



CHM4411L: Physical Chemistry Laboratory

Spring 2022 2 credit hours

Class Number(section): 29155(P3LM)

M Periods 4 (10:40 - 11:30) LEI242 ; 6-10 (12:55-18:00) LEI 248

No (specifically) Required Textbook: Notes for this course will be provided online; Complete understanding of the activities will require external resources to be sourced by the individual.

Contact Brucat if you have questions...

Instructor: PJ Brucat

- Office hours (subject to optimization):
Tue 10:00-11:45 ; Thur 11:00-13:00
or by appointment (message three choices)
- Contact method: *Canvas Messaging only*

TA: TBA

Course Website:

<https://ufl.instructure.com/courses/444781>

All communication and activities related to this course will be accessible from within UF's campus-wide eLearning system (Canvas) at the URL above. Please become familiar with our course website as soon as possible. Much of the materials there are subject to revision, so pay careful attention to all announcements, updates, and revision dates. *It is strongly advised that hardcopy or static downloads of course materials be avoided due to their continuous incremental improvement.*

This section of CHM4411L will work closely with Dr. Adam Mansell, his staff, and the other sections of the CHM4411L course being delivered this term. Monday lecture meetings will be shared among all sections. Although all CHM4411L sections will run in parallel for the most part, details of operations and activities may differ. Please make sure that you understand and follow the directives of the section to which you are enrolled.

Etiquette

Your polite, courteous, and civilized behavior is expected in all aspects of our course. This holds especially true in these times of stress and uncertainty. Be Human.

SPRING SEMESTER 2022							
	S	M	T	W	T	F	S
Jan.							Holiday 1
2		3	4	5	6	7	8
9		10	11	12	13	14	15
16		Holiday 17	18	19	20	21	22
23		24	25	26	27	28	29
30		31					
Feb.			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					
Mar.			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		
Apr.						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
May	Comm. 1	Grades Due 2	Dep. Cert. 3	4	5	6	7

Goals and Objectives

Course Goals

Successful completion of this course will enable the student to:

- Integrate the Scientific Method into the Investigation of the Natural World
- Apply the Postulates and Methods of Physical Chemistry to Chemical Experimentation
- Interpret Observations in the context of Hypotheses and Error
- Synthesize the Tenants of Physical Chemistry into Experimental Design
- Graphically Visual Data and Model Evaluation

Course Objectives

Accomplishment in the course material will be assessed in the following:

Knowledge

- Guiding Principles of Physical Chemistry
- Operating Principles of Common Laboratory Instruments

Skills

- Operation of Optical Spectrometers and Detectors
- Operation of Light Sources and Lasers
- Operation of EPR Spectrometer
- Operation of FTIR Spectrometer
- Application of Computational Tools and Programming Platforms to Create Publication-Quality Graphics
- Analysis and Interpretation of Molecular Spectra for the Purpose of Extracting Chemical Information

Course Operation

Course Meetings

There are two meeting types intrinsic to the learning experience of this course.

1. **Lectures** This course has regularly-scheduled meeting times designated for synchronous meetings of the entire class. These meetings are a one-on-many environment primarily for discussion and explanation of new material outlined in the course. Attendance at these meetings is strongly encouraged. If you fail to absorb information from these discussions, you will have difficulty completing the laboratory challenges.
2. **Laboratory Sessions** The actual experimentation will take place in the PChem Teaching Laboratory, LEI 248. The block of time shown on the schedule of courses will be broken into two blocks, labeled A and B. Your attendance will alternate between these blocks throughout the term. Lab attendance is required to perform the lab activities. If you will not be able to attend your scheduled lab time, contact your instructor prior to that time. Absences will be adjudicated in the context of the UF Attendance Policy, <https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/>

Communication with your Instructor

To guarantee rapid, reliable, and secure transmission, all course communications with your instructor(s) are to occur within the Canvas environment using the embedded tools. Configure your Canvas account profile for immediate automatic notification of course announcements and updates, and make sure that email forwarding, if desired, is set up correctly. It is expected that all replies to messages between instructor and student occur within 24 hours. **Responsibility for receiving and responding to electronic course communication in a timely fashion is entirely that of the student.**

Course Activities

Community Review (CR)

A Community Review assignment will be delivered in Canvas via [VoiceThread](#) prior to each laboratory experiment. The assignment will typically be to comment on the laboratory activity description and discuss and clarify the challenges and execution of the experiment with your peers. The CR are graded individual assignments and must be completed prior to the associated laboratory session.

