic integrity. Plagiarism and data fabrication will not be tolerated.

## Groups

Each lab section will be divided into groups of two students. You will work together as a team in the lab. For some labs several groups will work together. Lab reports will be submitted individually.

## Lab Notebook and Data Plotting.

Every good Chemist has a lab notebook by their side. It is a journal, evidence of discovery, a historical record, and a valuable tool. You will keep a proper lab notebook in this course. Your notebook will be checked and graded at the beginning and end of each lab period.

- Prior to the experiment:
  - Every **individual’s** notebook needs to be prepared with all tables and notes necessary for the specific experiment prior to coming to lab.
  - Every **group** should come with a laptop that has sufficient software to plot data as you collect it. The specific software should be prepared before coming to lab.
- During the lab session:
  - Your group should assess your data as it is collected, either visually with a plot, or by forming a table, or both.
  - It is your responsibility to repeat data measurements in cases where things have gone awry.
- Notebook grade: - Your TA will check your notebook both before and after the experiment, and grade it as acceptable (100%), unacceptable (50%) or empty (0%).

## Written Lab Reports

Each student will be responsible for submitting a write-up after each experiment. The specific expectations and due dates will be stated on the assignment page for each experiment. Many of the assignments will require you to write one or more of the sections described below:

1. Title Page and Abstract
2. Introduction: State purpose and/or problem on which the experiment is focused. Briefly indicate the theory or hypothesis to be verified.
3. Experimental: Briefly describe the procedure used.
  1. It may be appropriate to include an illustration of a block diagram of the experimental set-up.
  2. Include a structure diagram of any chemicals used in the experiment (excluding solvents etc.), and the schemes of any reactions that take place.

3. Any equations used in the derivation of values of interest using measured values, including example calculations
4. Results:
  1. Summary of results presented in tables and/ or figures
  2. Any equations used in the analysis of the collected data, including example calculations
  3. Error analysis
5. Discussion: Based on your experimental results evaluate your data in terms of the applicable theory, and try to answer the question/ hypothesis presented in the introduction.
  1. Determine whether your results corroborate or disprove the working theory/hypothesis.
  2. Suggest reasons for such disagreements and try to analyze them as much as possible. If your results fit within the accepted theory, discuss to what extent (to which experimental precision) this is the case.
  3. Discuss strengths and weaknesses of the approach. Discuss what improvements could be done to the experimental approach and/or the theory.
6. Conclusion: Briefly restate the most important conclusions worked out in the Discussion section, give important measurement results with proper error limits, and state how your work fits into the bigger scheme of things (as outlined in the introduction).
7. References – References should follow ACS formatting guidelines
8. Whenever possible and appropriate use mathematical, spreadsheet and/or graphing software for your analysis, such as Mathematica, Matlab, Matplotlib, MS Excel, xmgrace, Texplot, Sigmaplot, *etc.* Make sure that your plots look professional. The default setting of MS Excel is particularly notorious in producing awful plots. If you decide to work with Excel, make sure to modify the settings to produce high quality plots.
9. Reports should be prepared by computer. Either use a word processing program or one of the more advanced mathematics programs that allow you to intersperse text with calculations and figures. Pay attention to typos (use your word processing program's spell-checker), and to proper grammar.

### Course Grade Computation

Your letter grade will be derived from a simple calculation: the weighted average of your performance in:

	<b>Percentage Points</b>
<b>Quizzes (prelab and post lab feedback)</b>	5%
<b>Notebook</b>	5%
<b>Library Report</b>	5%
<b>Oral Reports</b>	20%
<b>Written Reports</b>	60%
<b>Subjective Grade</b>	5%
<b>Total</b>	100%

Your course grade will be determined from your total course performance percentage as follows:

90.0%-100%	A
88.0%-89.9%	A-
86.0%-87.9%	B+
80.0%-85.9%	B
78.0%-79.9%	B-
76.0%-77.9%	C+
70.0%-75.9%	C
68.0%-69.9%	C-
66.0%-67.9%	D+
60.0%-65.9%	D
50.0%-59.9%	D-
< 50%	E

All grades will be posted in the Canvas GradeBook, as available.

