NJIT New Jersey Institute of Technology

THE COLLEGE OF SCIENCE AND LIBERAL ARTS

THE DEPARTMENT OF CHEMISTRY AND ENVIRONMENTAL SCIENCE

Chemistry:
Fall 2025 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:
This course offers an overview of instrumental techniques and methods used in pharmaceutical analysis, emphasis is placed on practical applications and problem solving. In the context of drug discovery, analytes need to be separated and quantified, this includes studies aimed at drug candidates as well as pharmacodynamic markers. However, the nature of molecular structures is quite vast, ranging from small molecules to proteins and cells. We will examine the role of chromatography, especially when coupled to mass spectrometry detection, immuno-based and spectroscopic methods, and biophysical assays. The curriculum will consider method validation, industry guidance and Good Manufacturing Practices (GMP). We intend to develop a balanced understanding of how different analytical approaches can be used to solve problems that are encountered in drug discovery.

Suggested Textbooks (Not required - for your reference only)
Principles of Instrumental Analysis - DA Skoog, FJ Holler and SR Crouch, ISBN 13: 9780495012016
Method Validation in Pharmaceutical Analysis: A Guide to Best Practice - J Ermer and JH Miller, ISBN 13: 9783527312559
Statistics for Analytical Chemistry - JC Miller and JN Miller, ISBN 13: 9780130309907
Biochemical Calculations - IH Segel, ISBN 13: 9780471774211

Weekly Time Commitment
It is estimated that students will spend ~ 6 hours per week on this course. The amount of time may vary week to week, depending on the topic; this is consistent with the accepted standards for a three-credit, graduate-level course.

Homework/Project
Students should plan to critique a paper from the literature. This should be in the area of pharmaceutical analysis but can be on any topic of interest or relevance to their current or future goals. Work should be submitted using slide format (5 slides max), where the central idea / problem is clearly stated, followed by a strategy to solve the problem at hand – this should include a consideration of the resources. References should be sited, plagiarism will result in a failing grade and violation will be reported to NJIT administration; Artificial Intelligence (AI) can be used, however, the prompts and sources must be documented and any statements should be supported (just as one would do if not using AI).

Academic Integrity
All students must observe and support high standards of honesty and integrity in all aspects of education, practice, and research. For this reason, all students in this course are expected to abide by the School's

Faculty/Student Honor Code and accept responsibility to help ensure that these standards are maintained by reporting violations of the Honor Code observed in others. All academic integrity violations will be considered with gravest concern and may be punishable with sanctions as severe as suspension or dismissal.

Number of Credits: 3

Prerequisites: CHEM222

Course-Section and Instructors

Course-Section	Instructor
CHEM-714 Section 101	Stephen Previs, PhD

Email: stephen.previs@njit.edu
Office Hours: In person, Wednesday 2PM – 4:30 PM or Thursday 10AM – 2PM; Virtual, Mon 1PM – 3PM

University-wide Withdrawal Date: The last day to withdraw with a **W** is November 10, 2025. It will be strictly enforced.

Learning Outcomes: Students will become familiar with a range of instruments and methods that are available for solving analytical problems. Specifically, students should be able to explain the types of problems that are encountered along the development path. In some cases, this may mean being able to identify a contaminant whereas in other cases this may mean defining a target-ligand interaction. It is expected that students will develop critical thinking skills and be able to engage in problem-solving and participate in strategic planning of studies.

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:

Homework/Project	25%
Attendance	15%
Midterm Exam	30%
Final Exam	30%

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

A	90-100	**C**	70-75
B+	86-89	**D**	60-69
B	80-85	**F**	<60
C+	76-79		

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." This is a converged course, meaning that you may attend virtually on WebEx if you cannot make it. In-person attendance is encouraged.

Homework/Project Policy: There is an expectation of external course work. This will need to be handed in to the instructor for grading and will be used in determining the final letter grade as described above.

Exams: There will be two exams held in class. The following exam periods are tentative and therefore

possibly subject to change:

Midterm Exam	October 15
Final Exam	December 14 – December 20

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. If a student has a legitimate reason for missing an assignment/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.

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. 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: Fall 2025 Academic Calendar, Registrar
https://www.njit.edu/registrar/fall-2025-academic-calendar

Date	Day	Event
Sept	1	Labor Day. University Closed
Sept	2	First Day of Classes
Sept	8	Last Day to Add/Drop a Class
Sept	8	Last Day for 100% Refund, Full or Partial Withdrawal
Sept	9	W Grades Posted for Course Withdrawals
Sept	15	Last Day for 90% Refund, Full or Partial Withdrawal No Refund for Partial Withdrawal after this date
Sept	29	Last Day for 50% Refund, Full Withdrawal
Oct	2	Wellness Day
Oct	20	Last Day for 25% Refund, Full Withdrawal

Nov	10	Last Day to Withdraw from Classes
Nov	25	Thursday Classes Meet
Nov	26	Friday Classes Meet
Nov	27	Thanksgiving Recess Begins. No Classes
Nov	30	Thanksgiving Recess Ends
Dec	11	Last Day of Classes
Dec	12	Reading Day
Dec	13	Saturday Classes Meet
Dec	14	Final Exams Begin
Dec	20	Final Exams End
Dec	22	Final Grades Due

Course Outline

(We expect to cover the topics below, but the plan is subject to change)

Lecture	Date	Topic	Assignment
1	Sept 3	Introduction	
2	Sept 10	Chromatography (GC and LC)	Homework 1
3	Sept 17	Mass Spectrometry, basics	
4	Sept 24	Mass Spectrometry, applications	Homework 2
5	Oct 1	Electrophoresis, ELISA assays	
6	Oct 8	Biochemical methods (Spectroscopy, Fluorescence, etc)	
7	Oct 15	Exam 1	
8	Oct 22	Biophysical methods (SPR, NMR, MS, etc)	
9	Oct 29	Screening methods	Homework 3
10	Nov 5	Cell & Gene Therapy	
11	Nov 12	Literature review	
12	Nov 19	Biomarkers, Pharmacodynamics	
13	Nov 26	Validation, Regulatory, GMP	
14	Dec 3	Presentations	
15	Dec 10	Review / open discussion	
16	Dec 17	Final exam	