CHEM 162 HA–HF Syllabus Summer 2021

All readings and assignments are in "*Chemistry: Structure and Properties*" by Nivaldo J. Tro,

Exact pace of topics and associated problems subject to change, as determined in lecture

Lec #	**Date**	**Reading**	**Topics**	**Recitations**	**Homework problems** to be covered in recitation
1	7/12/M	13.1–5	Solutions: types, solubility, energetics, factors affecting solubility, expressing solution concentration,	Math Sheet	**13:** 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45, 47, 53, 55, 57, 59, 61, 63, 95
2	7/13/T	13.5–6	Colligative properties: vapor pressure lowering; freezing point depression, boiling point elevation, osmotic pressure		**13**: 67, 69, 71, 73, 75, 77, 79, 81, 101, 105, 109, 117
3	7/14/W	13.6–7	Colligative properties of strong electrolyte solutions	13.1–6	**13:** 83, 85, 87, 89, 91, 93, 110
4	7/15/Th	14.1–4	Kinetics intro, rates of reaction, instantaneous vs average rates, rate law: method of initial rates	Review	**14:** 27, 29, 33, 35, 39, 41, 43, 45
5	7/16/F	14.5– 6	Integrated rate laws, temperature dependence of rate, activation energy, collision theory	13.6–7 14.1–4	**14:** 47, 49, 51, 53, 55, 57, 59, 61, 63, 69, 85, 71, 89, 91, 109, 111
6	7/19/M	14.7–8	Reaction mechanisms, catalysis	14.5–6	**14:** 75, 76, 77, 78, 81, 82, 95, 96, 101
7	7/20/T	15.1–6	Equilibrium principles, nature of the equilibrium constant K, solving equilibrium expressions		**15:** 21, 23, 25, 27, 29, 33, 37, 39, 41, 43
8	7/21/W	15.7–9	Reaction quotient Q and K, equilibrium problems approximation methods, Le Châtelier's principle	14.7–8 15.1–6	**15:** 47, 49, 53, 55, 59, 61, 63, 65, 67, 69, 71, 73, 75, 81, 89, 93
9	7/22/Th	16.1–6	Definitions of acids and bases, acid strength related to molecular structure and K_a, strong vs weak acid	Review	**16:** 31, 33, 35, 37, 39, 41, 43, 49, 51, 53, 55, 57, 59
10	7/23/F	16.6–8	Autoionization of water, pH scales, K_a and K_b problems	15.7–9 16.1–6	**16:** 61, 63, 65, 67, 69, 71, 73, 75, 77, 79, 81, 83, 85, 87, 89, 91, 93, 95, 125, 133
11	7/26/M	16.9	Ions as acids and bases, pH of salt solutions	16.6–8	**16:** 97, 99, 101, 103, 105, 107, 109, 111, 143
	7/27/T		EXAM I (Lec 1–10: Chapter 13.1-16.8)		
	7/28/W	16.10–11	Polyprotic acids, Lewis acids and Lewis bases	16.9	**16:** 113, 115, 117, 119, 121,123
13	7/29/Th	17.1–3	Buffers	Review	**17:** 25, 27, 29, 31, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57
14	7/30/F	17.4	Titrations and pH curves, Indicators	16.10–11 17.1–3	**17:** 59, 61, 63, 65, 67, 69, 71, 73, 75, 79, 81, 119, 121
15	8/2/M	17.5–7	K_{sp} and solubility, common ion effect, Q test, selective precipitation, K_f and complex ions	17.4	**17**: 83, 85, 87, 89, 91, 93, 95, 97, 99, 101, 103, 105, 107, 109, 126, 127
16	8/3/T	18.1–6	Thermodynamics, spontaneity, entropy, the second law of thermodynamic, Gibbs free energy, Q and K		**18**: 27, 29, 35, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61
17	8/4/W	18.6–9	Free energy and non-standard states, temperature dependence of K	17.5–7 18.1–6	**18**: 63, 65, 67, 69, 71, 73, 75, 89, 77, 81
18	8/5/Th	19.1–3	Balancing redox reactions, half-reactions, galvanic cells, standard electrode potential	Review	**19**: 33, 35, 37, 39, 41, 43, 45, 99, 121
19	8/6/F	19.3–5	Standard electrode potential, free energy and K	19.1–3	**19**: 47, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67, 115
20	8/9/M	19.6	Nernst equation, concentration cells	19.3–5	**19**: 69, 71, 73, 75, 77, 105
	8/10/T		EXAM II (Lec 11–19: Chapter 16.9–19.5)		
21	8/11/W	19.7–9	Batteries, electrolysis, corrosion	19.6	**19**: 85, 87, 89, 91, 93, 95, 97, 119
22	8/12/Th	20.1–6	Nature of the nucleus, types of radioactivity, valley of stability: predicting the type of radioactivity, kinetics of radioactive decay and dating	Review	**20**: 31, 33, 35, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 83, 91
23	8/13/F	20.7–12	Nuclear binding energy, fission and fusion, effects of radiation	19.7–9 20.1–6	**20**: 57, 59, 61, 63, 64, 65, 67, 69, 71, 73, 75, 85, 109
24	8/16/M		Catch-up and review	20.7–12	
25	8/17/T		Catch-up and review		
	8/18/W	FINAL EXAM (Lec 1–23: Chapter 13.1–20.12)			

Quiz and Exam Dates

Date	**Quiz**	**Material Covered**		**Date**	**Exam**	**Material covered**
16 July	Quiz 1	13.1–13.7		27 July	Exam I	13.1–16.8
23 July	Quiz 2	14.1–15.9		10 Aug	Exam II	16.9–19.5
30 July	Quiz 3	16.1 –16.11		18 Aug	Final	13.1–20.12
6 Aug	Quiz 4	17.1–18.9				
13 Aug	Quiz 5	19.6–19.9				

Review sessions every Thursday after lecture (optional)