

AL FISCHER

CHEM 370 LECTURE MATERIAL

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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 5 (signals and noise)
- Granger Chapter 22 (statistical data analysis)

Part II: Spectroscopy

- Granger Chapters:
 - 2 (intro)
 - 3 (optics)
 - 6 (UV-vis)
 - 8 (luminescence)
 - 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/020penScienceBasics/>
- <http://faculty.nps.edu/rdfricke/0A3101/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 (singular) 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 (singular) vs. **Spectra** (plural) vs. **Spectrometer** (an instrument) vs. **Spectrometrists** (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)