NJIT New Jersey Institute of Technology

THE COLLEGE OF SCIENCE AND LIBERAL ARTS

THE DEPARTMENT OF CHEMISTRY AND ENVIRONMENTAL SCIENCE

Chem 339 Analytical/Physical Lab

Fall 2023 *Course Syllabus*

NJIT Academic Integrity Code: All Students should be aware that the Department of Chemistry & Environmental Science (CES) takes the University Code on Academic Integrity at NJIT very seriously and enforces it strictly. This means that there must not be any forms of plagiarism, i.e., copying of homework, class projects, or lab assignments, or any form of cheating in quizzes and exams. Under the University Code on Academic Integrity, students are obligated to report any such activities to the Instructor.

COURSE INFORMATION

CHEM 339. Analytical/Physical Chem Lab for Chemical Engineers.

This course will offer students an introduction to physical and analytical chemistry laboratory techniques. The application of principles learned in lecture will be reinforced by the experiments done in this lab. They will also provide exposure to analytical and other techniques used in chemistry and chemical engineering. The laboratory professor or teaching assistant (TA) will usually explain and/or demonstrate these and many more techniques which have been used successfully over the years. Students are encouraged to ask questions before it is too late and the mistakes have already been committed.

Prerequisites: CHEM 236* with grade C or better. Co-requisite: MATH 225

***** CHEM 235 *is an acceptable prerequisite as well.*

Credits: 2

Contact hours: 4

Course-Section and Instructors:

Course- Section	Course Time	Location	Instructor
CHEM339-001	T 8:30 AM - 12:50 PM	Tiernan 208	Chunyan Liu Email: cliu1@njit.edu
CHEM339-003	F 1:00 PM - 5:20 PM		
CHEM339-101	T 6:00 PM - 10:05 PM		

Office Hours: As posted in Canvas or by appointment by email. You are welcome to stay after class when the instructor is available.

E-Mail: **All E-mail to me should start with CHEM 339-section** in the subject so that it can be filtered appropriately. Any e-mail pertaining to your academic standing (i.e., grades) must be sent from your NJIT account. Anonymous e-mail will not be read.

Lab manual is required. CHEM339, Analytical/Physical Chem Lab Manual, available from NJIT Bookstore for $25.

Other required material:

- Hard-cover laboratory notebook
- Lab coat (available online)
- Safety goggles (available at the NJIT Bookstore or Home Depot)
- Disposable nitrile gloves (available online or at Home Depot)

You are responsible of bringing your own PPE to the lab

Learning outcomes:

Upon the successful completion of this course, the students should be able to:

- Apply the physical and analytical chemistry principles to the practical laboratory experiments
- Perform accurate quantitative physical measurements
- Analyze data statistically and assess reliability of the results
- Interpret the experimental results, draw conclusions, and communicate effectively
- Show teamwork and communication skills

POLICIES

All students must familiarize themselves with, and adhere to, all official university-wide student policies. CES takes these policies very seriously and enforce them strictly.

Attendance at classes will be recorded and is mandatory. All students should participate in the hands-on part of each experiment, up to two students working together while other students observe, ask questions, or make recommendations, and then students should switch between tasks.

Grading Policy: The total grade in this course will be a composite of your reports, quizzes and oral presentation. It is important to note first that Turnitin will be used for the lab reports and presentation.

Preliminary Experiments (i)	50 pts
Preliminary Experiments (ii)	50 pts
Major experiments (7 total)	7 x 100 pts = 700
Group oral presentations (including Q&A)	200 pts
Attendance (12 classes)	12 x 10 pts = 120
Safety and cleanliness	120pts
Participation	120pts
Pre-lab (7 total)	7 x 50 pts = 350
Quiz (2 total)	2x 100 pts = 200
TOTAL POINTS	**1910 pts**

Grading scheme:

A	90 - 100	**C**	70 - 74.5
B+	85 - 89.5	**D**	60 - 69.5
B	80 - 84.5	**F**	<60
C+	75 - 79.5		

Turnitin penalties: All orange and red flags will be reviewed individually. Similarity scores of 30% or higher may results in a grade penalty and/or reporting to the Dean of Students office, depending on what leads to high score. The instructor will review all flagged Turnitin scores before the end of the semester.

- Do NOT copy and paste from any source, including the lab manual or your own lab report from this or a previous semester (if you are repeating).
- There is a Turnitin penalty section for each lab report which could be up to the full point total earned. Minor penalties could be applied, see the document in Canvas.
- The Dean of Students may apply harsher penalties than the instructor. The penalties they apply cannot be adjusted by the instructor.

LAB REPORT GRADING - NO LATE LAB REPORTS

(Each lab report has two weeks to complete except for Prelim. Exp. (i) which has only one week to complete)

SECTION	MAX SCORE
Abstract	5
Introduction/Objective	5
Theory	5
Experimental Procedure	5
Results – Data/Calculation/Plots	30
Results – Interpretation	30
Results – Error Analysis	15
Discussion	5
TOTAL	**100 pts**

Important

- Bring lab notebooks to record your data.

