

CHEM 490: Chemical Ecology: The Chemistry of living things Fall 2025 Course Syllabus

Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working to achieve. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at: <http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf>.

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. **Any student found in violation of the code by cheating, plagiarizing, or using any online software inappropriately will result in disciplinary action. This may include a failing grade and/or suspension or dismissal from the university.** If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at dos@njit.edu

In the event of a shift to remote and converged teaching, both instructors and students must make changes to their normal working protocols for courses. Students are asked to practice extra care and attention in regard to academic honesty, with the understanding that all cases of plagiarism, cheating, multiple submission, and unauthorized collaboration are subject to penalty. Students must properly cite and attribute all sources used for papers and assignments. Students may not collaborate on exams or assignments, directly or through virtual consultation, unless the instructor gives specific permission to do so. Posting an exam, assignment, or answers to them on an online forum (before, during, or after the due date), in addition to consulting posted materials, constitutes a violation of the university's Honesty policy. Likewise, unauthorized use of live assistance websites, including seeking "expert" help for specific questions during an exam, can be construed as a violation of the honesty policy.

COURSE INFORMATION

Course Description: CHEM-490. This course introduces basic concepts of Chemical Ecology, i.e. how chemicals mediate the interactions between organisms and their environment. It covers topics such as plant-plant and plant-insect interactions, insect communication, microbial warfare, and vertebrate chemical ecology including humans. Students will learn about the ecological roles of chemical compounds, their biosynthesis, and analytical techniques used in chemical ecology research. The course combines lectures on theoretical concepts with experimental demonstrations in the classroom. Emphasis is placed on understanding how chemical signals and cues influence behavior, population dynamics, and the ecosystem. This is a very interdisciplinary class integrating knowledge from chemistry, biochemistry, biology, and ecology to provide a comprehensive understanding of how chemistry shapes ecological processes.

Number of Credits: 3 (3 contact hours per week, twice a week)

Prerequisites: Organic Chemistry I or instructor permission.

Course-Section and Instructors

Course-Section	Meeting Times; Instructor
Chem 490: 001	W and R, 8:30 – 9:50 am; Dr. Guillermo Jimenez Aleman

Office Hours: Upon request only, please contact the instructor to find a convenient time slot. It could be in person or virtual. If virtual, a Zoom link will be provided timely.

Webpage: The course website is available through Canvas, which can be accessed via canvas.njit.edu. Please email your instructor immediately if you cannot access the class site. All materials including lecture summaries, slides, and other documents will be posted on the class site. Please check the site frequently for new materials and announcements. All grades for this course will be posted to Canvas on a regular basis. You are responsible for all updates posted to Canvas, and if you find any mistakes in content or grading, or you need help accessing these materials, please contact the instructor.

Textbooks and Materials:

Title	“Chemical Ecology: The Chemistry of Biotic Interactions”
Author	Eisner, T. and Meinwald, J.
Edition	2023
Publisher	Legare Street Press
ISBN #	ISBN-13: 978-1019379967

Other course material containing selected book chapters, and research/review articles addressing specific topics will be provided.

University-wide Withdrawal Date: See table below “IMPORTANT DATES.”

Learning Outcomes:

1. Understand the fundamental concepts and historical development of chemical ecology
2. Acknowledge interactions between organisms mediated by chemical substances
3. Explain such interactions in different biological systems, from organisms to ecosystems
4. Identify ecological interactions that have resulted from chemical ecological interactions
5. Recognize the biosynthetic origin of different classes of biologically active molecules
6. Provide examples of how chemical ecological is applied in environmental monitoring and pest control
7. Advance problem-solving and analytical thinking skills
8. Critically evaluate current research in the field

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.

In addition, obtaining course materials such as past exams or solutions to homework and/or class assignments from external sources constitutes as cheating. The official Student’s Solutions Guide is exempt. Posting of course materials on external websites without the approval of the instructor violates intellectual property laws and hence is strictly forbidden. Any student caught cheating on homework will be assessed a penalty of 20 points, in addition to a grade of zero for the given homework assignment. **Students are encouraged to seek help from their instructors as needed.**

Grading Policy: The final grade in this course will be determined by a point total based on the following:

Assignments	250
Class Participation and Discussion	150
Midterm Exam I	150
Midterm Exam II	150
Final Exam	300
Total points	1000

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

A	≥850
B	700-849
C	600-699
D	550-599
F	< 550

ATTENDANCE POLICY: Attendance is **mandatory** and will be recorded, often through Poll Everywhere (integrated into Canvas, tutorials available). Each class is a learning experience that cannot be replicated through simply “getting the notes.”

