Beginning of new chapters are bolded/italicized; Pre-lecture videos (due before lecture!!) are in BLUE; Quizzes are in PURPLE

Week	Notes and quizzes	Tentative lecture topics; videos due before lecture		
		Monday	Wednesday	Friday
5 Sept	Classes begin Tues	-	Finish <i>chapter 1</i> (1.1, 1.2, 1.3, 1.4)	Chapter 2: atoms, isotopes, composition of matter
12 Sept		Chapter 3: ions, balancing reactions, organization of the periodic table. Chapter 4: ionization energy	Chapter 4: ionization energy, light is a traveling wave (4.1, 4.2, 4.3)	Light, photon energy, spectroscopy (4.4, 4.5, 4.6)
19 Sept	Quiz #1 (M)	Starting to explain electrons: matter waves, standing waves (4.7)	<i>Chapters 4 and 5:</i> H atom family album (PDF), quantum numbers (<i>n</i> , <i>l</i>) Bohr model (4.8, 4.9)	Energy and size of hydrogen electron waves; Abs/emission; Photoelectric effect (4.10, 4.11, 4.12, 4.13)
26 Sept		Photoionization; single electron atomic ions (5.1, 5.2, 5.3)	Multi-electron atoms: principles, quantum numbers (m_l, m_s) (5.4, 5.5)	Multi-electron atoms: shielding and Hund's rule (5.6)
3 Oct	Quiz #2 (M)	Electron configurations and periodic trends. <i>Chapter 6:</i> ions (6.1, 6.2)	lons and their electron configurations; lonic "bonds"	Chapter 7: Lewis structures, formal charge. (7.1, 7.2, 7.3)
10 Oct	No classes Mon. Tuesday is Monday schedule	Resonance forms, bond order, exceptions to the octet rule Bond polarity (7.4)	Chapter 8: molecular shape, steric number, VSEPR theory (8.1, 8.2, 8.3)	Shapes of molecules, molecular polarity Chapter 9: MO theory
17 Oct		MO theory of diatomic molecules (first period), σ and σ^* MOs, bond order	Second row diatomic MOs (with π and π^*), polar bonds, hybridization	Hybridization and bonding in molecules with more than 2 atoms (σ bonds)
24 Oct	Quiz #3 (M)	π bonds, molecules with delocalized electron clouds. Chapter 11 : moles (11.1)	Empirical formulas, combustion analysis, limiting reagents, yield (11.2, 11.3)	Chapter 10: naming ionic compounds, dissolving ionic compounds (10.1, 10.2)
31 Oct		Chapter 12: molarity (12.1) Solubility rules, precipitation reaction, hydrates (10.3)	Limiting reagents with ionic solutes. Molecular solutes, acids and bases (10.2, 10.5)	Redox reactions (10.4) Titrations
7 Nov	Quiz #4 (M)	Chapter 13: gases, the ideal gas law, the molar gas constant, and SATP (13.1, 13.2)	Partial pressures, molar mass and gas density, limiting reagent problems with gases	Kinetic molecular theory, root mean square speed of gases, diffusion and effusion (13.3)
14 Nov		Real gases Chapter 14: system and surroundings (14.1)	Heat, Calorimetry (14.2)	Work, the first law of thermodynamics (14.3)
21 Nov	Quiz #5 (M) Thanksgiving: no classes Wed-Fri	Enthalpy, molar enthalpy of reaction	-	-
28 Nov		Enthalpy versus internal energy, q_v vs. q_p	Hess's Law and manipulating reactions	Enthalpy of formation (14.4)
5 Dec		Bond enthalpies (14.5)	Getting ΔH for reactions (a summary)	Calorimetry, microscopic origin of heat capacity
12 Dec	Quiz #6 (M)	Last lecture today	-	Finals begin 12/15

Beginning of new chapters are bolded/italicized; Pre-lecture videos (due before lecture!!) are in BLUE; Quizzes are in PURPLE

