Chemistry 220 - Fundamentals of Analytical Chemistry Lecture (May 2018)

Co-requisite: Chem 220L  Pre-requisites: Chem 112, 112L, Math 111 or equivalents

Instructors:

Dr. Jay G. Forsythe (Week #1)  Dr. Wendy C. Cory (Week #2)
Office: SSMB 112  Office: SSMB 314
Phone: 843-953-5052  Phone: 843-953-1405
Email: forsythejg@cofc.edu  Email: coryw@cofc.edu

Lecture Time and Location: Monday – Friday, 8:30 AM – 12:00 PM, SSMB 127

Final Exam Time and Location: Tuesday, May 29, 8:30 – 11:30 AM, SSMB 127

Student Learning Outcomes:

- To carry out concentration, titrimetric, equilibrium, and statistical calculations.
- To explain and apply the theory behind quantitative methods and modern instrumentation.
- To assess the quality of laboratory data and identify any sources of error.
- To construct and apply calibration curves used in chemical analysis.
- To explain chemical equilibria and its applications and perform appropriate calculations.
- To select the most appropriate method for a given chemical analysis.
- To demonstrate problem-solving abilities in the area of chemical analysis.

Attendance and Participation:

Due to the math-heavy nature of this course, the majority of lecture material will be written on the board. Therefore, it is highly recommended you attend all lectures, and it is your responsibility to follow up on missed notes. While in class, it is expected that you will actively participate. Please refrain from texting, online games, social media, etc.

Required Materials:

- Scientific calculator with log and exponential functions

Optional Materials:


Disability Services:

If you are a student with a documented disability who will require accommodations in this course, you must provide the proper documentation in the form of a Professor Notification Letter (PNL) by the first day of class. If you are certified to have extra time on tests and quizzes, this will need to be arranged with the SNAP office so that you can take it there. I will need the envelope one day before the test so I can have it delivered to the SNAP office in time for you to take it there. The same applies to the final. No exceptions.

Honor Code:

Lying, cheating, attempted cheating, and plagiarism are violations of our Honor Code that, when suspected, are investigated. Each incident will be examined to determine the degree of deception involved.
Incidents where the instructor determines the student’s actions are related more to a misunderstanding will be handled by the instructor. A written intervention designed to help prevent the student from repeating the error will be given to the student. The intervention, submitted by form and signed both by the instructor and the student, will be forwarded to the Dean of Students and placed in the student’s file.

Cases of suspected academic dishonesty will be reported directly by the instructor and/or others having knowledge of the incident to the Dean of Students. A student found responsible by the Honor Board for academic dishonesty will receive a XXF in the course, indicating failure of the course due to academic dishonesty. This status indicator will appear on the student’s transcript for two years after which the student may petition for the XX to be expunged. The F is permanent. Students should be aware that unauthorized collaboration--working together without permission-- is a form of cheating. Research conducted and/or papers written for other classes cannot be used in whole or in part for any assignment in this class without obtaining prior permission from the instructor.

Students can find the complete Honor Code and all related processes in the Student Handbook at http://studentaffairs.cofc.edu/honor-system/studenthandbook/index.php

Course Evaluation:

Course evaluations will be completed on the last day of class. The instructor will leave the room early so you can fill out the electronic forms objectively. Please take them seriously.

Recommended Study Practices:

Working (and re-working) book / in-class problems is the best way to prepare for exams. Problems will not be collected or graded, but are essential in preparing for exams and should be done throughout the course. In particular, in-class problems should be useful as they are written similar to test questions.

Course Outline:

Before Week I:

- Obtain textbook.
- Review Ch 1 (sections 1-3 and 1-4) and Ch 2. There will be a short quiz covering this material on the first day of class.

Week I: May 14-18; Dr. Jay Forsythe

- **Monday:** Ch 3 and Ch 4, thru section 4.5 (error and statistics; skip section 4-6)
  - Suggested HW problems: 3-1, 3-2, 3-3, 3-4, 3-5, 3-9, 3-11, 3-12, 3-13, 3-14, 3-15, 3-16, 3-20, 4-1, 4-2, 4-4, 4-5, 4-6, 4-7, 4-8, 4-9, 4-11, 4-12, 4-13, 4-14, 4-15
- **Tuesday:** Ch 1 (section 1-5) and Ch 6 (equilibrium; skip sections 6-5 and 6-6)
  - Suggested HW problems: 1-27, 1-28, 1-29, 1-31, 6-1, 6-5, 6-6, 6-12, 6-14, 6-15, 6-17, 6-18, 6-20
- **Wednesday:** EXAM #1 (8:30 AM – 9:45 AM); Chapters 8 and 9 (acids and bases)
  - Suggested HW problems: 8-1, 8-3, 8-4, 8-9, 8-11, 8-13, 8-14, 8-15, 8-16, 8-17, 8-18, 8-19, 8-21, 8-22, 8-23, 8-28, 8-32, 9-1, 9-2, 9-4, 9-6, 9-7, 9-8, 9-9, 9-12, 9-13, 9-14, 9-15, 9-16, 9-20, 9-22
- **Thursday:** Chapters 10 and 11 (acids and bases; skip derivatives in 10-4, skip section 10-6)
  - Suggested HW problems: 10-1, 10-2, 10-3, 10-6, 10-7, 10-8, 10-9, 10-11, 10-12, 10-13, 10-14, 10-15, 10-16, 10-17, 10-20, 10-23, 10-27, 11-2, 11-3, 11-7, 11-9, 11-10, 11-12, 11-13, 11-17, 11-19, 11-20, 11-25, 11-26
- **Friday**: Chapter 12 (systematic treatment; skip problems using Debye-Huckel eqn in 12-2)
  - Suggested HW problems: 12-1, 12-2, 12-6, 12-7, 12-8, 12-9, 12-11, 12-16, 12-18, 12-22, 12-23, 12-24, 12-26, 12-29, 12-36, 12-37, 12-38

**Week II: May 21-25; Dr. Wendy Cory**

- **Monday**: EXAM #2 (8:30 AM – 9:45 AM); Ch 4 (4-6 and 4-7) and Ch 5 (calibration curves)
  - Suggested HW problems: 4-19 (use Excel), 5-4, 5-14, 5-18, 5-22

- **Tuesday**: Ch 21 and 22 (chromatography)

- **Wednesday**: Ch 18 and 19 (spectroscopy)
  - Suggested HW problems: 18-1, 18-2, 18-3, 18-4, 18-5, 18-7, 18-12, 18-14, 18-15, 18-19

- **Thursday**: Ch 20 (spectroscopy cont.) and Ch 14 (electrochemistry)
  - Suggested HW problems: 14-1, 14-2, 14-3, 14-4, 14-8, 14-9, 14-10, 14-11, 14-12, 14-14, 14-16, 14-17, 14-20, 14-23, 14-24, 14-25

- **Friday**: EXAM #3 (8:30 AM – 9:45 AM); Ch 15 (electrochemistry cont.)
  - Suggested HW problems: 15-1, 15-2, 15-11

**Week III: May 29**

- **Tuesday**: EXAM #4 (8:30 AM – 11:30 AM); comprehensive final

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**Grading**: Final grades will be given based on the following percentages. Decimal places of 0.50 will be rounded up. The final exam may replace your lowest exam grade.

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Percentages for individual assignments are listed below:

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