Students work in groups of three or four and submit **group reports** (except reports of Prelim. Exp (i) and Prelim Exp (ii)).

- Classes will require recording experimental data on a piece of paper with student name, date, experiment number and name, and group number and members' names, to be uploaded. **The TA or instructor MUST initial your data page before uploading.**
- All reports and presentations must be submitted **online in Canvas via Turnitin**. **Reports, lab classwork, or presentations submitted by e-mail will NOT be accepted. No extra time is provided without a Dean of Students approved excuse and instructor communication.** If you miss a deadline by *a little bit* early in the semester, you need to ask to have the Canvas assignments reopened at the instructor's discretion.
- All submitted reports should be **typed, 1.5-spaced, using 12-point font**. You must include a copy of your lab class work at the end of your submitted lab report or lose 10 points.
- Students are expected to **come to the lab on time and in full preparation for the scheduled experiment**, and to stay in the lab until the data collection is completed or points will be lost.
- All absences must be excused by the Dean of Students office. Once the excuse is approved, the student must contact the instructor to arrange a make-up lab.
- Pre-lab will be posted for most experiments. They are due before each class starts, no exceptions.
- Makeup Policy: There will normally be **NO MAKE-UP lab** during the semester. In the event that a student has a legitimate reason for missing a lab, the student should contact the Dean of Students office and present written verifiable proof of the reason for missing the lab, e.g., a doctor's note, police report, court notice, etc. clearly stating the date AND time of the mitigating problem. The student must also notify the CES Department Office/Instructor that the lab will be missed so that appropriate steps can be taken to make up the grade.

Safety policies – see the Safety slide presentation posted to Canvas:

- Do not wear your lab coat and goggles outside of the lab classroom. Put them on in the desk area when you enter. We advise you keep your lab coat in a separate bag in your backpack.
- Safety goggles must be always worn when in the lab area (which is any area except by the desks, including the balance room).
- Only the experiments described in the manual and assigned for specific day may be performed.

  Make sure to keep track of what Group Experiment your group is doing!
- If the instructor deems a student dangerous to himself/herself and/or others because of lack of preparation or for safety reasons, the student will be asked to leave. Remember we are asked to call Public Safety if a student removes their mask or enters without a mask and refuses to put one on.

- More information on safety and using various pieces of lab equipment is available on Canvas.

ADDITIONAL RESOURCES

Chemistry Tutoring Center: Located in the Central King Building, Lower Level, Rm. G12. Hours of operation are Monday – Friday 10:00 am - 6:00 pm. For further information please click here.

Accommodation of Disabilities: **O**ffice of **A**ccessibility **R**esources and **S**ervices (OARS) offers longterm and temporary accommodations for undergraduate, graduate and visiting students at NJIT.

If you are in need of accommodations due to a disability please contact OARS at 973-596-5417 or via email at oars@njit.edu. The office is located in Kupfrian Hall 201. A Letter of Accommodation Eligibility from OARS will be required for any accommodations to be made. The OARS website is:

https://www.njit.edu/accessibility/accommodations-and-support-services

Fall 2023 Academic Calendar

September	5	Tuesday	First Day of Classes
September	11	Monday	Last Day to Add/Drop a Class
September	11	Monday	Last Day for 100% Refund, Full or Partial
November	13	Monday	Last Day to Withdraw from Classes
November	21	Tuesday	Thursday Classes Meet
November	22	Wednesday	Friday Classes Meet
November	23	Thursday	Thanksgiving Recess Begins (No Classes)
November	26	Sunday	Thanksgiving Recess Ends
December	13	Wednesday	Last Day of Classes
December	25	Monday	Final Grades Due

Course Outline

Week	EXPERIMENTS		
1	Introduction, Safety (Safety quiz)		
2	Prelim. Exp (i), Prelim Exp (ii)		
3	Exp 1 - Measurement of CO_2 in Ambient Air		
4	Exp 2 - Conductometry of Strong and Weak Electrolytes		
5	Exp 3 - Potentiometric Titration of an acid mixture		
6	Exp 4 - Acid Dissociation Constant of Methyl Red		
7	Exp. 5 Calorimetry	Exp. 6 Vapor Press.	Exp. 7 Kinetics
8	*(continued)*		
9	Exp. 6 Vapor Press.	Exp. 7 Kinetics	Exp. 5 Calorimetry
10	*(continued)*		
11	Exp. 7 Kinetics	Exp. 5 Calorimetry	Exp. 6 Vapor Press.
12	**Different Classes Meet**		
13	*(continued)*		
14	**Presentations* with Q&A.**		

*Group presentations will be graded in two parts: the first part is a double value lab report for the slides, and the second part is individual based on Q&A and contribution to the group presentation.