Week 1 – Errors and Statistics

Gaussian Distributions, Standard Deviation, Confidence Levels

Week 2 – Spectroscopy, Part 1: Iron Colorimetry

UV-Vis Spectroscopy, Beer's Law, Linear Least Squares Calculations and Error analysis, Calibration Curves

Week 3 – Spectroscopy, Part 2: Fluorescence

Fluorescence Spectroscopy, Standard Addition, Limits of Detection

Week 4 – Acids & Bases: Titrations and Buffers

Acid-Base Equilibria, pH and alpha fractions, monoprotic and diprotic acids, buffers, monoprotic titration curves, diprotic titration curves, ampholytes.

Week 5 – Electrochemistry, Part 1: Measuring Current and Voltage

Batteries, Ohm's Law, Faraday's Law, Nernst Equation

Week 6 – Electrochemistry, Part 2: Potentiometry, Potentiometric Titrations, Solubility

Nernst Equation Calculations, Redox Half-Cell Potentials, Indicator Electrodes, Reference Electrodes, Potentiometric Titrations, Solubility Equilibria

Weeks 7 and 9 – Seawater Analysis Project: Multiple Measurements on Seawater Samples

1) Turbidity Measurement for Sulfate
2) Turbidity Measurement for Potassium
3) Bromide Colorimetry
4) Magnesium Complexometric Fluorometry with 8-hydroquinoline
5) EDTA and EGTA Titrations for Magnesium and Calcium
6) AgCl Precipitation Titration for Chloride
### Chemistry M3LC/H2LC Weekly Readings – Fall 2018

*Fundamentals of Analytical Chemistry, 9th edition, Skoog, West, Holler, & Crouch*

<table>
<thead>
<tr>
<th>Week</th>
<th>Experiment</th>
<th>Skoog Textbook</th>
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</table>
| 1    | Check-In, Glassware Logger Pro Errors and Statistics | Chapter 2, Sections A, B, D, E, I & J  
Chapter 5, Sections A & B  
Chapter 6 (all)  
Chapter 7, Sections A & D  
**Optional Textbook HW:** 5-12, 6-7, 6-20, 7-4, 7-5 |
| 2    | Colorimetry Experiment: Determination of Fe$^{2+}$ & Fe$^{3+}$ with Ferrozine | Chapter 2, Section G  
Chapter 4, Sections A & B  
Chapter 8, Section D  
Chapter 17, Section A1  
Chapter 24, Sections A, B, C1 & C2  
Chapter 26, Sections A1, A2 and A3 (to the bottom of pg. 729)  
**Optional Textbook HW:** 4-31, 8-17, 24-24 |
| 3    | Fluorescence Experiment: Riboflavin Content in a Multivitamin | Chapter 8, Sections E1 & E2  
Chapter 24, Section D  
Chapter 27 (all)  
**Optional Textbook HW:** 27-2, 27-6, 27-11 |
| 4    | Acids & Bases: Titration and Buffers | Chapter 9, Sections A2–A5, B4, B6 & C  
Chapter 13, Sections A, B, E  
Chapter 14 (all)  
**Optional Textbook HW:** 9-26, 9-28 |
| 5    | Electrochemistry, Part 1: Measuring Current and Voltage | Chapter 18, Sections A, B & C  
Chapter 19, Sections A, B & C  
Chapter 22, Section D1  
**Optional Textbook HW:** 18-11, 19-9, 19-10, 22-24 |
| 6    | Electrochemistry, Part 2: Nernst Equation, Potentiometric Titrations, Solubility Equilibria | Chapter 9, Section B5  
Chapter 17, Section B2  
Chapter 21, Sections A, B, C, D1–D5 & G1 |
| 7    | Complexation Reactions Note: in Fall, we only do EDTA titrations in the Seawater Analysis so this reading is optional. | Chapter 8, Section D3 (repeat)  
Chapter 17, Sections A, B1, C & D  
Chapter 21, Section F3  
Chapter 26, Sections A4–A5  
**Optional Textbook HW:** 8-15, 17-17, 17-20b |
| 7–9  | Seawater Analysis Project: Multiple Measurements on Seawater Samples | See list of experiments above and refer to prior sections  
**Optional Textbook HW:** 8-14, 4-21 |