Analysis Quizzes (AQ)

Shortly after your lab activity, short question sets will be delivered online through our course website. These are intended to be *formative* assessments, in that these activities focus on and cement concepts in the learners mind. These quizzes are entirely based on material relevant to the analysis and interpretation of your observations, and should be helpful in the crafting of your ES report, *vide infra*. Any resources may be used to solve these quiz problems, as long as they are worked entirely individually, without consultation with anyone except your instructors. You may discuss the quiz *only with your instructors* until after the due date has passed for everyone in the class. These are graded, individual assignments.

Executive Summary (ES)

After each lab activity you will be asked to report your observations. This will be in the form of an executive summary of the hypothesis, procedure, and findings, including some form of data analysis and graphical representation (captioned figures). This is a shorter and more focussed style than typical journal publications. Each ES will be submitted in .pdf or .ipynb format through the appropriate Canvas assignments page.

Laboratory Activity Schedule

(Assigned by group; tentative; see Canvas website)

Week	Date	Lecture	Group ID						
			G1	G2	G3	G4	G5	G6	G7
1	-	-	-	-	-	-	-	-	-
2	01/10	01	$\overline{X1A}$	$\underline{X1B}$	$\overline{X1A}$	$\underline{X1B}$	$\overline{X1A}$	$\underline{X1B}$	$\overline{X1A}$
3	-	-	-	-	-	-	-	-	-
4	01/24	02	$\underline{X2B}$	$\overline{X2A}$	$\underline{X2B}$	$\overline{X2A}$	$\underline{X2B}$	$\overline{X2A}$	$\underline{X2B}$
5	01/31	03	LIT	LIT	LIT	LIT	LIT	LIT	LIT
6	02/07	04	$\overline{X3A}$	$\underline{X3B}$	$\overline{X3A}$	$\underline{X3B}$	$\overline{X3A}$	$\underline{X3B}$	$\overline{X3A}$
7	02/14	05	$\underline{R0B}$	$\overline{R0A}$	$\underline{R0B}$	$\overline{R0A}$	$\underline{R0B}$	$\overline{R0A}$	$\underline{R0B}$
8	02/21	06	$\overline{R1A}$	$\underline{R1B}$	$\overline{R2A}$	$\underline{R2B}$	$\overline{R3A}$	$\underline{R3B}$	$\overline{R4A}$
9	02/28	07	$\underline{R2B}$	$\overline{R2A}$	$\underline{R3B}$	$\overline{R3A}$	$\underline{R4B}$	$\overline{R4A}$	$\underline{R5B}$
10	-	-	-	-	-	-	-	-	-
11	03/14	08	$\overline{R3A}$	$\underline{R3B}$	$\overline{R4A}$	$\underline{R4B}$	$\overline{R5A}$	$\underline{R5B}$	$\overline{R1A}$
12	03/21	09	$\underline{R4B}$	$\overline{R4A}$	$\underline{R5B}$	$\overline{R5A}$	$\underline{R1B}$	$\overline{R1A}$	$\underline{R2B}$
13	03/28	10	$\overline{R5A}$	$\underline{R5B}$	$\overline{R1A}$	$\underline{R1B}$	$\overline{R2A}$	$\underline{R2B}$	$\overline{R3A}$
14	04/04	11	MUW	MUW	MUW	MUW	MUW	MUW	MUW
15	04/11	12	\underline{PRB}	\overline{PRA}	\underline{PRB}	\overline{PRA}	\underline{PRB}	\overline{PRA}	\underline{PRB}
16	-	-	-	-	-	-	-	-	-

Activities listed as $\overline{**A}$ will occur in LEI248 from 13:00 → 15:30

Activities listed as $\underline{**B}$ will occur in LEI248 from 15:30 → 18:00

LIT is a Library Activity and will occur at the Marston Science Library L-308 from 12:55 → 15:00.

