

Spring 2019

# CHEM 480-102: Instrumentation Analysis Lab

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**Chemistry: CHEM 480**  
**Instrumentation Analysis Lab**  
*SPRING 2019 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**

**Course Description:**

Laboratory exploring the principles of operation of modern instruments for chemical analysis. Ultra-violet and infrared spectroscopy, mass spectrometry, gas chromatography, high performance liquid chromatography, voltametry, and potentiometry are among the instruments utilized. Apply calibration methods, statistical data treatment, and sample preparation techniques are applied.

**Number of Credits:** 2 Credits, 4 Contact Hours

**Prerequisites:** CHEM 221, CHEM 222 or equivalent with a grade of C or better.

**Course-Section and Instructors**

Course-Section	Instructor
CHEM 480-102	Chaudhery Mustansar Hussain

**Office Hours for All Chemistry & Environmental Science Instructors:** [Spring 2019 Office Hours and Emails](#)

**Required Textbook:**

<b>Title</b>	Textbook "Principles of Instrumental Analysis",
<b>Author</b>	Doglas A. Skoog, F. James Holler, Stanley R. Crouch
<b>Edition</b>	6th ed
<b>Publisher</b>	Cengage Learning; 6 edition
<b>ISBN #</b>	978-0495012016

**University-wide Withdrawal Date:** The last day to withdraw with a W is Monday, April 8, 2019. It will be strictly enforced.

## Learning Outcomes:

## POLICIES

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

**Grading Policy:** The final grade in this course will be determined as follows:

Grading: Lab Reports + Quiz + Attendance + Presentation  
(Lab reports: 50%, Quiz: 30%, Attendance 10%, Presentation 10%)

Your final letter grade in this course will be based on the following tentative curve:

A	Above 90	C	70-74
B+	85-90	D	60-69
B	80-84	F	Below 60
C+	75-79		

**Attendance Policy:** Attendance at classes will be recorded and is **mandatory**. Each class is a learning experience that cannot be replicated through simply “getting the notes.”

**Homework Policy:** Homework is an expectation of the course. The homework problems set by the instructor are to be handed in for grading and will be used in the determination of the final letter grade as described above.

**Exams:** There will be two midterm exams held in class during the semester and one comprehensive final exam. The following exam periods are tentative and therefore possibly subject to change:

Quiz Exam I	March 07, 2019
Quiz Exam II	March 14, 2019
Quiz III	May 15 - 21, 2019

The final exam will test your knowledge of all the course material taught in the entire course.

**Makeup Exam Policy:** There will normally be **NO MAKE-UP QUIZZES OR EXAMS** during the semester. In the event that a student has a legitimate reason for missing a quiz or exam, the student should contact the Dean of Students office and present written verifiable proof of the reason for missing the exam, 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 exam will be missed so that appropriate steps can be taken to make up the grade.

**Cellular Phones:** All cellular phones and other electronic devices must be switched off during all class times. Such devices must be stowed in bags during exams or quizzes.

## 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:** Office of Accessibility Resources and Services (**formerly known as Disability Support Services**) offers long term and temporary accommodations for undergraduate,

graduate and visiting students at NJIT.

If you are in need of accommodations due to a disability please contact Chantonette Lyles, Associate Director at the Office of Accessibility Resources and Services at [973-596-5417](tel:973-596-5417) or via email at [lyles@njit.edu](mailto:lyles@njit.edu). The office is located in Fenster Hall Room 260. A Letter of Accommodation Eligibility from the Office of Accessibility Resources Services office authorizing your accommodations will be required.

For further information regarding self-identification, the submission of medical documentation and additional support services provided please visit the Accessibility Resources and Services (OARS) website at:

- <http://www5.njit.edu/studentsuccess/disability-support-services/>

**Important Dates** (See: [Spring 2019 Academic Calendar, Registrar](#))

January	21	Monday	Martin Luther King, Jr. Day
January	22	Tuesday	First Day of Classes
February	1	Friday	Last Day to Add/Drop a Class
March	17	Sunday	Spring Recess Begins - No Classes Scheduled - University Open
March	24	Sunday	Spring Recess Ends
April	8	Monday	Last Day to Withdraw
April	19	Friday	Good Friday - No Classes Scheduled - University Closed
May	7	Tuesday	Last Day of Classes
May	8	Wednesday	Reading Day 1
May	9	Thursday	Reading Day 2
May	10	Friday	Final Exams Begin

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## Course Outline

	<b>LABORATORY EXPERIMENTS</b>	<b>INSTRUMENTATION REQUIRED</b>	<b>REPORTS</b>
Exp. 1	CHECK-IN & Spectrophotometric analysis of a soft drink	Shimadzu -1800 UV-VIS Spectrophotometer	
Exp. 2	Simultaneous determination of dichromate and permanganate	Shimadzu 1800 UV-VIS Spectrophotometer	Report (Exp 1)
Exp. 3	Determination of zinc in cooked beans	Shimadzu AA-7000	Report (Exp 2)
Exp. 4	Analysis of commercial analgesic tablets by HPLC	Shimadzu HPLC-20AT	Report (Exp 3)
Exp. 5	Gas chromatographic separations	Varian GC 3900 FID	Report (Exp 4)
Exp. 6	Determination of water content in paint	Shimadzu GC -TCD- 8A	Report (Exp 5)
Exp. 7	Confirming the Molecular Mass and Structure of a Reaction Product GCMS Demonstration	Shimadzu GCMS-QP2010	Report (Exp 6)
	Presentation		Report (Exp 7)

