

Fall 2018

# CHEM 661 - Instrumentation Analysis Lab

Somenath Mitra

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## Chemistry: *Fall 2018 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:** The objective of this course is to provide an overview of instrumental techniques used in analysis of different analytes. Many physically/chemically different analytes are encountered in different sample matrices, such as, solids, liquids and gases. Different sample preparation techniques and analytical instrumentation are needed for analyzing these species. It will not be possible to cover the whole spectrum of analytical techniques. The focus of this class will be on instrumentation for chromatography and spectroscopy.

**Number of Credits:** 3

**Prerequisites:**

**Course-Section and Instructors**

Course-Section	Instructor
01	Som Mitra, Lab Instructor M. Hussain

**Office Hours for All Chemistry & Environmental Science Instructors:** [Fall 2018 Office Hours and Emails](#)

**Required Textbook:**

<b>Title</b>	Principle of Instrumental Analysis by Skoog and Leary Harcourt
<b>Author</b>	by Skoog and Leary
<b>Edition</b>	any
<b>Publisher</b>	Harcourt
<b>ISBN #</b>	

**University-wide Withdrawal Date:** The last day to withdraw with a **W** is Monday, November 12, 2018. 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:

Midterm Exam I	50%
Laboratory	50%

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

A	85	C	65
B+	80	D	60
B	75	F	
C+	70		

**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:

Midterm Exam I	7 <sup>th</sup> or 8 <sup>th</sup> week
Lab	7/8-14 weeks
Final Exam Period	December 15 - 21, 2018

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 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 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/studentssuccess/disability-support-services/>

**Important Dates** (See: [Fall 2018 Academic Calendar, Registrar](#))

Date	Day	Event
September 4, 2018	T	First Day of Classes
September 10, 2018	M	Last Day to Add/Drop Classes
November 12, 2018	M	Last Day to Withdraw
November 20, 2018	T	Thursday Classes Meet
November 21, 2018	W	Friday Classes Meet
November 22 - 25, 2018	R - Su	Thanksgiving Break - University Closed
December 12, 2018	W	Last Day of Classes
December 14, 2018	F	Reading Day
December 15 - 21, 2018	F - R	Final Exam Period

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## Course Outline

Lecture	Topic
1	Introduction to analytical instrumentation
2	Fundamentals of spectroscopy.
3	UV-Vis Molecular absorption
4	Atomic spectroscopy for measurement of metals
5	Gas Chromatography
6	HPLC
7	Mass spec
8-14	Laboratory Experiments (variable schedule)

**Grading System:**

One midterm exam and laboratory reports. 50% exams, and 50% lab reports.

All exams will be closed-book. NJIT honor code will be withheld. Violations will be brought to the immediate attention of Dean of Students.

**Learning outcomes:**

By the end of the course, you should be able to do the following:

1. Understand the basics of analytical chemistry and the figures of merit for the analytical instruments.
2. Have learnt the theory of chromatographic separation
3. Apply these concepts to know about the design of gas chromatographic instruments.
4. Have learnt about the instrumentation of liquid chromatography as applied to semi volatile organics.
5. Acquired the concepts of mass spectrometry and the detailed instrumentation for this technique.
6. Have learnt the fundamentals of spectroscopic analysis
7. Have applied these concepts in molecular spectroscopy through the use of UV visible spectroscopy.
8. Have learnt about the analysis of metals by atomic spectroscopy.
9. Have had hands on experimental experience using UV-Vis, GC, HPLC and AA.