

Lecture Schedule, Exams and Reading Assignments

-Reading: **AJ** = Atkins & Jones' "Chemical Principles" 5th edition. Chem 202 assumes you are familiar with the high school review material in the "Fundamentals" chapter by the second lecture. Do all reading assignments before lecture, as the lectures do not just repeat the book. **Lx** refers to page x of the lecture notes. **WT** refers to the web text on quantum mechanics. Both can be found at http://www.scs.uiuc.edu/mgweb/Course_Notes/freshchem/

-Homework: assignments from **AJ** are shown in the last column for each lecture. These need **not** be turned in, but you can ask your TA to discuss them. One or more problems from each assignment will, in similar form, be included on the hour and final exams as a question. Finish the assignments not too long after the date they are listed! **Bold LC** assignments are online Lon-Capa homework due **on** the date shown. You can log on with your NetID at <https://access1.lon-capa.uiuc.edu/adm/roles>, select your role as "student" if needed, and go to "Course Contents" (in bar at the top, or in Main Menu) to do assignments.

-Lectures: MWF at 10AM in 100 Noyes, but not every week has 3 lectures. For example, lectures before the exam are reviews, and no lecture the day of the exam, to give you a little break. **Check below!**

Date	Topic	Book (5 th)	Lecture Notes	Quiz section homework (from Atkins & Jones, 5 th edition)
8/22	Molecules in motion: From greenhouse gases to photosynthesis	Review basic stuff in AJ F1-100, WT 2.1	L1,2	AJ A.22, 31, C.9, D.11, F.19, G18c, H.13, I.19a, J7.a, K.9a, L.18, M.13
1. Quantum mechanics and atoms				
8/24	Of Music and Molecules: classical vs. quantum mechanics	AJ 1.5-1.6	L3,4	-
8/26	More on the Heisenberg principle	WT 2.2-3	L5	AJ 1.26, 1.28
8/29	No lecture			
8/31	Electrons in boxes: square box, springy box, and hydrogen atom	WT 2.4 AJ p20 eq (11)-p21	L6	AJ 1.31, 1.32
9/2	Pauli principle and spin Photons and spectroscopy	WT 2.5-6 AJ 1.2-1.4,1.10	L7	AJ 1.5, 1.19a, 1.23, 1.34, 1.71 LC – first one due!
9/5	Labor day – no lecture			
9/7	Molecules as boxes: retinal, chlorophyll and light	WT 2.7	L8,9	AJ 1.38, 1.33 and LC #2 due
9/9	Wave functions and atomic orbitals	WT 2.8 AJ 1.7-1.11	L10-12	AJ 1.35, 1.45, 1.41, 1.117b
9/12	Periodic table, Hund's rule	AJ 1.12-1.18	L13,14	AJ 1.65, 1.67, 1.70 and LC #3 due
9/14	The periodic table and transition metals	AJ 1.21, 16.1-16.2	L14	AJ 1.85d, 1.73b, 1.104, 1.123
2. Chemical Bonding				
9/16	Making chemical bonds: bonding and antibonding overlaps, bond energy	AJ 2.5-2.10, p. 90-91, 3.9	L15, 16	AJ 1.121, 3.51

