Chemistry 116 - Syllabus - Fall 2021
Dr. Audrey Dell Hammerich

Week	TEXT Z	TEXT H	LECTURE/DISCUSSION Subject	LAB (H - Harris, LM - Lab Manual) Experimental Procedure
1 8/22			Introduction; Math and Units; (A1-A2, 1); Atoms, Molecules, Ions (2.1-2.7); Periodicity, Nomenclature (2.8-2.9) Overview (0, 1-1); Measurement (3-1–3-3); Lab Basics (2)	Check In, Safety Orientation; H_Exp_1: Calibration of Volumetric Glassware (1–2); LM_1: Data Analysis
2 8/29 **Q1**			Stoichiometry (3) Mass Spectrometry - EI, CI (22-1), MALDI (Box 22-4)	*Online* H_Exp_2: Gravimetric Determination of Calcium as $CaC_2O_4 \cdot H_2O$ (1-4, 2-7–2-8, 27-1_27-3)
3 9/5 **Q2**			Chemical Reactions, Solution Stoichiometry I (4) Stoichiometry in Chemical Measurements (1-2, 1-3); Experimental Error (3-1–3-3); Statistics I (4-1–4-3)	LM_3: A Sequence of Chemical Reactions **BOIL DI WATER FOR EXP 6**
4 9/12 **Q3**			Chemical Reactions, Solution Stoichiometry II (4.7-4.12) Titrations (7-1–7-2); Redox (Appendix D, 16.4–16.6); Statistics II (4-4–4-6)	*Online* H_Exp_5: Statistical Evaluation of Acid-Base Indicators (3, 4-1–4-6, 7-1–7-2)
Monday, September 20 - EXAM I				
5 9/19 **EI**			Bonding Concepts, Lewis Structures I (12.15, 13) Linear Least Squares, Calibration Curves (4-7–4-8); Spectrophotometry (18-1–18-3) **EXP 6, 7 PERFORMED WITH LAB PARTNER** **DON'T DISCARD H_EXP_6 SOLUTIONS** used in Exp 7, 8	H_Exp_6: Preparing Standard Acid and Base (11.7) and LM: Calibration of a pH Meter; H_Exp_7: Using a pH Electrode for an Acid-Base Titration (11-5–11-6, 15-5)
6 9/26 **Q4**			Lewis Structures II, VSEPR (13); Gases I (5)	*Online* PhET Spectrophotometry Simulation/ Activity
7 10/3 **Q5**			Gases II, Kinetic Theory, Real Gases (5)	LM_5: Determination of $NaHCO_3$, Molar Mass of $CO_2(g)$, and the Value of R
8 10/10 **Q6**			Intermolecular Forces, Liquids (16.1-16.2; Petrucci 12); Vapor Pressure; Phase Diagrams (16.10-16.11; Petrucci 12-4) Ionic Strength and Activity (8-1–8-3)	*Online* H_KH_4-4: Determination of Glucose in Blood Serum (Calibration Curve) (4-7–4-8, 18-1–18-3)
9 10/17 **Q7**			Properties of Solutions, Colligative Properties (17) Microdialysis (demo 27-1); Lab-on-a-Chip, Microfluidics (26-8)	H_Exp_8: Analysis of a Mixture of Carbonate and Bicarbonate (7-1–7-2)
Monday, October 25 - EXAM II				
10 10/24 **EII**			Chemical Equilibrium I (6) Chemical Equilibrium (6-1–6-2)	Finish experimental work, catch up
11 10/31 **Q8**			Chemical Equilibrium II (6); Strong Acids/Bases (7.1-7.4, 7.6) Strong Acids and Bases (6-5–6-7, 9-1) Systematic Strong Acid/Base Equilibrium (8-4, 9-1)	*Online* H_DU_10.5: Ion-Exchange Separation and Spectrophotometric Determination of Nickel and Cobalt (23-2, 26-2)
12 11/7 **Q9**			Weak Acids/Bases (7.5-7.6), Salt Solutions (7.8), Systematic Approach to Equilibrium (7.10-7.11) Systematic Approach to Equilibrium (8.4, 9-1, 9-2–9.4) Monoprotic Acid-Base Equilibria (6-5–6.7, 9-2–9-4)	Handout: Determination of the Molar Mass and Ionization Constant of a Weak Acid
13 11/14 **Q10**			Polyprotic Acids, Buffers (7.7, 8.1-8.4) Buffers (9-5), Polyprotic Acid-Base Equilibria (10)	*Online* LM_9: Stabilization of pH with Buffers
Monday, November 22 - EXAM III				
14 11/21 **EIII**			Titrations I (8.5-8.7) Acid-Base Titrations (11)	NO LAB - Thanksgiving Holiday
15 11/28			Titrations II (8.5-8.7); Solubility (8.8-8.9) Solubility Equilibria (6-3, 7-3) Global Warming and Acidification of the Oceans (6-3, 7-3)	Turn in Lab Notebook and Check Out

For each two-week laboratory segment, half of the class will perform an in-person experiment during the first week while the other half does an online experiment. In the second week of the segment the assignments will switch. This will give six in-person labs for the semester. Week 9 is a lab period where students can finish their experiments and/or consult with their TA or ask questions.

FINAL EXAMINATION: Tuesday, December 7, 8:00 - 10:00 am