Fall 2021

CHEM 126-001: General Chemistry II

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NJIT New Jersey Institute of Technology

THE COLLEGE OF SCIENCE AND LIBERAL ARTS

THE DEPARTMENT OF CHEMISTRY AND ENVIRONMENTAL SCIENCE

CHEM 126 (DAY):
Fall 2021 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 on. 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 of F, 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*

COURSE INFORMATION

Course Description: Chem 126
Number of Credits: 3
Pre-requisites: Chem 125
Corequisites: C or higher in Math 110 or equivalent

Course-Section	Instructor
Chem 126:	Dr. Buchspies

Office Hours:
Webex meeting room:
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, any PowerPoint 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 your instructor as soon as possible.
Required Textbook:

Title	Chemistry, A Molecular Approach
Author	Nivaldo J. Tro
Edition	Fifth
Publisher	Pearson
ISBN #	ISBN-13: 978-0134874371

University-wide Withdrawal Date: The last day to withdraw with a **W** is Wednesday, November 10, 2021.

Learning Outcomes:

1. Define Reaction Rate, relate reaction rate to stoichiometry and determine order of a reaction
2. Describe the factors affecting reaction rate
3. Use kinetic data to write reasonable reaction mechanisms
4. Explain equilibrium and equilibrium constants
5. Understand the concept of equilibrium constant and the reaction quotient, Q
6. Use equilibrium constant to determine the direction of reaction and product yield in the context of various chemical reactions
7. Use Le Chatelier's principle to determine direction of reaction
8. Understand different definitions of acids and bases
9. Explain the autoionization of water and the concept of pH to discuss acid/base strength
10. Define and perform calculations relating to acid and base dissociation constant
11. Explain the concept of buffer solution and their importance
12. Perform calculations to show the efficiency of buffer solutions
13. Interpret equilibrium constants Ksp and discuss solubility of sparingly soluble salts
14. Interpret titration curves and calculate the pH of the solution during titration of strong and weak acids versus base
15. Understand and explain energy transformations in chemical reactions
16. Explain entropy, Gibbs free and the second and third law of thermodynamics.
17. Determine whether a reaction is spontaneous
18. Calculate thermodynamic parameters ΔG, ΔS, ΔH and relate the equilibrium constant to these parameters
19. Balance redox reaction and write oxidation and reduction half –reaction
20. Calculate the cell potential for a redox reaction in a galvanic cell
21. Relate cell potential to thermodynamic parameters and determine the direction of spontaneity
22. Use Faraday's law to determine the amount of material deposited during electroplating
23. Explain electrolysis and overvoltage
24. Differentiate between chemical reaction and nuclear reaction
25. Balance nuclear equations and describe the particle emitted during the process
26. Predict the type of emission from unstable nuclides
27. Use mass –energy relationship to calculate the energy released during nuclear processes
28. Distinguish between nuclear fission and fusion
29. Describe the applications of nuclear reaction s in energy production
30. Name simple organic compounds and the basic function al groups
31. Write reactions of alkanes, alkenes and alkynes

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 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 during office hours.

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

Homework	150
Class Participation (recitation + lecture) **6 biweekly quizzes x 5 pts each (30 pts total)** **12 recitation worksheets x 10 pts each (120 pts total)** **Classroom attendance 50 pts**	200
Common Exam I,	175
Common Exam II,	175
Final Exam	300
Total points	1000

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

A	>835	**C**	600-659
B+	775-834	**D**	550-599
B	710-774	**F**	< 550
C+	660-709		

You must maintain an average of 35%, which is 228 points in the common exams and finals to be considered for a grade of D or higher. You will receive an F even if you have adequate point total without this requirement.

ATTENDANCE POLICY: Attendance at classes will be recorded and through **iclicker** and is **mandatory**. Each class is a learning experience that cannot be replicated through simply "getting the notes."

LECTURE (IN PERSON): A computer and scientific (non-graphing, non-programmable) calculator are required for all lectures. Students are expected to come to lecture after having reviewed the pre-recorded lecture notes available in Canvas. Instruction will be offered in person, so attendance is required for all the classes A laptop is required for all classes as instructors will administer online class quizzes. We will be doing a lot of problem -solving, so a paper notebook where you can do problems is highly recommended.

