

Chemistry 412

Dr. Susan Geldart

Office: Pastore 215A

Email: sgeldart@chm.uri.edu

Office hours: Drop in 215A or by appointment

Text: Harris, Quantitative Chemical Analysis, 8th ed. WH Freeman. (Chapters 13-24)

Chapter 13: Fundamentals of Electrochemistry

Chapter 14: Electrodes and Potentiometry

Chapter 15: Redox Titrations

Chapter 16: Electroanalytical Techniques

Chapter 17: Fundamentals of Spectroscopy

Chapter 18: Applications of Spectroscopy

Chapter 19: Spectrophotometers

Chapter 20: Atomic Spectroscopy

Chapter 21: Mass Spectroscopy

Chapter 22: Introduction to Analytical Separations

Chapter 23: Gas Chromatography

Chapter 24: Chromatographic Methods and Capillary Electrophoresis

The book will be used for assigning homework and for some of the figures in the chapters. If you have an older edition, that's fine. If you have another instrumental analysis book, it should cover the same material and you can use the notes to check that the material matches what we are doing in class.

Course objectives:

The use of instrumentation for detection and quantitative analysis of chemicals has expanded beyond the field of chemistry into biochemistry, forensics, nutrition, and engineering. Chemical instrumentation is used to detect and quantify compounds based on their chemical and physical properties. Knowledge of many different types of instrumentation, the principles behind them and how they are used is a very valuable skill and is often requested when searching for a position. Thus, the goal of this course is to introduce you to the background behind the different types of instrumentation, the ability to decide when each type is to be used and HOW to use it will be examined.

Studying:

This course moves extremely quickly. We will cover approximately 1 chapter per week, so it is important that you keep up with the workload. The material learned in each chapter will be used in subsequent chapters, so if you fall behind in the first few weeks, it's nearly impossible to catch up again. You are also expected to have retained the material you learned in freshman chemistry and chem 212, especially error and mass/moles/molarity calculations. The final will require you to compare and contrast different methods, so you do need to know the specifics of each type of instrumentation as we go along.

Notes, Assignments and Experiments

All class notes and assignments will be posted in the Resources section of Sakai. I will be posting notes approximately 1 week before each lecture so you have them ahead of time to use as a guide for reviewing the chapter material. Not everything in each chapter will be covered, so use the notes as a guide as to where the focus is on each topic. Assignments will be announced in class.

Office Hours:

In general, I'm in the building from 8-3, so feel free to stop by room 215A or email me for an appointment if you want to be sure I will be there when you show up. Official office hours are TuTh from 9:30-10:45.

Disability Accommodations:

Any student with a documented disability is welcome to contact me as early in the semester as possible so that we may arrange reasonable accommodations. I have no problem making any accommodations you may need, but I need at least a week's notice to set up an alternate location for exams or quizzes. I also need documentation from Disabilities Services, so contact them first at 330 Memorial Union, 401-874-2098.

Sports or Other University Sponsored Events:

Please let me know the first week of classes if you need any accommodations made. Please let me know if you have any lab conflicts as well.

Course Grades:

The course is graded strictly by the grades you achieve on the assigned material, and exams. **There is no extra credit!** Any errors in grading must be brought to my attention within 1 week of the material being handed back. No changes in any grades will be made after that point.

Scaling:

The scale for the course is given below. Remember, the grade is based on the exams and quizzes together. 60% of the grade based on lecture material and 40% on the lab. All grades will be posted on Sakai with a letter grade as you proceed through the course.

Course Scale:	A	100-90	C+	73-70	F below 55
	A-	89-86	C	69-66	
	B+	85-82	C-	65-62	
	B	81-78	D+	61-59	
	B-	77-74	D	58-55	

Exam Grade: 50% of Grade

Each exam will have 5 questions each worth 20 points. There will be several parts per question. All work must be shown to get credit. Each exam will cover material from previous exams, so all exams are cumulative. Your exams are worth 50% of the overall grade. Since each exam is based on a different area of instrumentation, no exams will be dropped. If you miss an exam for any reason you need to contact me about a makeup. The exam must be made up in the same week it is taken by the rest of the class unless you have documentation from the university regarding missing the entire week.

Tentative Exam Dates (within a week):

Exam 1, Electrochemistry: Wednesday, 2/12

Exam 2, Spectroscopy: Wednesday, 3/19

Exam 3, Separations: Wednesday, 4/16

Special Reports due: Monday, 4/21

Presentations: 4/21, 4/23, 4/25

Final: Friday, May 9th 11:30-2:30 (last day of finals!)

Assignments: 10% of Grade

Homework will be assigned throughout the course. All work must be shown to get credit. Quizzes will also be given in class and may be unannounced. I will drop the lowest homework or quiz since no makeups or extensions will be given. The combined homework and quiz grades are worth 20% of the overall grade. Late homework will not be graded and you will receive a zero for that problem set.

Special project: 15% of Grade

You will be expected to choose an instrumentation method, write a short report (5-10 pages) and give a 15 minute presentation on the material. These reports will be done at the end of the semester and will serve as a review for the class. More information regarding these topics will be given out once we get closer to spring break.

Final: 25% of Grade

The final is cumulative and will be based on understanding the theory, advantages and disadvantages of each type of instrumentation and a working knowledge of the hardware involved in each instrument.