#### REQUIRED MATERIALS

- Safety goggles (available at the NJIT Bookstore or Homedepot). Provided/sometime not Provided
- Disposable nitrile gloves (available at amazon.com or Homedepot). Provided
- Disposable lab coat or you can buy cloth lab coat (available at amazon.com). Not provided
- Lab notebook: (available at the NJIT Bookstore or Homedepot). Not provided

#### LAB REPORT FORMAT

Reports handed in later than the scheduled due date will lose 25% of available pts, 2 weeks after scheduled due date will lose 50% of available pts. If you are having difficulty writing up a lab, please make arrangements with the instructor.

1. Title: Title of the experiment, submitted to, Instructor name, submitted by your name, the date the report is submitted.
2. Introduction/ Theory: Describe the nature and objective of the experimental investigation and the method(s) used.
3. Objective and purpose: What is the objective of the experiment? , What was measured and how was the data obtained?
4. Chemicals and Apparatus: List all the chemicals used in the experiment, and record the exact amount. Prepare a schematic diagram of the apparatus and identify components.
5. Procedures: Cite the reference that describes the details of the experimental procedure. Describe any procedure you used that differs from the cited reference. Specify the precision of the instruments used in the measurements. Identify and define all variables and constants. Specify the quantities that are measured and those that are calculated.
6. Results and discussion: State the phenomena observed during the experiment. State the experimental measurements that were made, and what was calculated. Give the equations used for the calculations. Present the experimental data collected and the calculated results in tables and graphs where appropriate.
7. Conclusions: What were the results and how do they compare with the literature? Provide approximately two or three concise sentences for each answer.
8. References: List all the literature sources used to prepare the report.

## SAFETY RULES IN THE LABORATORY

- If the fire alarm sounds, leave the building immediately.
- Always conduct yourself in a professional manner. Have fun while working in the laboratory, but refrain from activities that might be dangerous to you or your neighbor.
- You must learn where the safety equipment is and how to use each item during the first day in class. In the event of an emergency, you should use whatever you need to address the emergency. Again, you do not need to ask for permission to respond to an emergency. Usually, your response will be to advise your TA and instructor and then follow his/her instructions. As a general rule, and if time permits, students should not attempt to provide first aid but should concentrate on contacting a professional (x3111 for emergency) in that area.
- No consumption of food (including gum) or beverages will be allowed.
- You are not to perform any unassigned experiments.
- Do not use your mouth to fill pipettes.
- If something is spilled on you, wash it off immediately with lots and lots and lots of water, and then report to the TA. Clean up the spill later according to instructions from the TA.
- Uncontrolled long hair or clothing (loose sleeves, ties, jewelry) that might come in contact with a flame or become entangled in mechanical equipment will not be permitted. You will not be permitted to work in the lab without protection for your feet (no sandals, for example).
- Never heat a closed system. It may result in an explosion.
- Never heat flammable materials with an open flame or near an ignition source.
- Do not heat or mix anything near your face (or anyone's face).
- Review the hazards of all reagents for an experiment before you start, so you know how to respond to an emergency. The SAFETY DATA SHEETS (SDS) for each reagent we use are available on the Internet (Consult Fischer Scientific Website [www.fischersci.com](http://www.fischersci.com)). You are encouraged to review any MSDS any time you have a question. You should also note that a considerable amount of safety information is on the reagent labels. Read them before you use the reagent.
- Do not rub your eyes with your hands. Your hands are frequently contaminated.
- Protective clothing (lab coat) is not required, but highly recommended. You will not be permitted to work in the lab in shorts and without protection for your legs and feet.
- You cannot tell when glass and other objects are hot by looking at them. Be careful and don't get burned by trying to pick up something that is hot.
- Do not store reagents near a sink or leave them near the balance where they will be in the way and get knocked over. Return all reagents to their proper location as soon as possible after you have finished with them. Be sure everything is returned to its original location before you leave and that you have left nothing in the balance room, in a fume hood or at some other location.
- Be sure you know where the safety equipment is located so you can find and use each item in an emergency (if the power fails, and the lab is dark, for example).
- Be sure that, in an emergency, you know how to turn off all of the utilities (gas, water, electricity) you have been using.
- Never attempt to identify an unknown by smelling or tasting it as recommended in some (especially old) textbooks.
- Use the appropriate safety equipment (safety shield, gloves, fume hood, shower, eye wash, etc.) and supplies as needed. Be sure any supplies you use are promptly replaced so they are available for the next emergency. It may be you again.
- Read all chemical labels prior to use. Be sure you know what you are using.
- Do not store chemicals near non-compatible chemicals (acids with bases or oxidizers with fuels, for example) even for short periods of time. 23. Transport and dispose of all chemicals properly. If you are not sure how to do so, ask your TA.
- Do not use chipped or broken glassware. Broken glassware will not be accepted at the end of the course and should be replaced during check-in or as soon as it is broken.
- Do not operate electrical equipment with wet hands.
- Do not wear contact lens to the laboratory.
- The EMERGENCY telephone number is 9-1-1 for university security/safety, x3568 for the department office.



