

Fall 2018

CHEM 122 - Fundamentals of Chemical Principles II

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CHEM 122: *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: Chem 122 - All Sections

Number of Credits: 3

Corequisites: Math 110 or equivalent

Course-Section and Instructors

Course-Section	Instructor
Chem 122- All sections	Duane Butherus

Office Hours: M 2:00-4:00 PM, W, Th 1:30-2:30 PM, F 12:00-1:30 PM

Office: T-351

Required Textbook:

Title	Chemistry, 10th Edition
Authors	Steven S. Zumdahl Susan A. Zumdahl Donald J. DeCoste
Edition	10th
Publisher	Cengage
ISBN #	ISBN-10: 1305957407 ISBN-13: 9781305957404

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

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. Interpret equilibrium constants to explain strong weak acids,
6. Use equilibrium constant to determine the direction of reaction and product yield in the context of various chemical reactions
7. Interpret titration curves and calculate the pH of the solution during titration of strong and weak acids versus base
8. Interpret and be able to predict solubility of sparingly soluble salts
9. Explain entropy, Gibbs free and the second and third law of thermodynamics.
10. Determine whether a reaction is spontaneous
11. Calculate thermodynamic parameters ΔG , ΔS , ΔH and relate the equilibrium constant to these parameters
12. Balance redox reaction and write oxidation and reduction half -reaction
13. Calculate the cell potential for a redox reaction in a galvanic cell
14. Relate cell potential to thermodynamic parameters and determine the direction of spontaneity
15. Use Faraday's law to determine the amount of material deposited during electroplating
16. Explain electrolysis and overvoltage
17. Differentiate between chemical reaction and nuclear reaction
18. Balance nuclear equations and describe the particle emitted during the process
19. Predict the type of emission from unstable nuclides
20. Use mass -energy relationship to calculate the energy released during nuclear processes
21. Distinguish between nuclear fission and fusion
22. Describe the applications of nuclear reaction s in energy production
23. Name simple organic compounds and the basic functional groups
24. 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.

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

Homework	260
Class Participation (recitation + lecture)	190
Common Exam I	100
Common Exam II	100
Common Exam III	100
Final Exam	250

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 193 points in the common exams and finals to pass the course. You will receive an F even if you have adequate point total without this requirement.

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."

Lecture: An I-clicker and calculator are required for all lectures. If your iclicker malfunctions, you are required to inform the instructor, either in person or via e-mail the **same day**. Failure to notify the instructor will result in loss of points for that day. If you are in class, but using a cell phone in any way, using a computer, or listening to music you will not get credit for that day's attendance. If you are cheating (having a second I-clicker) you and the person for whom you are cheating will get 0 for the entire semester. There are ways to

check! So, be honest.

Recitation: Students are expected to come to recitation after having reviewed the class lecture notes. Each recitation, the students will be given a worksheet to solve. The worksheets are collected at the end of the recitation and graded. Students who did not succeed in completing the worksheet during the recitation have one week time to complete the worksheets during office hours. Students who miss a recitation for a valid reason must still make up the worksheet to get credit.

Homework Policy: There are two types of homework: Basic and Regular.

Basic Homework, worth 100 points: It is recommended that you do the basic HW for the chapter before coming to the lecture. This homework is intended as a preparation for your participation in class. Getting > 70% in the basic homework before the lecture will ensure you have the foundation necessary to understand what is being taught in class.

Regular homework, worth 160 points: This 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.

All homework is very important. However, it is absolutely important that you aim to get > 90% in the basic and >70% in the regular HW to help you pass this class.

Each homework assignment has its due date. In addition, Moodle 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 AND UNEXPECTED EVENTS MAY OCCUR. IN GENERAL, THERE IS NO LATE HOMEWORK AND MOODLE BEING DOWN IS NOT A VALID EXCUSE. PLAN TO FINISH YOUR HOMEWORK AT LEAST ONE DAY BEFORE IT IS DUE. LATE HOMEWORK WILL ONLY BE ACCEPTED BY SUBMISSION OF A VALID EXCUSAL FROM THE DEAN OF STUDENTS.

Exams: There will be three 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:

Common Exam I	Monday 4:30 - 5:45pm - 10/1/18
Common Exam II	Monday 4:30 - 5:45pm - 10/22/18
Common Exam III	Monday 4:30 - 5:45pm - 11/12/18
Final Exam Period	December 15 - 21, 2018

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

TEST GRADING ERROR. Tests are returned in recitations following the test. If you believe there is an error, you have 24 HOURS following the test to submit a test for regrading. You must write a very brief description of the problem on the back of the test. (The answer key is provided in Moodle in the TEST INFORMATION book. You should always learn from your mistakes and go over the answer key.)

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 make-up examination** will be permitted if there is an acceptable and substantial reason. A grade of zero will be given for a second missed examination independent of reason.

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. 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.

Hours of operation are Monday - Friday 10:00 am - 6:00 pm. For further information please click [here](#).

Week	Dates	Topic	Homework
1	1	Ch 12: Chemical Kinetics	Warm up Basic HW Basic HW I Review of Graphing Basic HW II Kinetics I Regular HW Kinetics I
2	2,3,4	Ch 12: Chemical Kinetics Ch 13: Chemical Equilibrium	Basic HW Kinetics II Basic HW Review Mult. by One Regular HW Kinetics II\
3	4,5	Ch 13: Chemical Equilibrium	Basic Homework: Review Balanced Eq Basic Homework: Equilibrium I Regular Homework: Equilibrium I
4	6,7	Ch 14: Acids and Bases	Basic Homework: Equilibrium II Regular Homework: Equilibrium II Basic HW I: Reaction Stoichiometry
EXAM 1: Chapters 12-14			
5	9, 10	Ch 14: Acids and Bases	Basic Homework: Acids and Bases I Regular Homework: Acids and Bases I
6	9, 11	Ch 15: Acid-Base Equilibria	Regular Homework: Acids and Bases II Regular HW: Regular Homework: Buffers
7	8	Ch 16: Solubility and Complex Ion Equilibria	Regular Homework: Titrations Regular Homework: Solubility
EXAM 2: Chapters 14-16			
8	9,10	Ch 17: Spontaneity, Entropy, and Free Energy	Basic Homework: Thermodynamics Review Regular Homework: Thermodynamics I Basic Homework: Thermodynamics II
9	11,12	Ch 17: Spontaneity, Entropy, and Free Energy Ch 18 Electrochemistry	Regular Homework: Thermodynamics II Warm Up Basic Homework: Oxidation states Basic Homework: Electrochemistry
10	13,14	Ch 18 Electrochemistry	Regular Homework: Electrochemistry I Basic Homework: Electrochemistry II Regular Homework: Electrochemistry II
EXAM 3: Chapters 16-18			
11	15	Ch 18: Electrochemistry	
12	16,17,18, 19,20	Ch 19: The Nucleus: A Chemist's View	Basic Homework: Nuclear Chemistry Regular Homework: Nuclear Chemistry
13	23,24	Ch 22: Organic and Biological Molecules	Regular Homework: Organic Chemistry

14	1 - 21	FINAL EXAM Review	Basic: Chapters 1-8 Basic Chapters 9-12 ACS Chem 125-126 Review I ACS Chem 125-126 Review II
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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. 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

Course Outline