LECTURE (IN PERSON): Students are expected to come to lecture after having reviewed the previous lecture notes and/or the relevant textbook section(s). Instruction will be offered *in person* unless informed otherwise, in which case virtual instruction will be implemented. A laptop, tablet or smartphone with internet capability is required for all classes as instructors will take attendance using Poll Everywhere. A notebook where you can solve problems by hand and take notes is highly recommended.

If your technology malfunctions and you are unable to participate in Poll Everywhere polling notify your instructor at the end of the class and send later an email explaining the problem (**the same day**) to receive participation points. Please include your name, the course number and section (if applicable) in your email. Failure to notify the instructor properly or in a timely manner (in person and via email) will result in loss of participation points for that day.

CLASS RECORDINGS: Class sessions may be recorded by the instructor. These recordings shall only be used as an educational resource and are not to be distributed or used outside of this class. Information on how to access recorded lectures will be made available by your instructor. Any recordings that contain identifiable information about students will not be used beyond this semester.

CLASS RECORDING ETIQUETTE: Students are expected to respect their fellow students’ privacy and freedom to learn without disruption. Students are not allowed to capture or reproduce anyone’s name, image, or voice without permission. They must be polite and respectful in the online chat. Informal chat is okay, but typing is restricted to things that one would say out loud in front of the entire class. Students must always conduct themselves on their webcam video as they would in person in a classroom.

ASSIGNMENTS: For assignments, the students will be given adequate time to complete the work and upload it to Canvas. These tasks are essential for helping you learn and are worth 250 points total. Make sure you complete each assignment in a timely manner. Students who miss an assignment for a valid reason must still make up the work to receive points.

COURSE LEARNING RESPONSIBILITY: Students are asked to practice extra care and attention in regard to academic honesty, with the understanding that all cases of plagiarism, cheating, multiple submission, and unauthorized collaboration are subject to penalty. Students may not collaborate on exams or assignments, directly or through virtual consultation, unless the instructor gives specific permission to do so. Posting an exam, assignment, or answers to them on an online forum (before, during, or after the due date), in addition to consulting posted materials, constitutes a violation of the university’s honesty policy. Likewise, unauthorized use of live assistance websites (e.g. use of Ai), including seeking “expert” help for specific questions during an exam, can be a violation of the honesty policy. All students should be familiar with the NJIT integrity code: <http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf>. Please utilize all the resources that are available to you to be successful in the courses. Examples include paying full attention in class, copying notes, accessing the tutoring center, and requesting instructor office hours for help.

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:

Exam I	October 8-9
Exam II	November 26-27
Final Exam ^a	December 17-18

^aThe final exam will be a cumulative exam of all the course content.

ADMINISTRATION OF EXAMS: The Common and Final Exams will be administered in person unless University Policies dictate otherwise. If virtual, exams will use the RESPONDUS browser with Webcam. This browser is available on Canvas. Students must complete a proper environment check before starting the exam in the exam video by showing their calculator, blank scratch paper, their work surface and ensure cell phone is placed away from work area and is inaccessible during the exam. Students may only use scientific (non-programmable, non-graphing) calculators on exams and #2 pencils. The student will also be asked to show a photo-ID. No cell phones, tablets, other computers, smartwatches, or anything else which can access the internet should be anywhere near the exam—any indication of cell phone, headphones or smart device presence (a ring tone, vibration, music, or a visible phone) will result in a point penalty or a zero on the exam. Talking to anyone during the exam is not permitted.

TEST GRADING ERROR. Test scores will be available in Canvas roughly 2 weeks after the test. If you wish to go over your exam, arrange to meet your instructor during office hours. If you believe there is an error, you have one week after scores are posted to discuss the error with your instructor during office hours.

ALL ERRORS NEED TO BE BROUGHT TO THE INSTRUCTOR'S ATTENTION WHEN THEY OCCUR. DO NOT WAIT UNTIL THE END OF THE SEMESTER.

MAKEUP EXAM POLICY: There will normally be **NO MAKE-UP EXAMS** during the semester. If a student has a legitimate reason for missing an 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. **One cumulative make-up examination** will be permitted at the end of the semester if there is an acceptable and substantial reason.

Using the Respondus Lockdown Browser and a Webcam for Online Exams

Respondus LockDown Browser is a locked browser that prevents you from printing, copying, going to another URL, or accessing other applications during an online exam. If a Canvas exam requires that LockDown Browser is used, you will not be able to take the assessment with a standard web browser. The LockDown Browser with a webcam (Respondus Monitor) will record you during an online exam.