If your computer malfunctions and you are unable to attend class either in person, you are required to inform the instructor, via e-mail the **same day**. Failure to notify the instructor will result in loss of points for that day.

RECITATION (SECOND LECTURE PERIOD) IN PERSON: Each recitation, the students will be given a worksheet to solve. You will be given adequate time to complete the worksheets and upload your work. These worksheets are essential for helping you learn and are worth points. So please take the time to do the work neatly and upload them in the space provided in CANVAS. Students who miss a recitation for a valid reason must still make up the worksheet to get credit.

COURSE LEARNING RESPONSIBILITY: The COVID-19 pandemic has required that both instructors and students 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 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. All students should be familiar with the NJIT integrity code: ***http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf.***

In addition to adhering to the NJIT Integrity statement, converged learning also places a significant amount of responsibility on you. Please review the email sent by the registrar for detailed instructions on classroom assignment and dates when you will be on campus. This can be accessed via **Back2Classroom** app. More details can be found at: **https://back2classroom.njit.edu/getting-started-students**

HOMEWORK POLICY:

Homework is 100% online and accessed via CANVAS. The homework is to test your understanding of the material being taught. This homework will build on the classroom content and enhance your understanding of the material. This homework will also be good preparation for the common exams. It is important that you aim to get > 90% in all your homework to get the most benefit.

Each homework assignment has it due date. In addition, Canvas has a calendar with due dates. **ALL HOMEWORK MUST BE DONE ON TIME. There is no credit for late homework.** DO NOT WAIT TO THE LAST MINUTE TO DO YOUR HOMEWORK. ONLINE SYSTEMS ARE NOT 100% RELIABLE. UNEXPECTED EVENTS, like Canvas being down, MAY OCCUR but they are not considered valid excuses for missing a due date. PLAN TO FINISH YOUR HOMEWORK AT LEAST ONE DAY BEFORE IT IS DUE.

EXAM REVIEW: Before each exam, a review packet will be distributed. In order to complete the packet, the student must do one of the following: a) attend the tutoring center for assistance b) attend any instructor office hours. The list of office hours will be posted in the Canvas page.

EXAMS: There will be two midterm (Common) exams and one comprehensive final exam. The following exam periods are tentative and therefore possibly subject to change:

Common Exam I	**October 4, 2021**
Common Exam II	**November 8, 2021**
Reading Days	**December 13 and 14**
Final Exam Period	**December 15- 21**

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

ADMINISTRATION OF EXAMS:

The Common and Final Exams will be administered **ONLINE, IN PERSON** using the RESPONDUS browser with Webcam. This browser is available in 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, cell phone is placed away from work area, and a 360 degree view of their workspace to confirm no information is posted around the work area. Students may only use scientific (non-programmable, non-graphing) calculators on exams. The student will also be asked to show a photo-ID**.**

The final Exam will be an in-person, proctored ACS final exam.

During the exam, you have to adopt the following behaviors:

1. No cell phones anywhere near the exam-- any indication of cell phone presence (a ring tone, vibration, music, or a phone visible to the camera will result in a point penalty)
2. Not talking to anyone.
3. No covering of face (either with clothing or hand) unless the student is in a public space (like the library)
4. No moving out of frame.
5. No listening to music or having headphones/earbuds on.
6. No setting up the camera so that the camera's view is not completely on student and workspace.

To protect the test's integrity, anyone found to violate any of the rules (2-6) of an exam or have facial recognition for less than 50% of the exam time will be docked 10 points for each violation from their exam score.

We understand these are difficult times and it is natural to move around when taking an exam in the comfort of your home. We must remind you that this is a high stakes exam and must be treated as such. Please observe all exam rules as if you were taking the exam in person.

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 as these online exams may not be visible after submission. If you believe there is an error, you have one week after scores are posted to submit a test for regrading. You must describe the error via email to your professor for consideration.

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 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.

One *cumulative make-up examination* will be permitted at the end of the semester if there is an acceptable and substantial reason. A grade of zero will be given for a second missed examination independent of reason. ***Tentative date of the makeup exam is during the week of December 6th .***

Using 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 a quiz. If a Canvas quiz requires that LockDown Browser be used, you will not be able to take the assessment or quiz with a standard web browser. You may be required to use LockDown Browser with a webcam (Respondus Monitor), which will record you during an online exam.

