

CHEM 4450: Physical Chemistry I
Fall 2018 Course Syllabus

Instructor: Dr. Makenzie Long
Office: Laney-Manion Annex 126
Office Hours: M W 11:00 am-12:00 pm
T 3:00 pm-5:00 pm
By appointment (email me)
Email: m1ong14@uca.edu (put CHEM 4450 in the subject line)
Office Phone: (501) 450-5795

“Knowledge is constructed, not transferred.” – Ann Taylor¹

Class: M W F 9:00 am-9:50 am, Laney-Manion 102

Lab: M 2:00 pm-4:50 pm, Laney-Manion 305 (CRN# 18114)
T 10:50 am-1:30 pm, Laney-Manion 305 (CRN# 22666)
W 2:00 pm-4:50 pm, Laney-Manion 305 (CRN# 17042)

Course

Description: Modern theoretical chemistry with laboratory applications. Designed to challenge students to think of chemistry primarily from a molecular and mathematical basis. Topics include quantum mechanics, spectroscopy, and chemical kinetics. Significant amount of computer simulation using modern mathematical software.

Course

Objectives: Upon successful completion of CHEM 4450, you will be able to:

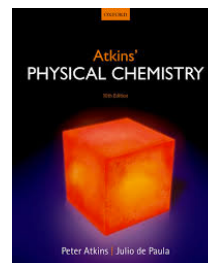
- Predict and interpret chemical reaction rates using chemical kinetics
- Describe chemical reactions at the molecular level using reaction dynamics
- Explain the fundamental concepts of quantum mechanics
- Use calculus skills to apply quantum mechanics to chemical systems
- Describe the electronic structure of atoms and molecules
- Predict chemical bonding using valence bond and molecular orbital theory
- Predict and interpret electronic, rotational, and vibrational spectra

These objectives will develop the following skills:

- Problem solving
- Critical thinking
- Physical interpretation of mathematical equations
- Written and oral communication
- Spectroscopic measurements
- Computer simulations
- Data analysis

Prerequisites: A grade of C or better in the following courses:
College Chemistry II (CHEM 1451)
University Physics II (PHYS 1442) (or College Physics II if approved)
Calculus II (MATH 1497)

Textbook: "Physical Chemistry: Thermodynamics, Structure, and Change" 10th Edition by Peter Atkins and Julio de Paula, W. H. Freeman and Company, New York, NY, 2014; ISBN-13: 978-1-4292-9019-7, ISBN-10: 1-4292-9019-6.



Materials: Calculator, goggles, and bound notebook.

Website and UCA Email: Course material (worksheets, lab assignments, grades, etc.) will be posted to the Blackboard course website available at <https://my.uca.edu>. Emails will be sent to your UCA email address. Please check the Blackboard course website and your UCA email regularly.

Electronic Devices: Electronic devices may be used for learning purposes in class and lab. Pictures, videos, audio recordings, etc. may not be posted online or widely shared.

Expectations: Of the student:

- Attend class and lab regularly and arrive on time
- Read assigned textbook chapters/sections *before* class
- Actively participate in classroom discussions and activities
- Be respectful to each other and myself
- Minimize distractions and stay on task
- Schedule enough time outside of class and lab to complete assignments
- Turn assignments in on-time

Of the instructor:

- Arrive to class and lab on time
- Upload course material to Blackboard course website in a timely fashion
- Answer questions in a clear and concise manner
- Demonstrate problem-solving and critical-thinking skills
- Provide constructive and timely feedback on assignments
- Treat you with respect

How to be Successful:

From previous students:

- Do not procrastinate, try to do a little review daily.
- The material builds on itself, so go to class as much as possible.
- Ask a lot of questions, whether it be in class or office hours.
- Read through the book when you are confused or stuck.
- Keep your notes organized.
- I learned better by asking questions in office hours *after* working on the homework.
- Do not be late to class or lab, the professor finds it rude and I agree.
- It's a challenging, but fair class.
- Be prepared to study and work really hard!
- Dr. Long's teaching style takes some getting used to, but it is overall very effective.
- Listen carefully, everything she says is important to the point of the lecture and she uses very precise definitions that you must be aware of to keep up.

<i>Grading:</i>	Preparation (13%)	
	Attendance Questions	30 points (3%)
	Homework	100 points (10%)
	Lab and Written Communication (30%)	
	Lab Assignments	60 points (6%)
	Lab Reports (Labs 1, 2, 4, and 5)	120 points (12%)
	Formal Lab Report Assignment (Lab 3)	120 points (13%)
	Exams (57%)	
	Exams 1-3	390 points (39%)
	Final Exam	<u>180 points</u> (18%)
		1000 points

Course

Grade: Percentage of total points that **guarantee** course letter grades are:
 A ≥ 90% B ≥ 80% C ≥ 70% D ≥ 60% F ≤ 50%

Exams: There are three in-class exams (130 points each) and a comprehensive final exam (180 points):

Exam 1, Monday, September 17

Exam 2, Friday, October 19

Exam 3, Monday, December 3

Final Exam, Wednesday, December 12, 2:00 – 3:00 pm

Exam Policies:

- No exam scores will be dropped. Your final exam score may replace your lowest exam score, if your final exam score is higher (by percentage).
- A periodic table of the elements, physical constants, and mathematical formulas will be provided.
- Notes written on a double-sided index card (4 in x 6 in) are allowed for each exam. Three index cards are allowed for the final exam.
- Calculators are allowed. Cell phones and other electronic devices, including smart watches, are not allowed.
- Hats with a bill must be removed or turned around. Hoods, headphones, earbuds, etc. may not be worn.