UF's Grading Policy: <http://www.registrar.ufl.edu/catalog/policies/regulationgrades.html>

Experiment Schedule

Week	Date	Experiment
1	Aug 20-24	None
2	Aug 30-31	Heat Capacity Ratios
3	Sep 3-7	Conjugated Dyes
4	Sep 10-14	pK <sub>a</sub> (1)
5	Sep 17-21	pK <sub>a</sub> analysis
6	Sep 24-28	Fluorescence (1)
7	Oct 1-5	Fluorescence (2)
8	Oct 8-12	Discharge Tube Spectra
9	Oct 15-19	I <sub>2</sub> Fluorescence
10	Oct 22-26	pK <sub>a</sub> (2)
11	Oct 29-Nov 2	Kinetics
12	Nov 5-9	1. NMR 2. EPR
13	Nov 12-16	FTIR
14	Nov 19-23	Thanksgiving
15	Nov 26-30	None
16	Dec 3-7	Reading Days
17	Dec 10-14	Finals

### Absences and Tardiness

Excused absences are allowed in accordance with UF policy. Consult with your instructor and group members in advance. Do not arrive late to your lab. Tardiness will lead to loss of points on the 'subjective grade.' Unexcused arrival more than 30 minutes late for a lab may result in the student not being admitted to the lab. This leads to an automatic loss of all notebook points and the student may not use this lab for an oral lab report.

### Late Submission Policy

Late assignments will receive a late penalty of 10% per day past the scheduled due date. If something arises that prevents you from completing the assignment on time, contact the instructor as soon as possible to request an extension.

## Resubmission Policy

If you are unhappy with the grade of a written report, you may resubmit it with corrections. Each assignment can be resubmitted once. The resubmission must be turned in no more than one week after the original grade is posted to Canvas. The maximum score you will be able to receive is 70% (B).

## Getting Help

For quickest response, you might find posting questions to the Canvas Discussion Board might be a good choice. Messaging the Instructor, TA, or even a classmate also works.

For Username/Password issues, such as difficulties logging into any Gatorlink-authenticated site at UF, (including our course website), please contact the UF Help Desk at: [helpdesk@ufl.edu](mailto:helpdesk@ufl.edu), (352) 392-HELP - select option 2.

## University Policy on Accommodating Students with Disabilities

Students requesting accommodation for disabilities must first register with the Dean of Students Office (<http://www.dso.ufl.edu/drc/>). The Dean of Students Office will provide documentation to the student who must then provide this documentation to the instructor when requesting accommodation. You must submit this documentation prior to submitting assignments or taking the quizzes or exams. Accommodations are not retroactive, therefore, students should contact the office as soon as possible in the term for which they are seeking accommodations.

## University Policy on Academic Misconduct

This class will operate under the policies of the student honor code which can be found at:

<https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>. The students, instructor, and TAs are honor-bound to comply with the Honors Pledge: **We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.** You are expected to exhibit behavior consistent with this commitment to the UF academic community, and on all work submitted for credit at the University of Florida, the following pledge is either required or implied: *"On my honor, I have neither given nor received unauthorized aid in doing this assignment."* It is assumed that you will complete all work independently in each course unless the instructor provides explicit permission for you to collaborate on course tasks. Furthermore, as part of your obligation to uphold the Honor Code, you should report any condition that facilitates academic misconduct to appropriate personnel. It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated. Violations will be reported to the Dean of Students Office for consideration of disciplinary action. For more information regarding the Student Honor Code, please see: <https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>.

## Disclaimer for this document

Note: All aspects of course operations, including grading, course policy and policy execution, are subject to change at the discretion of the course instructor.

If you have further questions, please contact me. Have a great semester!

Sincerely,

Adam Mansell