

CHEM 3110 Laboratory for Analytical Chemistry (CRN: 11282/11987)
FALL 2020

I. Instructor:

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Office Hours: Mondays and Tuesdays 12 pm to 1 pm.

II. Teaching Assistants:

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Office Hours:	Monday 11 am to 1 pm	Tuesday 11 am to 1 pm

III. Textbook: No textbook is required for this course. Laboratory activities will be posted on the course Blackboard site.

IV. Course Objectives:

To practice and improve students' skills and knowledge in quantitative analytical chemistry. Students will gain an understanding of:

- a. qualitative and quantitative chemical analysis;
- b. the application of statistical methods for the evaluation of laboratory data;
- c. methods for calibration and sampling applied to quantitative analysis;
- d. assessment methods of analysis related to chemical analysis goals such as detection limits;
- e. the performance of graphical analysis to analyze laboratory results;
- f. the application of analytical methods based on titrations, separations, electrochemical measurements
- g. the design and application of an analysis related to a question of relevance based on experience in the laboratory and research of the scientific literature

V. Course Description:

These experiments are intended to illustrate the major analytical techniques described in the lecture.

Due to the current circumstances, the initial experiments will be recorded by the TA's and you will be provided with the data for each experiment. Students need to submit the detailed lab report (individual) before the next lab. As the situation gets better, we will include in person hands on experiments in the lab with social distancing. You will be updated accordingly with any changes with the current system.

A pre-lab quiz will be uploaded to blackboard for each experiment to test the basic knowledge of the lab content. Prelab quizzes will be uploaded every Friday and students are expected to submit them before 1.00pm Monday. A live session will be

held every Monday from 1.00 pm to 1.30 pm for discussing any questions regarding the prelab quiz.

VI. Course Evaluation:

You will be evaluated based on your overall grasp of the skills, concepts, and participation in the laboratory experiments and written exercises. Your overall lab grades will depend on:

- A. Prelab live session attendance 5%
 - B. Prelab Quizzes: 30 %
 - C. Reports: 40 %
 - D. Final Exam: 25 %
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Grade Breakdown:

90 ----- 80 ----- 70 ----- 60
A B C D F

- A. Prelab live session attendance: A prelab live session will be held every Monday at 1.00 pm to discuss any questions regarding the quiz provided. Attendance for this session is mandatory
- B. Prelab Quizzes: The quizzes are designed to test your basic understanding of the materials for the specific week. Prelab quizzes will be uploaded onto blackboard every Friday and are due by Monday 1.00 pm. No make-ups will be given.
- C. Lab Reports: Reports are turned in on individual basis.
Reports uploaded to Blackboard before due date which is the day of next lab by 1:30 pm. There will be reduction of points for every report submitted past the deadline. No reports are accepted 2 days beyond the deadline.

LABORATORY REPORT REQUIREMENTS:

A lab report should contain the following components.

1. Your name and date
2. Title of the experiment.
3. Objectives of the experiment. (3 pts)
4. Introduction: A description of the basic theory of the experiment and the operation of the instrument used. (5 pts)
5. Materials and Methods: (5 pts)
 - List all chemicals (including solvents) to be used. List formula weights for each substance and other useful information such as the physical properties, MSDS, etc. Find this information in the reference libraries, or on-line.
 - A clearly and concise procedure statement. You are required to use a flow chart to illustrate the procedure.
6. Results and Discussions: (30 pts)

- Data, numerical analysis, graphs, tables, etc. Show appropriate calculations and clearly identify important answers. Always use units in your calculations. Be sure to indicate any uncertainties.
 - Discussions of the results: Describe experimental conditions, observations, and interesting finding. You may find references to support your hypothesis and statements.
 - Discussions of any challenges or mistakes that you encounter during the experiment and how your group address the problems.
7. Conclusion: A conclusion statement summarizing the result and any conclusion. A summary statement about the data found and the determined results must be clearly stated. Also indicate what you have learned in this experiment. (5 pts)
 8. References: List at least 4 references cited in your reported. (2 pts)
- D. Final Exam: A comprehensive exam will be given at the end of the semester.
- **Academic honesty:** Materials (reports, quizzes, exam or otherwise) submitted to fulfill academic requirements must represent a student's own efforts. Any act of academic dishonesty attempted by a UTEP student is unacceptable and will not be tolerated. Academic dishonesty is prohibited and is considered a violation of the UTEP Handbook of Operating Procedures. It includes, but is not limited to, cheating, plagiarism, and collusion. Violations will be taken seriously and will be referred to the Dean of Students Office for possible disciplinary action. Students may be suspended or expelled from UTEP for such actions.
 - As we will try to accommodate hands on experience towards the end of the semester, it is important to keep in mind points regarding lab safety and waste disposal

VII. Others:

- **Safety:** Please practice safety.
 - Safety eyewear must be worn during experiments.
 - Cell phones must be turned off. NO EXCEPTIONS.
 - Open-toe shoes are not allowed.
 - Gloves should be worn when appropriate and recommended by the instructor.
 - Long hair must be tied back so it will not accidentally fall into an experiment.
 - No foods or drinks are allowed in the lab.
 - You must wash your hands after dealing with chemicals or dirty glassware, and when you are done with the lab.
 - Always look behind you before beginning to move in a lab.
 - Speak loud and clear to warn others of an accident and or potential danger.
 - Know your safety options before you begin (sinks, shower, eyewash, gloves).
 - Know your path out of the lab, if it becomes necessary.
 - Know where the fire extinguishers are.

- If an instructor is present during a fire, allow them to operate the fire extinguisher.
 - Know what can go wrong and be prepared with a solution.
 - Research any chemical that is unfamiliar to you. Know its properties.
 - Familiarize yourself with the first-aid supplies and their location.
- **Waste**

Improper waste disposal into the drain is not only dangerous to you, but hazardous to a whole community. Unpredictable and dangerous (explosive) chemical reactions can occur. Follow the directions given to you on the boards or hoods for properly disposing chemical waste. **Make sure to write down the name and the quantity of the waste put into the waste bottle.**

VIII. Course Withdrawal Policy

Classes dropped prior to the official census date (**9/12**) will be deleted from the student's semester record. After this date, the University permits any student to drop with an automatic "W" by the course dropping deadline (**11/2**). After this date students who withdraw must receive grades of "F".

IX. Course Calendar:

Wk	Date	Subject
1.	09/31-1	No lab
2.	09/7-8	Labor day holiday
3.	09/14-15	Introduction/ Safety
4.	09/21-22	Exp. 1 Calibration of Volumetric Glassware
5.	09/28-29	Exp. 2 Gravimetric Determination of Calcium as $\text{CaC}_2\text{O}_4 \cdot \text{H}_2\text{O}$
6.	10/05-06	Exp. 3 Penny statistics
7.	10/12-13	Exp. 4 Statistical Evaluation of Acid-Base Indicators
8.	10/19-20	Exp. 5 Preparing Standard Acid and Base
9.	10/26-27	Exp. 6 Using a pH Electrode for an Acid-Base Titration
10.	11/02-03	Exp. 7 Analysis of a Mixture of Carbonate and Bicarbonate
11.	11/09-10	Exp. 8 Using a Gran Plot to Find the End Point of a Titration
12.	11/16-17	Exp. 9 Cyclic Voltammetry of Ascorbic acid
13.	11/23-24	No lab- Thanksgiving week
14.	11/30, 12/01	Lab visits if possible
15.	12/07	Final Exam