

# Physical Chemistry I

## CHEM 4450, CRN 18114, 17042

Course Syllabus, Fall 2014

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<b>Instructor:</b>	Kristin Dooley
<b>Office:</b>	Laney 203D
<b>Phone:</b>	450-5961
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<b>Website:</b>	<a href="http://faculty.uca.edu/kdooley">http://faculty.uca.edu/kdooley</a>
<b>Office Hours:</b>	T: 1:30-3:00 pm W: 10:00-12:30 pm F: 10:00-12:30 pm <i>other times by appointment</i>
<b>Lecture:</b>	MWF 9:00-9:50 am (Laney 105)
<b>Lab:</b>	CRN# 18114: M 2:00-4:50 pm (Laney 305) CRN# 17042: T 10:50-1:30 pm (Laney 305)
<b>Required Material:</b>	<i>Physical Chemistry</i> (10 <sup>th</sup> Ed.) by Atkins and de Paula Calculator, goggles, bound composition notebook with numbered pages

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**Course Description** This course will introduce and develop the principles of quantum mechanics. These concepts will then be applied to both atomic and molecular structure and spectra. The kinetics and dynamics of reaction mechanisms will also be addressed. Other topics that will be studied are molecular interactions and the properties of macromolecules. This course also includes a laboratory component that will complement the topics covered in the lecture.

**Course Objectives** One of the main objectives for this course is to provide the student with a firm foundation in quantum theory which will be used to describe our current ideas of electronic structure in both atoms and molecules, chemical bonding, vibrational and rotational spectroscopy, and intermolecular forces. Another goal of this course is to describe a reaction on the molecular level through reaction dynamics and describe the rate of reaction with chemical kinetics. A main goal throughout this course is the development of effective problem solving skills and the ability to apply math skills to chemical problems. This course will draw on skills and concepts learned from all of your chemistry and math courses taken prior to this course. You will also gain knowledge of computer software packages such as Mathcad and Gaussian. The laboratory portion of this course will develop the topics covered in the lecture portion of the course while introducing the student to instrumentation and techniques used in a typical physical chemistry laboratory.

## Grading

- Your overall grade in this course is calculated based on your points accumulated in the following categories: Exams, Labs, Assignments, and Final Exam. I will post the grades that I have recorded for you on Blackboard. The course will have a total of 1000 points. I don't include bonus points in my courses. You should be working hard from Day 1 and not relying on bonus to get by.
- Three **Exams** will be given throughout this course. The dates of these exams can be found on the Lecture Schedule. Date changes for exams will be announced at least 1 lecture meeting in advance of the test date. No exam scores will be dropped. Instead, your lowest exam score (a zero if the exam was missed) may be replaced by your final exam grade provided that your final exam score is higher.
- There will be 3-4 graded **assignments** given before each exam. They will commonly be problems assigned from your textbook or problem sets provided on my website or given in class. You will be able to find information about the assignments and due dates on my website. You will have at least 10 assignment scores, and your top 9 scores will be used to calculate your grade.

*Firm due dates will be provided at the time that assignments are made. Late assignments will be accepted for half-credit up to two (calendar) days after the assignment was due. This means that you may need to submit a late assignment electronically if needed.*

- Your **lab** grades will consist of 5 informal lab write-ups, and 2 formal lab reports. Your lab notebook will constitute a portion of the informal lab grade. The formal lab reports should be written in the style of the Journal of Physical Chemistry. A tentative lab schedule and more information on the lab assignments will be provided at your first lab meeting.
- The course's **final exam** will be comprehensive, and no portion of the final exam will be dropped. Your score on the final exam scaled to 125 points will replace your lowest exam grade.
- Grade disputes concerning scores on specific assignments or exams should be addressed promptly. After the assignment has been returned, the student has 1 week to bring the question to my attention. After that time, the grade on the assignment or exam will not be changed. Please make sure that you check the grades I have posted for you, and confirm that they match the grades you see on your returned work. Mistakes happen, and I will be glad to fix the grade I have recorded for you as long as you provide the original graded assignment that does not appear altered.

Point Distribution	Category:	Total Points Possible:
	<b>Exams</b>	3 @ 125 Points Each 375 Points
	<b>Informal Lab Reports</b>	5 @ 30 Points Each 150 Points
	<b>Formal Lab Reports</b>	2 @ 50 Points Each 100 Points
	<b>Assignments</b>	9 @ 25 Points Each 225 Points
	<b>Final Exam</b>	150 Points 125 Points
		<b>TOTAL: 1000 Points</b>

**Grading Scale**    **Grades: A: 90-100 %    B: 80-90    C: 70-80    D: 60-70    F: <60**

**Grade Calculation**    YOUR GRADE IN THIS COURSE SHOULD NOT BE A MYSTERY! I will post your grades on Blackboard, and will return most of your graded work for you to keep. Your course grade can be calculated easily by hand, and will be available for any grade questions or concerns.

## Website/ Blackboard

The majority of the content of this course will be located on my faculty web page at <http://faculty.uca.edu/kdooley>. This site has a course page where you will find a calendar for the course, lecture slides, and lab materials. Please see me if you have any issues regarding the website.