MUW is a makeup week. Activities scheduled *ad hoc*

PR* is the Laboratory Practical

X1* is 'Calorimeter Design'

X2* is 'Adiabatic Expansion of Gases'

X3* is 'Optical Spectra of Organic Dyes'

R0* is 'Lab Rotation Walkthrough'

R1* is 'Iodine Photophysics'

R2* is 'Membrane Ion Transport'

R3* is 'Gas Phase IR Spectroscopy'

R4* is 'Ground and Excited State pKa'

R5* is 'EPR Investigation of Radical Kinetics'

Assignment Schedule

(tentative; see Canvas website course stream)

Week	CR**	Due	AQ	Due	ES	Due
1			SYLQ	01/07		
2	CRX1	01/10	AQX1	01/12	ESX1	01/16
3			SAFQ	01/19		
4	CRX2	01/24	AQX2	01/26	ESX2	01/28
5			AQLIT	02/02	ESLIT	02/04
6	CRX3	02/07	AQX3	02/09	ESX3	02/11
7			AQR0	02/16		
8	CRR*	02/21	AQR*	02/23	ESR*	02/25
9	CRR*	02/28	AQR*	03/02	ESR*	03/04
10						
11	CRR*	03/14	AQR*	03/16	ESR*	03/18
12	CRR*	03/21	AQR*	03/23	ESR*	03/25
13	CRR*	03/28	AQR*	03/30	ESR*	04/01
14						
15					ESPR	04/15
16						

SYLQ is the Syllabus Quiz.

SAFQ is the Safety Quiz.

CR** is a Community Review Assignment. These will cover the laboratory activity description document and vary with group during the rotation phase, weeks 8-13.

ES** is a Executive Summary report. This will vary with group during the lab rotation phase, weeks 8-13.

AQ** is an Analysis Quiz. This will vary with group during the lab rotation phase, weeks 8-13.

ESPR is the Lab Practical Report.

All 'official' activity dates and grades are posted on the secure course website. Assignments are to be submitted in full by the assignment deadline for credit.

Groups

Laboratory activities will be undertaken in groups of two. Your group designation will determine the laboratory activity schedule. Group assignments may be found in the course Canvas website.

You are expected to work professionally and efficiently with your group partner. Troublesome partnerships will suffer from poor subjective grades.

All assignments will be turned in as individuals, but data will be shared between group partners.

Grades

Course Grade Computation

Course grades will be computed from the weighted-average of the earned percentages of each graded items described under [Course Activities](#), submitted by the individual student. The weighting factors of the activity categories are as follows:

Default Category Weights

Grade Category	weight %
Community Review (CR)	20
Analysis Quiz (AQ)	20
Executive Summary (ES)	40
Instructor Subjective	20

The grading scheme will generate a aggregate assignment percentage, which will be converted into a letter grade as follows:

Course Letter Grade Percentages

Grade	A	A-	B+	B	B-	C+	C	D	E
Minimum percentage	87.5	80.0	77.5	72.5	70.0	67.5	60.0	50.0	< 50.0

Regrade Requests

Grade accuracy is a high priority for this course. Assignments will be regraded if a grading error is suspected. Regrade requests from students must be submitted through Canvas Messaging to Brucat within 48 hours of the grade post. Regrades will be performed on the entire assignment following the standard assignment rubric. Grade adjustments may be positive or negative.

UF's Grading Policy

See <https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

Honesty and Truthfulness

Ethical, moral, and professional behavior is expected and required of all participants in this course. Moreover, all participants in UF's Academic activities are bound by [Rules of Conduct](#), from which can be found the following excerpt:

“UF students are bound by The Honor Pledge which states,

‘We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code.’

On all work submitted for credit by students 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’

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 instructor or TAs in this class”

Accommodations

The Disability Resource Center at UF offers this advice:

“Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the Disability Resource Center by visiting our [Get Started](#) page. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.”

Counseling

Useful non-academic services are available in many forms at UF.

- [U Matter, We Care](#): If you or a friend is in distress, please contact umatter@ufl.edu or 352 392-1575 so that a team member can reach out to the student.
- The Counseling and Wellness Center: <http://www.counseling.ufl.edu/cwc/>

GatorEvals

The UF course evaluation policy includes the following statement:

“Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.”

All course policies and procedures are subject to change at any time at the sole discretion of Brucat

We, the members of the University of Florida Community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity

— Revision: January 2, 2022—