Chemistry 162, General Chemistry II Summer 2025

Chemistry 162 is the second semester of the general chemistry course.

Department Learning Goals Met by this Course:

By the end of this course (Chem 162), students will be able to draw upon:

- relevant scientific models
- representations at the macroscopic, submicroscopic (small particle), and symbolic levels—including mathematical formulae
- qualitative and quantitative reasoning skills

...to demonstrate their understanding that:

1. “Atoms: Matter consists of atoms that have internal structures that dictate their chemical and physical behavior.”
2. “Bonding: Atoms interact via electrostatic forces to form chemical bonds.”
3. “Structure and Function: Chemical compounds have geometric structures that influence their chemical and physical behaviors.”
4. “Intermolecular Interactions: Intermolecular forces— electrostatic forces between molecules—dictate the 2 physical behavior of matter.”
5. “Chemical Reactions: Matter changes, forming products that have new chemical and physical properties.”
6. “Thermodynamics: Energy is the key currency of chemical reactions in molecular-scale systems as well as macroscopic systems.”
7. “Measurement and Data: Chemistry is generally advanced via experimental observations.”
8. “Visualization: Chemistry constructs meaning interchangeably at the particulate and macroscopic levels.”

Lector: Professor Kornienko, e-mail: akern@rutgers.edu

Lectures are four times a week from 9:00 AM to 10:55 AM on Mondays, Tuesdays, Wednesdays, and Thursdays in LOR-022 on Douglass Campus.

Recitations are three times a week, on Mondays, Tuesdays, and Wednesdays and are taught by the following instructors:

Section B1 meets from 8:00 AM to 8:50 AM _ Dr. Kornienko

Section B5 meets from 11:00 AM to 11:50 AM _ Dr. Kornienko

Sections B4 meet from 11:00 AM to 11:50 AM_TBD

Office hours:

with Dr. Kornienko on Mondays and Wednesdays from 11:50 AM to 12:50 PM in LOR-022

Textbook: Chemistry: Structure and Properties, 3[d] Edition by Nivaldo Tro. Lecture material and suggested practice problems originate in this book. The textbook is available online as an e-book at https://www.vitalsource.com/products/chemistry-nivaldo-j-tro-v9780134551326 (Links to an external site.) Some inexpensive rental deals are available on Amazon.

Calculator: A scientific calculator with h the capability of handling logarithms and scientific notation.

Course page is on Canvas: All communication with students will be done using Canvas. If you are new to Canvas review tutorials at **https://onlinelearning.rutgers.edu/getting-started- canvas-students** and if there are still questions, please call to help desk at (877)361-1134. You should login to this website using your Rutgers net ID and password. **You are responsible for checking Canvas announcements and Rutgers email.**

Grades and Grading

Grades will be calculated based on the total number of points obtained in Quizzes and Exams.

Twelve quizzes are 2% each or 24% in total;
Two lecture exams are 20% each or 40% in total;
Final Exam is 36%.
Total 100%.

All quizzes will be given on Canvas.

Lecture exams will contain 25 questions and will be given during regular lecture periods according to the syllabus.

Final exam will be ACS exam for general Chemistry II and you will be given 110 min to complete.

Your **Final grade** will be based on your overall percentage. An approximate idea of the grading scale would be as follows:

A >> 88%
B + 80-87%
B 72-79%
C+ 64-71%
D 55-64% and F < 55%

Lectures schedule:

Lecture #	Weekday &Date	Topic	Textbook*	Suggested Problems
1	T 05/ 27	Types of solutions and solubility, Heat of solution formation, Henry's Law	13.2, 13.4	Ch13:25,27,29,31,33,35,37,39, 41,43,45,47,53,55,57,59,61,63,66,67,69,95
2	W 05/28	Concentrations, Raoul's Law, colligative properties of strong electrolytes	13.5-13.7	Ch13: 67,69,71,73,75,77,79,81, 83,85,87,89,91,93,110
3	Th 05/29	Rates of Reactions, method of initial rates	14.2-14.4	Ch 14: 27,29,33,35,39,41,43,45
4	M 06/02	Integrated rate Laws, temperature dependence of rate	14.5 -14.6	Ch14:47,49,51,53,55,57,59,61,63
5	T 06/03	Reaction mechanisms, catalysis	14.7-14.8	Ch 14: 75,76,77,78
6	W 06/04	Equilibrium, equilibrium calculations	15.2-15.6	Ch 15: 21,23,25,27,29,33, 37,39,41,43,47,49
7	Th 06/05	K approximation methods, Le Chatelet's Principle	15.7-15.9	Ch 15: 53,55,59,61,63,65,67,69,71
	M 06/9	**Exam 1**	**13.2,13.4-15.9**	
8	T 06/10	Acids and bases, acid strength and molecular structure	16.2-16.4	Ch16: 31,33,35,37,39,41,43,47
9	W 06/11	Acid strength and K_a, pH calculations, percent ionization, polyprotic acids	16.5-16.7,16.10	Ch16:49,51,53,55,57,59,61,63,65,67, 69,71,73,75,77,79,81,83,85,87,89, 113,115,117,119,121,123
10	Th 06/12	Strong and weak base solutions, ions as acids and bases, pH of salt solutions	16.8-16.9	Ch16:97,99, 103,105,107,109,111, 143
11	M 06/16	Buffers	17.2-17.3	Ch17: 25,27,29,31,37,39, 41,43,45
12	T 06/17	Titrations and indicators	17.4	Ch17: 59,61,63,65,67,69,71,73,75, 81,119
13	W 06/18	Ksp and solubility, common ion effect, precipitate formation	17.5-17.7	Ch 17: 83,85,87,89,91,93,95,97,101, 105,107,109,111
14	Th 06/19	Lewis acids and bases, complex compounds and solubility	16.11, 17.7	Ch16:29,30,127,129 Ch17: 113,115
	M 06/23	**Exam 2**	**16.1-17.7**	
15	T 06/24	Thermodynamics, spontaneity, entropy	13.3 18.2-18.6	Ch13: 33,35,37,39 Ch18:29,35,37,39,41,43,45,47,49,51,59,61
16	W 06/25	Gibbs free energy, equilibrium, K and Q. Balancing redox equations	18.7-18.9 19.2	Ch18: 63,65,67,69,71,73,75,77,89 Ch19: 33,35,37
17	Th 06/26	Voltaic cells, calculation equilibrium constant	19.3-19.5	Ch19:39,41,43,45,47,49,51,53,55,57,59,61 ,63,65,67,69,71,73, 75, 99,121
18	M 6/30	Nernst equation, concentration cells, batteries, electrolysis	19.6-19.8	Ch 19: 85,87,89,91,93,95,97,119
19	T 07/01	Skeletal structures and stereoisomerism for alkanes, alkenes, and alkynes	21.2-21.6	Ch 21: 9,10,13,15,23,29,30,31,32,33,35,39,59,61
20	W 07/02	Aromatic compounds, functional groups	21.7-21.13	Ch 21: 71,75,79,83,89
	Th 07/03	**Final Exam**	**13.2-21.13**	

