

INSTRUMENTAL ANALYSIS LAB- CHEM 4113

Spring, 2009

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T, Th. 8:00-10:00 am
F. 11:00am –12:00pm
Open door policies.

DESCRIPTION: A scientist has at her or his disposal a variety of sophisticated instrumentation that better enable him or her to answer questions and solve problems. Solutions to problems require the scientist to understand the question and the nature of the answer sought, be able to determine the type and amount of samples needed to answer the question, and to select an appropriate instrumental technique to help solve the problem. This course is designed to help you learn to solve problems using modern instrumentation by solving challenging, "real" problems. You will explore the principles on which major instrumental techniques are based so that you have a full arsenal of ways to solve problems.

STUDENT LEARNING OUTCOMES:

By the end of the course students will be able to:

1. Assess and address the germane challenges associated with a particular analysis;
2. Select an appropriate method or methods to solve a chemical problem;
3. Demonstrate the understanding of modern chemical instrumentation theory;
4. Operate modern chemical instrumentation
5. Interpret data and to use the appropriate statistical methods in their evaluation;
6. Communicate effectively the results of an investigation into a chemical problem;

TEXTS: *Principles of Instrumental Analysis*, 6th ed., by Skoog, Holler and Nieman (req.)
Handbook of Instrumental Techniques for Analytical Chemists, F. Settle, ed. (rec.)

EVALUATION: Your grade in this course is determined by your ability to evaluate and solve chemical problems and write laboratory reports. Each graded assignment is listed below along with its weight.

Total : Seven lab assignments worth 700 points;

The total number of points you attained on all graded work determines your final grade.

Grade	%
A	90 - 100
B	80 - 89
C	70 - 79
D	60 - 69
F	below 59

POLICIES: My expectation is that you will attend all labs unless directed otherwise. I will assign articles for you to read. We will discuss these readings during class, and I will expect you to participate. If you are unable to attend a lab, it is your responsibility to determine all material discussed and assignments given.

You will be allowed to make up a missed lab with an excused absence. Normally, these reasons would include medical emergencies, a death in your family or required travel for an UT at Tyler's event (e.g., athletic team travel). If the absence is not excused, you will receive zero points for the lab.

NOTE REGARDING STUDENT ABSENCES DUE TO RELIGIOUS OBSERVANCES:

Students who anticipate being absent from class due to a religious observance are requested to inform the instructor of such absences two weeks before the religious holiday.

DISABILITY STATEMENT: If someone wants to request an accommodation due to disability, including a learning disability, please contact Ida MacDonald in the Disability Support Services offices to arrange the appropriate accommodation.

SOCIAL SECURITY NUMBER: It is the policy of The University of Texas at Tyler to protect the confidential nature of social security numbers. The University has changed its computer programming so that all students now have identification numbers that are not related to their social security numbers

LABORATORY NOTEBOOK FORMAT:

Title/Date:

Procedure: The procedure includes all experimental details related to conducting the experiment.

Data/Observations: All measurements and observations made during the experiment should be recorded directly in your notebook immediately after they are made. Please label all data and observations clearly.

Calculations: Include all calculations in this section and identify what you are calculating.

TYPEWRITTEN REPORT FORMAT

Title/Date/Name:

Introduction: State what you are studying or determining and why this is important. State the principle(s) behind the analysis and give equations for all pertinent chemical reactions related to the analysis.

Procedure: Describe the procedure you followed.

Results/Discussion: This section should contain an organized (i.e., tables, graphs) presentation of the results of your experiment, a comparison with expected values and a discussion of any significant difference. In addition, you should state and explain all important observations.

References: (if appropriate)

Use this checklist to help you write your report.

In the report,

1. Do you have a cover page, introduction, procedure, results/discussion section and references?
2. In the introduction have you
 - stated what you are studying and why?
 - explained the principle behind the analysis and described any pertinent chemistry related to it?
3. In the results and discussion sections have you,
 - stated the results of your investigation and compared those results with accepted values?
 - stated and explained all important observations made during your investigation?
4. Have you properly referenced all appropriate material?

5. Do you have page numbers, are graphs needed and included, and have you proofread the report?

GRADE REPLACEMENT:

If you are repeating this course for a grade replacement, you must file an intent to receive grade forgiveness with the registrar by the 12th day of class. Failure to file an intent to use grade forgiveness will result in both the original and repeated grade being used to calculate your overall grade point average. A student will receive grade forgiveness (grade replacement) for only three (undergraduate student) or two (graduate student) course repeats during his/her career at UT Tyler. (2006-08 Catalog, p. 35)

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Experiment*

Check in; safety; introduction; a paper discussion

Method Validation 1: Drug determination in Dristan Nasal Spray
(**technical report: 100 points**)

Project 1: Elemental Analysis (AA)
(**project report: 100 points**)

Method Validation2: Fluorescence Lab
(**technical report: 100 points**)

Project 2: Molecular Analysis (GCMS)
(**project report: 100 points**)

Project 3: Electrochemistry
(**project report: 100 points**)

Method Validation 3: HPLC
(**technical report: 100 points**)

Project 4: Electron Microscopy

* Subject to changes