The webcam can be built into your computer or can be the type 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.

HOW TO SUCCEED IN THIS COURSE:

You are responsible for utilizing the resources provided like pre-recorded lectures to help yourself learn. You will benefit from the lecture and recitation only if you come prepared to class. Please plan to spend at least 6-9 hours each week outside the lecture/recitation period for this class.

Spend a little time on chemistry and problem-solving everyday!

All instructors will provide their availability for office hours where you can go for extra help. In addition, the Chemistry tutoring center will be a useful resource where you can get help from peers. On a weekly basis you need to plan for:

a) Time to listen to pre-recorded lectures (before the class) and review the textbook chapter
b) Prepare questions to ask the professor during class
c) Review material and come prepared to do the recitation problems
d) Time to do the online homework and textbook problems
e) Go to tutoring center in CKB Room G12 .The tutors can help with Canvas Homework
f) Go to Instructor office hours—this is particularly useful for clarifying concepts

ADDITIONAL RESOURCES

Chemistry Tutoring Center: Located in the Central King Building, Lower Level, Rm. G12. Students can get help from peer tutors on a "walk-in" basis. There is no private tutoring available, however if the center is not too busy, you may be able to get more personal attention. In this peer tutoring model, tutors are taught to encourage interaction among students to promote learning. In addition, there will be limited tutoring available online as well *Hours of operation are between Monday – Friday 10:00 am - 6:00 pm*, either virtually or in-person

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/

Accommodation of Disabilities: **O**ffice of **A**ccessibility **R**esources and **S**ervices (**OARS**, *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 Scott Janz, Associate Director at the Office of Accessibility Resources and Services at 973-596-5417 or via email at scott.p.janz@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 2021 Academic Calendar**)

Month	Day	Weekday	Event
September	1	Wednesday	First Day of Classes
September	6	Monday	Labor Day
September	8	Wednesday	Monday Classes Meet
September	8	Wednesday	Last Day to Add/Drop a Class
November	10	Wednesday	Last Day to Withdraw from Classes
November	25	Thursday	Thanksgiving Recess Begins
November	28	Sunday	Thanksgiving Recess Ends
December	10	Friday	Last Day of Classes
December	13	Monday	Reading Day 1
December	14	Tuesday	Reading Day 2
December	15	Wednesday	Final Exams Begin
December	21	Tuesday	Final Exams End

Course Outline

This is a second part in a 2 course Chemistry sequence. This course builds on content from Chem 125. So, it is expected that the student will have reviewed Chapters 1-14 before starting this course.

Week	Outcomes	Topic	Homework
1	1,2	Chapter 15: Chemical Kinetics	Warm up Basic HW Chapter 15 HW-part 1
2	1,2,3	Chapter 15: Chemical Kinetics	Chapter 15 HW-part 2
3	4,5	Chapter 16: Chemical Equilibrium	Chapter 16 HW- part 1
4	4,5,6,7	Chapter 16: Chemical Equilibrium	Chapter 16 HW- part 2
		EXAM 1: Chapters 15 and 16 (October 4)	
5	8, 9	Chapter 17: Acids and Bases	Chapter 17 HW- part 1
6	8,9, 10	Chapter 17: Acids and Bases	Chapter 17 HW - part 2
7	11, 12	Chapter 18: Aqueous Ionic Equilibrium	Chapter 18 HW-part 1
8	13,14	Chapter 18: Aqueous Ionic Equilibrium	Chapter 18 HW- part 2
9	15,16	Chapter 19: Free Energy and Thermodynamics	Chapter 19 HW - part 1
		EXAM 2: Chapters -17, 18 & part of 19 (November 8)	
10	17,18	Chapter 19: Free Energy and Thermodynamics	Chapter 19 HW – part 2
11	19,20,21	Chapter 20: Electrochemistry	Chapter 20 HW – part 1
12	21, 22, 23	Chapter 20: Electrochemistry	Chapter 20 HW – part 2
13	18, 19,20	Chapter 21: Radioactivity and Nuclear Chemistry	Chapter 21 HW
14	21	Chapter 22: Organic Chemistry	Chapter 22 HW
15	1 - 21	FINAL EXAM Review	Basic: Chapters 1-8 Basic Chapters 9-12 ACS reviews: I and II