## Chem 274 Spring 2019 (CRN 80331)

## Syllabus for Principles of Analytical Chemistry

## (Tues and Thurs 10:30-11:45)

**Instructor:** Chester Dabalos (Office: Bilger 247B; Email: cdabalos@hawaii.edu)

**Office Hours:** 9-10 Tues and Thurs; 9-11 Wed

**Prerequisite:** Chem 162 or 181; Math 215, 241, 251A or equivalent

**Requirements:** scientific calculator and handy periodic table of elements

**Exams:** Three Exams (one exam per two major sections, see course schedule)

Final Exam (cumulative, may be used to replace lowest exam)

**Online exercises:** OWLv2 (C-engage)**;** due on Tuesdays 11pm (see schedule)

**Course Grade:** 20% per exam; 20% exercises

**Learning Objectives:**

- Integrate principles from general chemistry (such as stoichiometry, unit analysis, and ICE tables) to solve problems involving determination of chemical analytes
- Appreciate the role of chemical equilibria during chemical analysis
- Gain an overview of various experimental techniques and how they are used in environmental, industrial and medical applications

**Textbook:** "Fundamentals of Analytical Chemistry" ($9^{th}$ edition or its equivalent) by Skoog and its "Solutions Manual". This book is also available as an e-book from C-engage at a cheaper price. E-book is free when purchasing OWLv2.

**Course Schedule:**

| Wk | Date | Day | Topics/Important Information |
|---|---|---|---|
| 1 | 1/8 | T | Syllabus, Math Review |
| | 1/10 | R | Measurements:<br>Chemical Concentrations and Stoichiometry Calculations (**4**) |
| 2 | 1/15 | T | continuation; Experimental Error (**5, 6**) |
| | 1/17 | R | Statistics (**7**) |
| 3 | 1/22 | T | Continuation; Exercise #1 |
| | 1/24 | R | Chemical Equilibrium Part I:<br>Protic acids and bases (**9**) |
| 4 | 1/29 | T | Monoprotic Acid-Base Equilibria (**14, 15, 16**) |
| | 1/31 | R | continuation; Acid Base Titrations |
| 5 | 2/5 | T | continuation; Buffers; Exercise #2 |
| | 2/7 | R | **EXAM_1** |
| 6 | 2/12 | T | Chemical Equilibrium Part II:<br>Solubility Product and Precipitimetry (**9**) |
| | 2/14 | R | Gravimetric Analysis (**12**) |
| 7 | 2/19 | T | EDTA Titrations (**17**); Exercise #3 |
| | 2/21 | R | continuation |
| 8 | 2/26 | T | Fundamentals of Electrochemistry (**18**) |
| | 2/28 | R | Redox Titrations (**20**) |
| 9 | 3/5 | T | Continuation; Exercise #4 |
| | 3/7 | R | **EXAM_2** |
| 10 | 3/12 | T | Electrodes and Potentiometry (**21**) |
| | 3/14 | R | continuation |
| 11 | 3/19 | T | Spring Recess |
| | 3/21 | R | Spring Recess |
| 12 | 3/26 | T | Prince Kuhio Day |
| | 3/28 | R | Fundamentals of Spectrophotometry (**24, 25**) |
| 13 | 4/2 | T | Continuation; Exercise #5 |
| | 4/4 | R | Applications of Spectrophotometry (**26, 27**) |
| 14 | 4/9 | T | Continuation; Exercise #6 |
| | 4/11 | R | **EXAM_3** |
| 15 | 4/16 | T | Introduction to Analytical Separations (**31**) |
| | 4/18 | R | High-Performance Liquid Chromatography (**33**) |
| 16 | 4/23 | T | Gas Chromatography (**32**); Exercise #7 |
| | 4/25 | R | Mass Spectroscopy (**29**) |
| 17 | 4/30 | T | Continuation; Exercise #8 |
| | 5/2 | R | **Review** |
| | TBA | | **FINAL EXAM** |