Week	Notes and	Tentative lecture topics; videos due <i>before</i> lecture		
	quizzes	Tuesday	Thursday	
5 Sept	Classes begin Tues	Finish chapter 1. Chapter 2: atoms, isotopes (1.1, 1.2, 1.3, 1.4)	Composition of matter, Chapter 3: ions, balancing reactions, organization of the periodic table	
12 Sept		Chapter 4: ionization energy, light is a traveling wave, resonance, photon energy (4.1, 4.2, 4.3, 4.4)	Spectroscopy. Starting to explain electrons: matter waves, standing waves (4.5, 4.6, 4.7)	
19 Sept	Quiz #1 (M)	Chapters 4 and 5: H atom family album (PDF), quantum numbers (<i>n</i> , <i>l</i>), Bohr model: energy and size of hydrogen electron waves. (4.8, 4.9)	Absorption/emission lines. Photoelectric effect and photoionization; single electron atomic ions (4.10, 4.11, 4.12, 4.13, 5.1)	
26 Sept		Multi-electron atoms: principles, quantum numbers (m_l, m_s), shielding (5.2, 5.3, 5.4, 5.5)	Multi-electron atoms: Hund's rule, Electron configurations and periodic trends (5.6)	
3 Oct	Quiz #2 (M)	Chapter 6: ions and their electron configurations, Ionic "bonds" (6.1, 6.2, 7.1)	Chapter 7 : Lewis structures, Formal charge, resonance forms, bond order, exceptions to the octet rule, bond polarity (7.2, 7.3, 7.4)	
10 Oct	No classes Mon. Tuesday is Monday schedule	No classes today	<i>Chapter 8:</i> molecular shape, steric number, VSEPR theory, molecular polarity. <i>Chapter 9:</i> MO theory (8.1, 8.2, 8.3)	
17 Oct		MO theory of diatomic molecules (first period), σ and σ^* MOs, bond order, second row diatomic MOs (with π and π^*), polar bonds, hybridization	Hybridization and bonding in molecules with more than 2 atoms (σ bonds), bonding in molecules with more than 2 atoms (π bonds)	
24 Oct	Quiz #3 (M)	Molecules with delocalized electron clouds. Chapter 11 : moles, empirical formulas, combustion analysis (11.1)	Limiting reagents, yield (11.2, 11.3) Chapter 10: naming ionic compounds, dissolving ionic compounds (10.1, 10.2)	
31 Oct		Chapter 12: molarity (12.1) Solubility rules, precipitation reaction, hydrates, limiting reagents with ionic solutes (10.3)	Molecular solutes, acids and bases, electrolyte strength (10.2, 10.5), redox reactions (10.4) Titrations	
7 Nov	Quiz #4 (M)	Chapter 13: gases, the ideal gas law, the molar gas constant, and SATP, Partial pressures, molar mass and gas density (13.1, 13.2)	limiting reagent problems with gases, kinetic molecular theory, root mean square speed of gases, diffusion and effusion (13.3)	
14 Nov		Real gases Chapter 14: system and surroundings, heat (14.1)	Heat and calorimetry, work, the first law of thermodynamics (14.2, 14.3)	
21 Nov	Quiz #5 (M) Thanksgiving: no classes Wed-Fri	Enthalpy, molar enthalpy of reaction, Enthalpy versus internal energy, q_v vs. q_p	No classes today	
28 Nov		Hess's Law and manipulating reactions, Enthalpy of formation (14.4)	Bond enthalpies (14.5)	
5 Dec		Getting ΔH for reactions (a summary)	Calorimetry, microscopic origin of heat capacity Last lecture of CH101	
12 Dec	Quiz #6 (M)	Classes end Monday. No classes today.	Finals begin 12/15	

Important note about Chapter 10:

- We are skipping chapter 10. Much of the way the material in chapter 10 is presented is *very outdated* (at best), or even outright wrong. For example: <u>total</u> ionic equations are <u>totally incorrect</u> (see what we did there?). Instead, we will <u>only</u> discuss net ionic equations in this course.
- While this book is just the right level for CH101/102 and does most things great, chapter 10 is not good. Please <u>do</u> <u>not use the text of chapter 10</u> to guide your work.
- We will cover *select topics* (not all of them!!) related to chapter 10 as we work through chapters 11 and 12. Please *use the pre-lecture videos* for that material (videos 10.1 10.5) as well as the material we will present in class.
- We will make use of a *few* of the reference tables from Chapter 10, a few in-text examples, and some of the end-of-chapter homework problems.
- Note: our focus of chapter 10 will be on developing a microscopic understanding of the following types of reactions: dissolving solids, precipitation reactions, acid-base reactions, and reduction-oxidation reactions.
- Below are the details of the order we will cover chapters 10-12, including which homework problems go with each topic that we will cover.

Our path through Chapter 10 through 12 in McQuarrie:

- 1. <u>Chapter 11: moles and chemical calculations</u> (all sections of McQuarrie Chapter 11; pre-lecture videos 11.1-11.3) End-of-chapter homework (chapter 11): 1, 2, 4, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 42, 44, 46, 50, 52, 53, 59, 60, 62, 68, 70, 72, 77, 78, 80, 86, 88, 90, 94
- <u>Dissolving and naming ionic compounds</u> (pre-lecture videos 10.1 and 10.2; know Tables 10.1, 10.2, 10.3, and 10.4) In-text Examples 10-1, 10-2, and 10-3 End-of-chapter homework problems (chapter 10): 2, 4, 6, 8, 10, 12, 14, 22, 24, 26, 28, 91
- 3. <u>Solution concentration</u> (pre-lecture video 12.1; McQuarrie sections 12-1, 12-2, and 12-3) End-of-chapter homework problems (chapter 12): 4, 6, 8, 10, 12, 43, 45, 46, 52
- Solubility of ionic compounds and precipitation reactions (pre-lecture video 10.3; know Table 10.9) In-text Examples 10-13 and 10-15 End-of-chapter homework problems (chapter 10): 42, 44, 46, 48, 50, 52, 58 (note: only write NET IONIC equations!)
- <u>Hydrates</u> (section 10-5) In-text Examples 10-8 End-of-chapter homework problems (chapter 10): 30, 32
- 6. <u>Limiting reagents with concentrations</u> (McQuarrie sections 12-4, 12-5) End-of-chapter homework problems (chapter 12): 18, 24, 28, 68, 69, 70, 71
- Molecular solutes don't break up when dissolving (review pre-lecture video 10.2 again) End-of-chapter homework problems (chapter 12): 14, 16, 39
- 8. Acids and bases (pre-lecture video 10.5)
- <u>Reduction and oxidation</u> (pre-lecture video 10.4) In-text Examples 10-18, 10-19 End-of-chapter homework problems (chapter 10): 62, 64
- 10. <u>Titrations</u> (McQuarrie sections 12-6, 12-7) End-of-chapter homework problems (chapter 12): 29, 32, 36, 38, 72
- 11. Additional chapter 12 end-of-chapter homework problems: 54, 55, 60, 62, 64, 66, 80, 82, 85