

Chemistry for engineers (CHEM 150) Fall 2017

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- LAB SECTIONS:** Roderick Black; Jill Headrick; Franklin Feng Tao
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- LEADTEACHINGASSISTANT:** Trey Ronnebaum, Email: treyron@gmail.com
Office Hours: be posted on Blackboard.
- COURSE DESCRIPTION:** This one semester course offered by Department of Chemistry was designed for students in the School of Engineering who are not required to take additional chemistry courses at the college level. Topics covered in this integrated lecture and laboratory course include quantum theory, atomic structure, chemical bonding, gas, solid, liquid, thermodynamics, equilibrium, acids and bases, electrochemistry and battery. The applications of these concepts to engineering problems and practices are emphasized. The goal of this course is to build foundation for learning advanced engineering courses.
- PREREQUISITES:** A course in high school chemistry and eligibility for MATH 121 or MATH 125 (or departmental consents). Students not admitted to the School of Engineering must receive permission from instructor. This course will not serve as a prerequisite for any other chemistry courses and meets no requirement for any major outside the School of Engineering.
- CLASS TIME:** MWF 9:00am -9:50am, 3140 Wescoe
For understanding of the material during lecture, you should read the assigned sections of the textbook and finish the assigned pre-homework **before** class. Time of experiments is different for different lab section you chose.
- CLASSROOMDECORUM:** While attending the lectures will likely improve your understanding of the materials, attendance is not mandatory (although note that there will be no make-up quizzes). Thus, talking with friends, reading the newspaper, completing homework, listening to electronic devices, texting, and other disruptive activities should be carried on outside of class.
- COURSE WEBSITE:** Assignments and course documents will be posted on Blackboard. You may also post questions on the Discussion Board on the course Blackboard site. We (TA and I) will try to address questions wither on the site or during class.
- COURSE EMAIL:** to be posted. Please use this email address for all questions about course logistics, homework, OWL, grades, etc.
- TEXTBOOK:** *Chemistry for Engineering Students*, by Brown and Holme, third edition (A set of hard copy and electronic copy is available from KUbookstore). Homework will be mostly or entirely assigned on OWL, you may use any edition of the text.
- ONLINE HOMEWORK:** Most homework and pre-lecture assignments will be submitted online. A subscription to the OWL2 interactive online homework system is required.

CLICKEZRS: This class will use clickers (iClicker2) for in-class participation. Each student is required to purchase a clicker. The iClicker is the KU standard and can be used in multiple classes. You can receive full credit for clicker questions for the semester by answering 80% or more of clicker questions. Note: some quizzes may be administered by iClicker. These would be part of your quiz grade.

RECITATION: The first hour of each lab session will be devoted to a recitation led by your graduate Teaching Assistant. These recitations will build on the concepts and problem-solving approaches discussed in the lecture and experienced in the laboratory. They will not merely be a demonstration of how to work the homework problems. You should bring your calculator along with paper and a writing utensil to each recitation. Worksheets, to be completed during the recitation section, may also be assigned.

DISCUSSION: Time and place to be determined. The optional discussion provides an informal period for raising questions concerning lecture material, assigned readings, and problem sets. Group and individual problem solving sessions may also be held during the time. Discussion section will be interactive. Please prepare your questions before attending it.

HOMEWORK: Working problem is the way you find what you don't understand and then you could understand through working out the problems. Most homework will be submitted and graded on the OWL websites. Some homework may also be assigned to be turned in in class. Part of materials related to homework will be included in the quizzes and exams. Some supplemental, recommended problems may come from the textbook. Generally, homework will be due by midnight Thursday.

PRE-LECTURE HOMEWORK: Pre-lecture exercises and problems will be assigned regularly. These exercises are designed to help you complete and understand reading assignments *before* the lecture and will be due before the start of class.

EXAMS:

Exam 1: Wednesday, Sept. 20, 8:00 - 10:00 pm, Budig 110

Exam 2: Wednesday, Oct. 25, 8:00 - 10:00 pm, Budig 110

Exam 3: Wednesday, Nov 29, 8:00 - 10:00 pm, Budig 110

Final Exam: time: TBD; location: 3140 Wescoe

You will only be permitted to use an *acceptable* non-programmable calculator on exams: Texas Instruments 30XA or Casio FX260.

