AL FISCHER

CHEM 370 LECTURE MATERIAL

Contents

Course Information

Course Website, Syllabus, & Lab Manual

- alphonse.github.io/chem370

Books Referenced Herein

- **"Harvey"**: Harvey, D. *Analytical Chemistry 2.1* Available on Chemistry LibreTexts
- **"Granger"**: Granger, R.M, H.M. Yochum, J.N. Granger, and K.D. Sienerth. *Instrumental Analysis* (Revised First Edition). Oxford University Press. ISBN: 9780190865337 (Rental Book, available in WCU Bookstore)

Topics/Readings

Part I: Foundations

- Granger Chapter 1 (toolbox)
- Harvey Chapters:
  - 1 (intro)
  - 2, 3 (tools, vocabulary)
  - 4 (data evaluation)
  - 5 (standardization)
- Granger Chapter 22 (statistical data analysis)

Part II: Spectroscopy

- Granger Chapters:
  - 2 (intro)
  - 3 (optics)
  - 6 (UV-vis)
  - 8 (luminesence)
  - 11 (FT-IR)
  - 7, 9 (atomic)

Part III: Mass Spectrometry

- Granger Chapter 13

Part IV: Separations

- Granger Chapters 15 and 16 (LC & GC)

Part V: Special Topics

- TBD (SEM/TEM, CRD, PAS)

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Part I

Foundations

1
The Analyst's Toolbox

Harvey Chapter 1: Introduction to Analytical Chemistry

1.1 The Analyst's Toolbox

2
Analytical Tools

Prepare

- **Read:** Harvey Chapter 2: Basic Tools of Analytical Chemistry
- **Read:** Harvey Chapter 3: The Vocabulary of Analytical Chemistry

2.1 How is Analytical Chemistry taught?

- Quant + Instrumental
- Instrumental (incl. Quant)

Prepare

- **Read:** Harvey Chapter 4: Evaluating Analytical Data
- **Read:** Granger Chapter 22: Statistical Data Analysis

3
Reproducible & Open Reserch

We will focus on reproducible data analysis.

What does this mean?

- https://ropensci.github.io/reproducibility-guide/sections/introduction/
- https://book.fosteropenscience.eu/en/02OpenScienceBasics/
- http://faculty.nps.edu/rdfricke/OA3101/Lab%201.pdf

4
Signals and Noise

- Read Granger Ch. 5

5
Calibration and Quality Assurance

Prepare

- **Read:** Harvey Chapter 5: Standardizing Analytical Methods

6
Instrument Survey

- FAAS
- GCMS
- HPLC

Part II

Spectroscopy

7
Spectroscopy

- Read Granger Ch 2 (partial?)

Spectrum (singlular) vs. **Spectra** (plural) vs. **Spectrometer** (an instrument) vs. **Spectroscopist** (a person)

- *Vignette:* Spectroscopy and the Ozone Layer

8
UV-Vis Spectroscopy

- Read Granger Ch 6

9
Luminescence Spectroscopy

- Read Granger Ch 8

10
FT-IR Spectroscopy

- Read Granger Ch 11

11
Atomic Spectroscopy

- Read Granger Ch 7, 9

Part III

Spectrometry

12
Mass Spectrometry

- Read Granger Ch 13

Spectrum (singlular) vs. **Spectra** (plural) vs. **Spectrometer** (an instrument) vs. **Spectrometrist** (a person)

Part IV

Separations

13
Separations

14
Liquid Chromatography

- Read Granger Ch 15

15
Gas Chromatography

- Read Granger Ch 16

Part V

Special Topics

16
Special Topics

- TBD (SEM/TEM, CRD, PAS)