CHEM 307
INSTRUMENTAL ANALYSIS LABORATORY

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Office hours: You are always welcome when I am available at my office.

Required Texts:
- Skoog & West, Fundamentals of Analytical Chemistry, 8th Edition
- Chem 307 Laboratory Manual (will be obtained from Durak Copy)

Required Materials:
- Safety Goggles
- Lab coat
- Comfortable shoes
- Scientific calculator

Prerequisites: Must be taken concurrently with Chem 305 when registered for the first time.

Objectives:
The overall goal of this laboratory is to learn how to use analytical instrumentation to solve chemical problems.

1) Spectroscopic methods involve the use of light and measure the amount of either light absorbed or light emitted by solutions of the analyte.
   1) Spectrophotometric Determination of Iron in Vitamin Tablets
   2) Spectrophotometry of an Indicator
   3) Determination of Cu/EDTA mole ratio by continuous variation method

2) Electroanalytical methods involve the measurement of a voltage or current resulting from the electrodes immersed into the solution.
   1) Potentiometric Determination of Fe
   2) Electrogravimetric Determination of Cu & Zn
   3) Conductometric Titration
   4) Floride Ion Determination

3) Chromatographic methods allow the separation, identification and determination of the chemical components in complex mixtures by the differences in the rates at which they are carried through a fixed or stationary phase.
   1) Ion chromatography
**Grading:**

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<tr>
<th>Component</th>
<th>Points</th>
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<tr>
<td>Lab reports</td>
<td>45 pts*</td>
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<tr>
<td>Pre-Lab quizzes</td>
<td>15 pts**</td>
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<td>Final exam</td>
<td>40 pts***</td>
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*Laboratory report grade will be based on the accuracy of your unknown result (20 pts) and how well the report is prepared (80 pts).

** Prior to each new experiment a quiz will be given. If you get a “0” you will not be allowed to work in the lab. Therefore reading and understanding the lecture notes and the procedure before coming to lab is strongly recommended.

*** The students should complete all the experiments and should submit all the lab reports on due dates in order to take the final exam, otherwise they are not allowed to enter the final exam.

**Lab Reports:**

**Title page**: Give the title of the experiment, your name, the date performed, a blank space to indicate the date received by the instructor, and the name of the coworkers. The abstract should be placed on the title page.

**Abstract**: The abstract should define the problem, the method used to solve the problem. Also you should indicate how results are interpreted and briefly state the results.

**Introduction**: (three pages maximum, excluding figures) this should include:

*In theory part*, explain the fundamental, molecular principles of the measurement in your own words (you may use your lecture notes or any other source). Do not forget to give proper references to any background information.

*In the instrument design and operation part*, explain how the instrument works and the function of each of its major components including a block diagram of the instrument. Do not paste copied figures into your report.

**Experimental**: Write the experimental procedure followed (make a summary!), including sample preparation and calibration of the instrument. Do not copy the procedures that you already have. Do not forget to write the manufacturer and the model number of the instrument.

**Data and Results**: This section should include:

*Data*: Organize your primary laboratory data into Excel tables. Include all data used to calculate the result. Tables should be numbered sequentially and should be labeled. Units must be clearly indicated.
Graphs: Use Excel to make any required graph. Scale axes appropriately and label them clearly. Do not forget to name your graphs and to number them.

Calculations: Show all type of your calculations. Do not forget to write the units.

Discussion: (one page maximum) this part should include

Error analysis: Give a brief discussion of systematic and random errors that can affect the experiment. What can be done to minimize error?

Discussion: Interpret your data; tell what conclusions are supported by your numerical results. Compare to expected values if appropriate. Explain any advantages or disadvantages of the given technique relative to competing methods. How might this analysis be improved?

References: Write your references by using standard J.Am.Chem.Soc. format.

Due Dates: Unless noted otherwise, lab reports are due by 5:00 PM on the day one week after the experiment is performed. Lab reports should be submitted on the due dates. After five days, no late reports will be accepted. Students who submit all lab reports on due dates will be awarded an additional 5 points to their final grade.

Attendance: Attendance at laboratory is mandatory. If a laboratory period is missed due to illness or official University activity a signed statement from your doctor (infirmary) or an official part must be submitted as soon as possible. Make-ups for excused absences will be given at the end of the semester. Unapproved or unexcused absences will result in a grade of zero for that lab day. No make up will be given.

Academic Honesty: Although laboratory partners follow the same procedure and share the experimental data, reports must be written independently. The normal penalty of such an offense is a zero grade on that report.

😊 Have A Nice Semester 😊