No makeup exams will be given. Please notify me at least one week in advance if you must miss the exam for a legitimate reason so that arrangements for an early exam can be made. If you must miss an exam for a legitimate, documented emergency, the exam grade for that exam will be replaced by the average of your other midterm exams.

QUIZZE: Quizzes will be given every one to two weeks (generally Fridays). Quizzes will be announced at the preceding lecture period. These 10-15 minute quizzes will cover material discussed in the lectures, discussions, and problem sets. *There will be no make-up quizzes.* The lowest quiz score of the semester will be dropped. Some quizzes may be administered by iClicker and graded as part of your quiz grade.

LAB REPORTS: Lab reports must be submitted at the beginning of the lab period in which they are due. Follow the link to Guidelines for Lab Reports on the course and laboratory websites for details. While you are encouraged to discuss concepts you encounter in the lab with other students, you must submit your own work. Lab reports are not group assignments, always use your own words, Never include language taken from other sources (including the lab handouts) without attribution-this is plagiarism and will be considered academic misconducts that will be persecuted to the full extent considered academic misconduct that will be prosecuted to the fullest extent possible (see the Academic Misconduct section above).

LAB QUESTION SHEETS: During a few lab sessions in this semester, you will work with a small group of your classmates to complete question sheets related to the experiments. These must be completed during the lab session and submitted to your Lab TA before your group leaves for the day.

LAB GRADING: The laboratory course will account for 246 points of your final Chem 150 grade (out of 1000 total points). For this laboratory portion of your grade, it includes pre-lab quizzes (18 points), lab notebooks (18 points), lab question sheets 30 points, and lab reports 180 points.

ACADEMIC MISCONDUCT: University Senate Rules and Regulations defines academic misconduct as follows: Academic misconduct by a student shall include, but not be limited to disruption of classes; threatening an instructor to fellow student in an academic setting; giving or receiving of unauthorized aid on examinations or in the preparation of notebooks, themes, reports or other assignments; knowingly misrepresenting the source of any academic work; unauthorized changing of grades; unauthorized use of University approvals or forging of signatures; falsification of research results; plagiarizing of another's work; violation of regulations or ethical codes for the treatment of human and animal subjects; or otherwise acting dishonestly in research (http://policy.ku.edu/governance/USRR#_art2sect6).

Any incident of academic misconduct in this class will be prosecuted to the fullest extent possible according to the procedures outlined in the KU Student Handbook (<http://WWW.studenthandbook.ku.edu>). At a minimum, this includes receiving no credit for the work in question, but may also result in a grade of F in the course and suspension or expulsion from the University. While students are welcomed and even encouraged to study or work on assignments in groups, any work that you turn in must be your own. Specifically, any work you turn in should reflect *your* knowledge of the subject matter and be *your* original work. KU subscribes to a digital plagiarism detection program that will be used to check papers, including lab reports, submitted in this class. Students will be asked to submit writing assignments in a digital format so papers can be checked against web pages and on-line databases of existing papers. Additionally, please note that students' exams, papers, or laboratory reports may be photocopied at the discretion of the instructor without the knowledge or consent of the student.

COURSE MATERIALS AND NOTE-TAKING: Course materials prepared by the instructor, together with the content of all lectures and discussion sessions presented by the instructor are the property of the instructor. Video and audio recording of lectures

and discussion sessions is prohibited. Pursuant to the University of Kansas' Policy on Commercial Note-Taking Ventures, commercial note-taking is not permitted in CHEM150. Lecture notes and course materials may be taken for personal use for the purpose of mastering the course material, and can not be sold to any person or entity in any form. Any students engaged in or contributing to the commercial exchange of notes or course materials will be subject to discipline, including academic misconduct charges, in accordance with University policy.

DISABILITIES: The Academic Achievement Access Center (AAAQ coordinates academic accommodations and services for all eligible KU students with disabilities. If you have a disability for which you wish to request accommodations and have not contacted the AAAC, please do so as soon as possible. They are located in 22 Strong Hall and can be reached at 785-864-4064 (V/TTY). Information about their services can be found at <http://www.access.ku.edu>. Please contact me privately in regard to your needs in this course.

