

CHEM 4171
Dr. Dan Feldheim

Wherever you choose to sit make sure you can read this screen clearly and easily.

Please have your iclickers ready.

Introduction to CHEM 4171

CH 4171

Welcome to Chemistry 4171. The primary objective of the course is to develop a deeper understanding of the fundamental principles of chemical analysis while keeping an eye on larger issues of how these principles can be used to solve problems and transform society on a global scale.

Prerequisites

CHEM 3331 OR 3371 (MIN GRADE C-)

Introduction to CHEM 4171

Course and Contact Information

Instructor: Dr. Dan Feldheim

Office: Ekeley M321

Email: Daniel.Feldheim@Colorado.edu

Office Hours: By appointment

Introduction to CHEM 4171

Course Website (CULearn)

The URL for the CULearn Web page is:

<https://learn.colorado.edu>

Introduction to CHEM 4171

Texts & Materials

Textbook (Optional):

Skoog, Holler, Crouch, Principles of Instrumental Analysis, 6th edition.

Willard, Merritt, Dean, Settle, Instrumental Methods of Analysis.

iclicker for use in lecture

Grades

Semester and Final Exams

A total of four examinations will be given in this course. The dates, times, and locations are listed below and are non-negotiable:

First Exam	Fri.	Sept. 19
Second Exam	Fri.	Oct. 10
Third Exam	Fri.	Nov. 7
Final Exam	Sun.	Dec. 14 (7:30 PM)

Due to University and CHEM rules no early or late exams will be given.

NO MAKE-UP EXAMS WILL BE GIVEN!

Homework

As a guide to material that will appear on the exams, homework problems will be assigned throughout the semester. HW assignments will not be collected or graded.

Grades for the course will be assigned according to the following assignments:

Hour Examinations (3@100 pts each)	300
Final Exam	150
Homework	<u>50</u>
Total	500

Final grades for the course will be assigned using the following point scale (+ or – grades will be assigned):

A	>88%
B	78%-87%
C	68%-77%
D	58%-67%
F	57% and below

Please note that no extra credit assignments will be given at the end of the semester to improve your grade!

Most Importantly!

No electronic devices other than calculators are allowed in class!

(Unless I approve.)

Approximate Lecture Schedule

Handouts—Statistical Methods of Data Analysis

Chapter 5—Signal and Noise

Chapters 6-10—Atomic Spectroscopy

Chapter 11—Mass Spectrometry

Chapters 13 and 14—UV-Visible Spectroscopy

Chapter 15—Luminescence Spectroscopy

Chapters 16 and 17—Infrared Spectroscopy

Chapter 18—Raman Spectroscopy

Chapter 20—Molecular Mass Spectrometry

Chapters 22-25—Electroanalytical Chemistry

Chapters 26, 27, 28, 30—Chromatography

Special Topics in Micro and Nanoscale Analytical Chemistry

Chapters from Skoog

Clickers

1 point for answering

1 point for a correct answer

Question

What do you plan to do after you graduate from CU?

- A. Go to medical school
- B. Go to graduate school in chemistry
- C. Other post-graduate school (physics, biochem, eng)
- D. Teach
- E. Other

Where were you born?

- A. Colorado
- B. Some other state west of the Mississippi
- C. In a state east of the Mississippi
- D. In another country



Instrumental Analysis

What has analytical chemistry enabled?

Genomics/Proteomics: We now know many of the molecules (genes, proteins) involved in diseases such as cancer.

We know the molecular composition of the atmosphere and can monitor changes in composition.

Diabetics can monitor glucose levels rapidly.