Lab Policies:

- You must attend lab to earn credit for lab assignments and reports.
- If you arrive more than 10 minutes after the start of lab, you will not be allowed to participate in lab and will earn zero points for that lab assignment or report.
- Goggles and appropriate lab attire is required when chemicals and glassware are used (see Course Schedule).
- Lab handouts will be posted on the Blackboard course website. Please print lab handouts *before* lab.

All assignment due dates and times are listed on the Course Schedule.

Lab

Assignments: There are 5 lab assignments (15 points each). You can earn **up to 60 points** from lab assignments. Lab assignments are worksheets or tutorials that you complete and turn in by the end of lab.

Lab Reports: There are 4 lab reports (30 points each). Additional details on Blackboard.

Formal Lab Report

Assignment: The formal lab report assignment consists of 4 parts:

- Article Review (20 points)
- Introduction and Methods (20 points)
- Results, Discussion, and Conclusion (20 points)
- Formal Lab Report (60 points)

Additional details on Blackboard.

Homework: There are 11 homework assignments (10 points each): 1 math review and 10 problem sets. Each homework assignment will be graded as follows:

- 5 points for accuracy (select problem(s) will be graded at random)
- 4 points for completion
- 1 point for neatness (answers circled/boxed, legible handwriting, etc.)

Homework must be submitted on paper by 9:05 am in class on the due date. You can earn **up to 100 points** from homework assignments.

Practice problems will be assigned from the textbook, but not be collected. Solutions are available in the Student Solutions Manual (ISBN: 1-4641-2449-3).

Attendance

Questions: Attendance questions (5 points each) will be asked during the first 5 minutes of class randomly throughout the semester, except on exam days. Attendance questions will be graded as follows:

- 2 points for timely completion
- 3 points for accuracy

Attendance questions must be submitted on paper. Students can earn **up to 30 points** from attendance questions.

Late Work:

Assignments are expected to be submitted by the due dates and times listed on the Course Schedule. This allows me to grade and provide feedback in a timely manner.

- Homework turned in by 9 am the following business day will be graded for half credit.
- ONE lab report or part of the formal lab report assignment may be turned in by 5 pm the following business day with a 10% point deduction.
- Two or more lab reports or parts of the formal lab report assignment turned in after the due date and time will not be graded and will receive zero points.

Makeup Labs

and Exams: Makeup labs and exams will not be provided after the fact. Please contact me as soon as possible for planned absences due to valid, documented reasons (conferences, job or professional school interviews, etc.).

Extra credit: Extra credit assignments or points will not be offered.

Regrading: If you believe that an exam, lab report, or homework assignment has been graded incorrectly, you may return it for regrading within two business days after it was returned to you. You must request a regrade in writing (i.e. email). The entire exam or assignment will be regraded, so your score could go up or down. Any student who attempts to cheat by altering an exam or assignment and returning it for regrading will receive a score of zero for that assignment and may be subject to further disciplinary action.

Collaboration: You are encouraged throughout this course to use your peers as a resource. Discussing problem-solving strategies and double checking your work is expected. However, the final product (i.e. homework, exams, lab reports, etc.) should be your own work. **Copying answers from the internet, solutions manual, each other, or any other source is unacceptable.**

Academic Integrity:

The University of Central Arkansas affirms its commitment to academic integrity and expects all members of the university community to accept shared responsibility for maintaining academic integrity. Students in this course are subject to the provisions of the university's Academic Integrity Policy, approved by the Board of Trustees as Board Policy No. 709 on February 10, 2010, and published in the *Student Handbook*. Penalties for academic misconduct in this course may include a failing grade on an assignment, a failing grade in the course, or any other course-related sanction the instructor determines to be appropriate. Continued enrollment in this course affirms a student's acceptance of this university policy.

Americans with Disabilities Act:

The University of Central Arkansas adheres to the requirements of the Americans with Disabilities Act. If you need an accommodation under this Act due to a disability, please contact the UCA Disability Resource Center, 450-3613. For additional information visit <http://uca.edu/disability/>.

Building Emergency Plan:

An Emergency Procedures Summary (EPS) for the building in which this class is held will be discussed during the first week of this course. EPS documents for most buildings on campus are available at <http://uca.edu/mysafety/bep/>. Every student should be familiar with emergency procedures for any campus building in which he/she spends time for classes or other purposes.

Title IX: If a student discloses an act of sexual harassment, discrimination, assault, or other sexual misconduct to a faculty member (as it relates to “student-on-student” or “employee-on-student”), the faculty member cannot maintain complete confidentiality and is required to report the act and may be required to reveal the names of the parties involved. Any allegations made by a student may or may not trigger an investigation. Each situation differs, and the obligation to conduct an investigation will depend on the specific set of circumstances. The determination to conduct an investigation will be made by the Title IX Coordinator. For further information, please visit: <https://uca.edu/titleix>.
**Disclosure of sexual misconduct by a third party who is not a student and/or employee is also required if the misconduct occurs when the third party is a participant in a university-sponsored program, event, or activity.*

Counseling Center: Mental health screenings and personal and group counseling services are available to registered students for no additional charge. With the exception of certain emergencies, information shared with the Counseling Center staff is confidential. For more information, please visit <http://uca.edu/counseling>.

Additional Resources: Center for Writing and Communication
<http://uca.edu/cwc/>