The webcam can be built into your computer or it can be a separate unit that plugs in with a USB cable. Watch this [short video](#) to get a basic understanding of LockDown Browser and the webcam feature. A student [Quick Start Guide \(PDF\)](#) is also available.

1. Download and install LockDown Browser from this link:
<http://www.respondus.com/lockdown/download.php?id=264548414>
2. Once your download has finished, locate the "LockDown Browser" shortcut on the desktop and double-click it. (For Mac users, launch "LockDown Browser" from the Applications folder.)
3. You will be brought to the Canvas or Moodle login page within the LockDown Browser. If you are in Moodle, click "Login with your UCID" to log in with your NJIT UCID and password and then click Login.
4. Under "My courses," click on the course in which you have to take the exam that requires the LockDown Browser.
5. After you enter the course, find the exam and click on it.
6. A confirmation prompt will appear. Click the "Start attempt" button. Once a quiz has been started with LockDown Browser, you cannot exit until the Submit all and finish button is clicked.
7. If you are required to use a webcam (Respondus Monitor), you will be prompted to complete a Webcam Check and other Startup Sequence steps.

ADDITIONAL RESOURCES

HOW TO SUCCEED IN THIS COURSE:

You are responsible for utilizing the resources provided to help yourself learn. You will benefit from the lecture, textbooks and articles only if you **consciously and systematically** read and understand them. Please plan to spend as many hours as you can each week outside the lecture time for this class.

Reach out to the instructor to organize office hours where you can go for extra help. On a weekly basis you need to plan for:

- a) Read notes/material from previous lectures (before the class) and review the textbook chapter if applicable.
- b) Prepare pertaining questions to ask the professor during class
- c) Time to complete assignments

ACCOMMODATION OF DISABILITIES: Office of Accessibility Resources and Services, **OARS (formerly known as Disability Support Services)** offers long-term and temporary accommodation for undergraduate, graduate and visiting students at

NJIT. See <https://www.njit.edu/studentsuccess/node/5> to learn more about their services. If you need accommodations due to a documented disability, please contact the Office of Accessibility Resources and Services 973-596-5417 or via email oars@njit.edu. The office is in Fenster Hall Room 260. A Letter of Accommodation Eligibility from the Office of Accessibility Resources Services office authorizing your accommodations is required to receive accommodations on assignments or exams. Eligible students requiring special conditions for exams must fill out an [OARS forms](#) stating the date and time of the exam. It is advisable for eligible students to fill out forms for the two common exams in the first week of classes.

Please request all exams that must be administered by OARS by the end of the first week of class. If accommodation is not requested in a timely manner, your request will likely be denied.

Mental Health and Well-being: NJIT is committed to the mental health and well-being of its students. If you or someone you know is feeling overwhelmed, depressed, and/or in need of mental health support, services are available. For help, such individuals should contact Center for Counseling and Psychological Services (c-CAPS) at <https://www.njit.edu/counseling/> or by calling the c-CAPS office at 973-596-3414. If you need support and information about options and resources, please also reach out to the Office of the Dean of Students at <https://www.njit.edu/dos/>

IMPORTANT DATES: <https://www.njit.edu/registrar/fall-2025-academic-calendar>

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

Week	Topic	Recommended reading
1	Course overview and introduction to chemical ecology. Chemical communication.	Textbook page 1
2	Insect communication.	Textbook page 41
3	Plant defenses.	https://doi.org/10.4161/psb.21663 ; doi.org/10.1146/annurev-arplant-042110-103854
4	Plant-herbivore interactions. Animal defense coevolution.	doi.org/10.1146/annurev-arplant-042110-103854 ; https://doi.org/10.1111/nph.20450
5	Plant-plant communication.	https://doi.org/10.1016/j.pbi.2018.03.008

6	Midterm exam I	
7	Chemistry of multitrophic interactions.	https://doi.org/10.1016/j.cois.2024.101307 ; and references therein
9	Chemistry of Sexual Selection.	Textbook page 119 and 133
10	Mimicry, deceit, and eavesdropping. Pollination.	Textbook page 51; https://doi.org/10.1111/nph.20450
11	Chemical Signals in the Marine Environment	Textbook page 147
12	Microbe chemical ecology.	DOI:10.1038/s41396-019-0469-x; https://doi.org/10.1155/2015/342982
13	Midterm exam II	
14	Vertebrate chemical ecology.	Textbook page 17; DOI: 10.1007/s10886-010-9739-9
15	Chemical Ecology in the Pharma and Agrotechnological Industries	Textbook page 183
16	Final Exam	