GRADING:

Mid-term exams (100 point each) (300 pts)
 Pre-lecture homework (54pts)
 Clicker questions (50 pts)
 Worksheets (in class) (60 pts)
 Recitations (40 pts)
 Homework (100 pts)
 Quizzes (50 pts)
 Final exam (100 pts)
 Total of lecture portion: 754 pts
 Total of lab portion: 246 pts
 Total of all components of this course: 1000 pts

Chem 150 Approximate Lecture Schedule -Fall 2017

<i>Week</i>	<i>Dates</i>	<i>Topic</i>	<i>Class periods</i>	<i>Text chapter</i>
1	Aug 21 -Aug 25	Introduction and review, atomic theory.	3	1.1-1.4
2	Aug 28 -Sept 1	Atomic theory, waves	3	2.2, 2.3, 2.5, 6.2
3	Sept 4 -Sept 8	Light, spectra, and atomic structure	2	6.2 -6.4
4	Sept 11 - Sept 15	Atomic structure and the periodic table	3	2.5, 6.5 -6.6
5	Sept 18 - Sept 20	Periodic properties, ionic bonding	2	6.6 -6.7; 7.2
	Sept 20	Exam 1		
6	Sept 25 - 29	Chemical bonding, molecular orbitals	3	7.1 -7.4, 7.6, 7.7 and Suppl.
7	Oct 2 - Oct 6	Building molecules, gases	3	5, 7.5, 7.8, 7.9
8	Oct 9-Oct 13	Gases, intermolecular interactions, liquids	2	5, 8.4,
9	Oct 16-Oct 18	Solids; common and uncommon materials	3	8.1-8.3, 8.6, 8.7 and Suppl.

	Oct 25	Exam 2		
10	Oct 23-Oct 27	Energy and enthalpy	3	9
11	Oct 30 -Nov 3	Entropy and free energy	3	10.1-10.6
12	Nov 6 -Nov 10	Free energy, phase changes, solutions	3	10.7, 8.5
13	Nov 13-Nov 15	Chemical equilibrium	3	12.1-12.3
	Nov 29	Exam 3		
14	Nov 20 Nov. 27 -Dec 1	Chemical equilibrium, solutions, acids and bases, oxidation and reduction	4	12.3-12.8, 13.2
15	Dec 4 -Dec 6	Electrochemistry and battery	2	13.2, 13.4, 13.5

This schedule is tentative (and probably too optimistic) and is intended to assist you in coordinating lecture topics with reading in the textbook. Topics of the lectures could be varied slightly.

Chemistry 150 Lab Schedule – Fall 2017

Week #	Week of...	Lab	Do Students Complete a Question Sheet or Write a Report?	Points Available				NOTES
				Prelab Quizzes	Note-Books	Question Sheets	Reports	
1	Aug 21	<i>No Labs, No Recitations</i>	-	—	—	—	—	First Week of KU Classes
2	Aug 28	LAB #1: Introduction to Spectroscopy	Report	2	2	—	30	
3	Sep 4	<i>No Labs, No Recitations</i>	-	—	—	—	—	Labor Day Week
4	Sep 11	LAB #2: Particle-in-a-Box	Question Sheet	2	2	10	—	
5	Sep 18*	LAB #3: Periodic Trends	Report	2	2	—	30	
6	Sep 25	LAB #4: Temperature and Resistance of Electronic Materials	Question Sheet	2	2	10	—	
7	Oct 2	LAB #5: Nitinol	Report	2	2	—	30	
8	Oct 9	Recitation Only (Worksheet 1)	-	—	—	—	—	See Course Syllabus Regarding Recitation Pts
9	Oct 16	<i>No Labs, No Recitations</i>	-	—	—	—	—	Fall Break Week
10	Oct 23*	LAB #6: Energy of Phase Changes	Report	2	2	—	30	
11	Oct 30	LAB #7: Biodiesel	Question Sheet	2	2	10	—	
12	Nov 6	LAB #8: Solar Cell	Report	2	2	—	30	
13	Nov 13	LAB #9: Determination of an Equilibrium Constant	Report	2	2	—	30	
14	Nov 20	<i>No Labs, No Recitations</i>	-	—	—	—	—	Thanksgiving Week
15	Nov 27*	Recitation Only (Worksheet 2)	-	—	—	—	—	See Course Syllabus Regarding Recitation Pts
16	Dec 4	<i>No Labs, No Recitations</i>	-	—	—	—	—	Stop Day Week

*: Exam week.