9/19	Localized electron models: hybrid orbitals and Lewis dot structures	AJ 2.5-2.8, AJ 3.4-3.7	L17,18	AJ 2.33, 2.48, 2.54c, 3.40ab LC #4 due
9/21	Excited states and conjugation in the hybrid picture	-	L19	AJ 2.45, 3.33, 3.96
9/23	A delocalized electron model: molecular orbitals	AJ 3.8,3.10-3.11, review 3.9	L20	AJ 3.62, 3.79
9/26	MOs: the saga continues	AJ 3.12	L20	LC #5 due
9/28	Octahedral and tetrahedral symmetry complex MOs	AJ 16.5-7	L21,22	AJ 2.14a, 3.98, 16.65, 16.66
9/30	Transition metal spectroscopy, backbonding, crystal fields	AJ 16.8-16.12	L23,24	AJ 16.47, 16.61, 16.73, 16.81
10/3	Types of bonding: covalent, metallic, ionic, coordination	AJ 2.1-2.4, 2.11 AJ 2.14-2.16 AJ 6.12-6.13	L25	AJ 2.32, 2.105ab, 6.40, 6.45 LC #6 due
10/5	Review lecture (with TAs)	-		-
First hour exam: Thursday, Oct 6; covers up to 9/26 lecture				
10/7	No lecture – exams will be returned			
3. From molecules to moles				
10/10	How many atoms in a mole?	AJ F38-44	L26	AJ E.1, E.5, E.11, E.23 LC #7 due
10/12	Temperature is the average energy per active degree of freedom	AJ 7.7	L27	AJ 7.33, 7.34
10/14	The motion of atoms and molecules, ideal gas	AJ 4.9-11	L27	AJ 4.69, 4.70, 4.80
10/17	The ideal gas law; real gases	AJ 4.1-4.8	L28	AJ 4.104, 4.110 LC #8 due
4. Chemical kinetics				
10/19	Atmospheric kinetics; four factors governing kinetics	AJ 14.1-3	L29,30	AJ 14.7, 14.10, 14.13, 14.15, 14.97
10/21	Simple and integrated rate laws; initial conditions	AJ 14.4-6	L30	AJ 14.18, 14.25, 14.38, 14.103
10/24	The rate coefficient: collision rate, transition state, steric factor	AJ 14.11-13	L31	LC #9 due
10/26	The rate coefficient: Boltzmann factor	AJ 14.11-13 (still!)	L31	AJ 14.59, 14.93
10/28	Reaction mechanisms; organic & inorganic reactions; detecting kinetics by spectroscopy	AJ 14.7-9,14.14-15	L32	AJ 14.48, 14.47, 14.94
10/31	Equilibrium constant; Microscopic reversibility	AJ 14.10, 10.1-2	L33,34	AJ 14.53, 14.54, 10.97 LC #10 due

5. Chemical Thermodynamics				
11/2	Closed equilibrium systems and the three laws	AJ 7.1-2	L35	AJ 7.1
11/4	Energy, heat and work	AJ 7.3-7.10	L35	AJ 7.3, 7.13, 7.15
11/7	Enthalpies, Hess' law, calorimetry	AJ 7.11-7.21	L36	AJ 7.17, 7.22, 7.41, 7.45, 7.67, 7.74a LC # 11 due
11/9	Entropy I: a quantitative measure of disorder	AJ 8.5	L37,38	AJ 8.31
11/11	Entropy II: why $S = k \ln(\Omega)$ and $dS = dQ_{\text{rev}}/T$	AJ 8.1-4,6-8	L39	AJ 8.1, 8.5, 8.43
11/14	Reversible processes and free energy	AJ 8.9-12	L39	AJ 8.45, 8.51, 8.53 LC # 12 due (last one!)
11/16	Free energies of reaction	AJ 8.13-16	L40	AJ 8.21, 8.39, 8.56a, 8.61a
11/18	Doing free energy calculations; equilibrium constant	AJ 10.1-8	L40, 41	AJ 10.1, 10.6, 10.13, 10.17, 10.47, 10.89a
11/28	Review lecture (with TAs)	-		-
Second hour exam: Tuesday, Nov 29; covers up to 11/11 lecture				
11/30	No lecture – exams will be returned	-		-
12/3	The free energy and Le Châtelier's principle	AJ 10.9-11	L41	AJ 10.74, 10.75a, 10.79ab
12/5	Review and demo lecture I: the TAs!			
12/7	Review and demo lecture II: the Prof!			
Final Exam: Thursday Dec. 15th 8-11 AM (covers all material); location TBA				