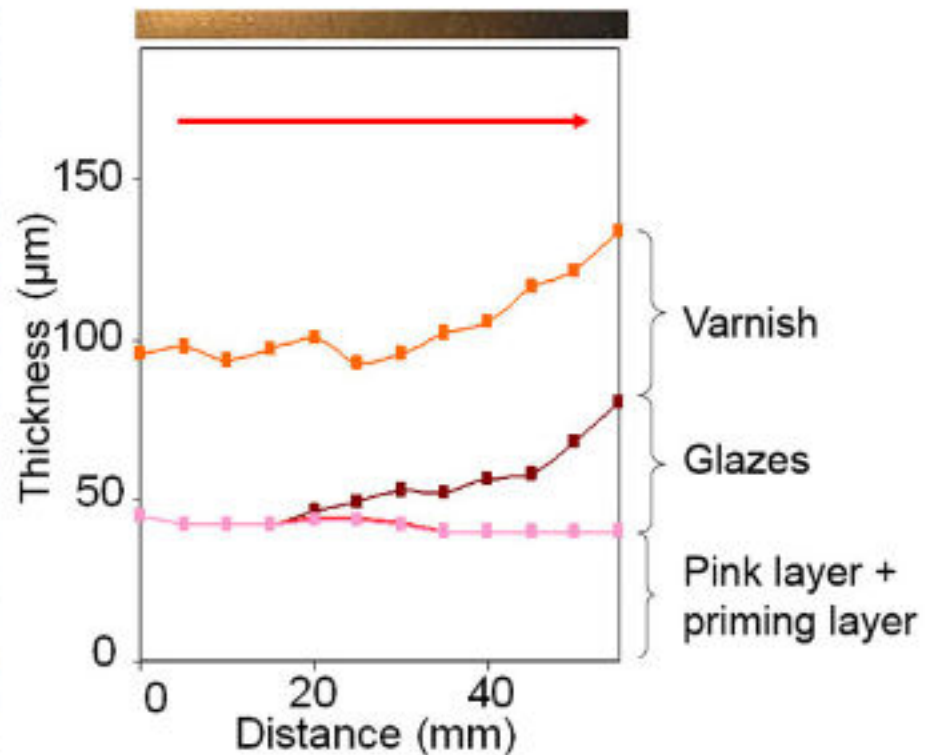
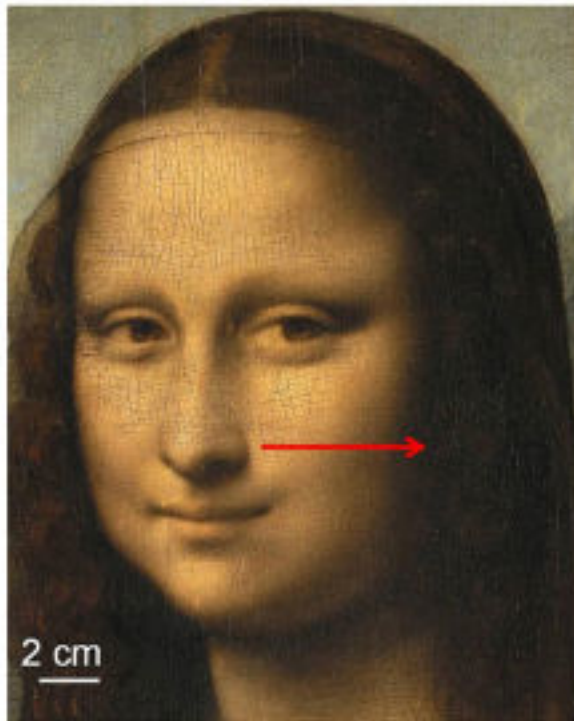
HIV testing is rapid and simple.



Instrumental Analysis

What has analytical chemistry enabled?

Historical artifacts can be analyzed non-destructively.



Instrumental Analysis

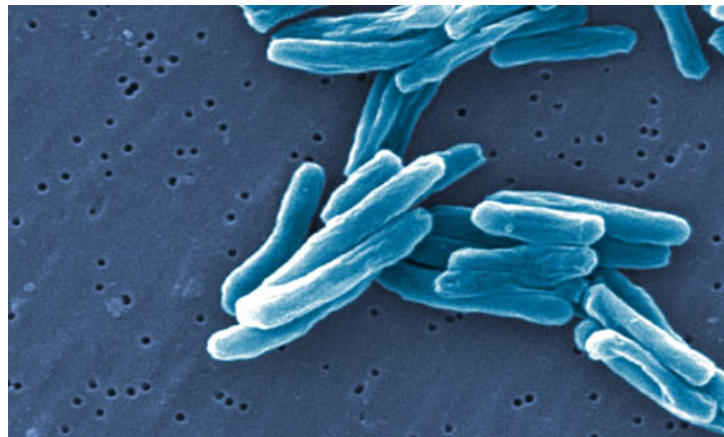
What analytical techniques does the world need?

Diagnosing disease in resource-limited settings remains challenging.



Malaria: Deadliest disease of all time.

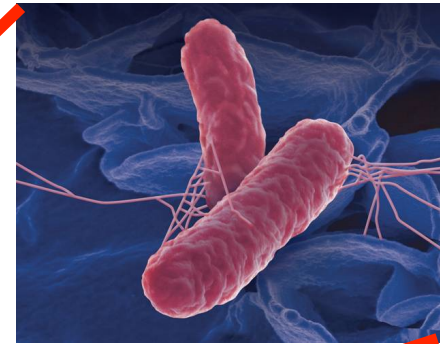
Tuberculosis: 22nd deadliest.



Instrumental Analysis

What analytical techniques does the world need?

Rapid Tests for Food Safety



Instrumental Analysis

Applied Physical Chemistry, Engineering, Statistics, Biology

Chemical analysis tools are based upon fundamental atomic/molecular behaviors.

Understanding how molecules absorb/emit light, for example, allows new tools to be developed.

This is why fundamental research is so important. If someone had not done research to understand how molecules behave in a magnetic field, we would not have MRI (the most used medical technique in the world).

In this class, we will cover both the fundamentals and applications of chemical analysis.