The Blackboard shell for this course can be accessed through your myUCA account. Unless there are issues with the website, I plan to only use Blackboard to post your grades. You should check these grades periodically to make sure that the numbers that I have recorded for you are consistent with the grades on your assignments. Please alert me if there is a mistake. I will alter a recorded grade if you supply the original assignment in question.

## Tips for Being Successful

- Read the Sections of the text that we will cover BEFORE coming to class. Even if you do not understand it all, attending lecture will be more effective if you have been introduced to the material previously.
- Be willing to spend the time necessary to *master* the material as it is introduced. Note that this is probably much more time intensive than the time it takes to “get by” the next assignment, exam, etc. Simply “getting by” usually haunts you later on.
- Use my office hours! Try to identify the specific point in lecture where you got confused, the homework problem you can’t solve, or the exam/quiz question you missed before you come. This will make the best use of this time. If you cannot make my office hours, set up a time when you can come.
- Don’t rely on the drop/replace policy. These are in place as insurance for absences or other unforeseen instances. Do not use this policy to ignore studying for an exam; you will see all of the material again at your final exam date.
- Ask questions. Either in class, thorough email, or during office hours, but make sure your questions get answered.
- Do more homework than I have assigned for a grade. The graded assignments represent a minimum workload for mastery in this course.

## Classroom Policies

**Attendance:** Students who regularly miss class are rarely successful. It is the student’s responsibility to obtain the information/assignments/handouts covered during an absence. An outline of the course schedule is attached to this syllabus. You should obtain specific notes of from missed lectures from a classmate.

**Academic Honesty:** Cheating and plagiarism are not tolerated! The penalties for cheating will be severe with the most minor being a failing grade on the assignment/exam which will not be able to be dropped. More severe penalties will be issued when deemed appropriate by the instructor. (See University Policies, below.)

**Makeup Policy:** Missed exams/assignments will be dropped as your lowest score. There will be no makeup assignments offered; however, missed labs may be made up at my discretion (dependent on type of lab and reason for absence). It is also very unlikely that makeup exams will be offered barring an extreme circumstance (short-term, minor illnesses do not qualify as extreme). Exams will only be made up at my discretion if *prior arrangements* with me through email or in person as soon as you know you have a conflict.

**Disruptions:** Electronic devices should be silenced during class. Texting and other social interactions during class are disrespectful to your classmates and will not be tolerated. Students engaged in these activities will be asked to leave the lecture.

## University Policies

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 Office of Disability Support Services, 450-3613.
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.
Course Evaluations	Student evaluations of a course and its professor are a crucial element in helping faculty achieve excellence in the classroom and the institution in demonstrating that students are gaining knowledge. Students may evaluate courses they are taking starting on the Monday of the twelfth week of instruction through the end of finals week by logging in to myUCA and clicking on the Evals button on the top right.
Emergency Procedures	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 <a href="http://uca.edu/mysafety/bep/">http://uca.edu/mysafety/bep/</a> . 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 Disclosure	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 those specific set of circumstances. The determination to conduct an investigation will be made by the Title IX Coordinator. For further information, please visit: <a href="https://uca.edu/titleix">https://uca.edu/titleix</a> . *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.
Other Policies	Students are encouraged to familiarize themselves with all policies included in the Student Handbook, particularly the Sexual Harassment Policy, and all Academic Policies.

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## Lecture Schedule

\*This is a tentative schedule.

Exam dates and content are subject to change. See website for a more detailed schedule.

Aug	22	F	Syllabus/Fundamentals
	25	M	Chapter 7: Quantum Theory: Introduction and Principles
	27	W	
	29	F	
Sep	1	M	
	3	W	
	5	F	Chapter 8: Techniques and Applications
	8	M	
	10	W	
	12	F	
	15	M	Chapter 9: Atomic Structure and Spectra
	17	W	
	19	F	
	22	M	
	24	W	<b>Exam 1: Chapters 7-9</b>
	26	F	Chapter 10: Molecular Structure
	29	M	
Oct	1	W	
	3	F	Chapter 12: Molecular Spectroscopy 1: Rotational and Vibrational Spectra
	6	M	
	8	W	
	10	F	
	13	M	Chapter 13: Molecular Spectroscopy 2: Electronic Transitions
	15	W	
	17	F	<b>No Class: Fall Break</b>
	20	M	
	22	W	Chapter 14: Molecular Spectroscopy 3: Magnetic Resonance
	24	F	
	27	M	
	29	W	<b>Exam 2: Portions of Chapters 10, 12-14</b>
	31	F	Chapter 17: Molecular Interactions
Nov	3	M	
	5	W	Chapter 18: Materials 1: Macromolecules and Self-Assembly
	7	F	
	10	M	Chapter 21: Kinetics
	12	W	
	14	F	
	17	M	Chapter 22: Reaction Dynamics
	19	W	
	21	F	
	24	M	Chapter 23: Catalysis
	26	W	<b>No Class: Thanksgiving Break</b>
	28	F	<b>No Class: Thanksgiving Break</b>
Dec	1	M	
	3	W	<b>Exam 3: Portions of Ch 17, 18, 21-23</b>
	5	F	<b>No Class: Study Day</b>
<b>Wednesday, December 10, 2:00-4:00 PM COMPREHENSIVE FINAL EXAM</b>			