*Chemistry, Structures and Properties by Tro, Third edition.

Recitations schedule:

Recitation #	Day &Date	Topics	Book*
1	T 05/27	Types of solutions, concentrations, solubility, Henry's Law	13.2, 13.4
2	W 05/28	Raoul's Law, colligative properties, electrolytes	13.5-13.7
3	M 06/02	Rates of Reactions, method of initial rates. Integrated rate Laws, temperature dependence of rate	14.2 -14.6
4	T 06/03	Reaction mechanisms, catalysis	14.7-14.8
5	W 06/04	Equilibrium, equilibrium calculations. Approximation methods, Le Chatelier's Principle	15.2-15.9
	M 06/09	**Exam I, recitation to answer all the questions from the previous chapters**	**13.2, 13.3-15.9**
6	T 06/10	Acids and bases	16.2-16.4
7	W 06/11	pH calculations	16.5-16.9
8	M 06/16	Ions as acids and bases, pH of salt solutions. Polyprotic acids, Lewis acids and bases	16.9-16.11
9	T 06/17	Buffers	17.2-17.3
10	W 06/18	Titrations and titration curves, indicators. K_{sp} and solubility, common ion effect, selective precipitation, complex compounds	17.4-17.6 22.3-22.4
	M 06/23	**Exam II, recitation to answer all the questions from the previous chapters**	**16.2-17.6**
11	T 06/24	Thermodynamics, spontaneity, entropy	13.3, 18.2-18.6
12	W 06/25	Free energy, equilibrium, temperature dependence of K	18.7-18.9
13	M 06/30	Voltaic cells, calculation equilibrium constant, Nernst equation, concentration cells, batteries, electrolysis	19.2-19.9
14	T 07/1	Skeletal structures and stereoisomerism for alkanes, alkenes, and alkynes	21.2-21.6
15	W 07/02	Aromatic compounds and functional groups	21.7-21.13
	Th 07/03	**Final Exam**	**13.2-21.13**

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- **Lecture notes** will be posted on the canvas site for this course usually two hours prior each lecture. Any lecture handouts will also be posted at the same time.

- **Exams** will be given on the specified dates during lecture period. The material for the exams will come from your homework problems, recitation discussions, quizzes and lecture material. Make sure you do all the homework problems. No notes, whether on paper or electronic, will be permitted on the exam. Scientific calculators are allowed.

- **Missed Exams**: **All exams must be taken at the scheduled times and places**. If you fail to take an exam at the scheduled time and place, you must notify Dr. Kornienko, promptly by e-mail at least of <u>two weeks in advance</u> and provide an acceptable explanation for your absence, or you will receive a score of zero (0) for that exam. No exceptions!

Absences. If you are absent for one of the exams, you should fill out a self-reported absence form, available at https://sims.rutgers.edu/ssra. **There are no makeup exams.** If a student misses an exam with an acceptable reason, the final grade will be calculated proportionally based on the other exams, along with quizzes.

Special Needs. Any student requiring extra time and/or other unusual testing accommodations must provide documentation supporting their circumstances and needs directly to Dr. Kornienko during the first week of classes, or immediately after these needs have been documented. ALL requests for extended time and/or other special accommodations for exams must be handled through the Office of Disability Services (http://disabilityservices.rutgers.edu/). The Office of Disability Services will be responsible for all necessary proctoring arrangements.

Academic Integrity. Rutgers University policies on academic integrity and procedures for disciplinary action (http://academicintegrity.rutgers.edu/) will be strictly followed. Amongst all other considerations noted in these policies, please note in particular that all exams and quizzes are **closed-book/closed-notes**, that electronic devices other than calculators are not allowed on your person during any exams, that it is strictly forbidden to share information with any other person or receive information from another person during an exam or quiz, and that it is strictly forbidden to impersonate or otherwise represent yourself as another student in any exam or quiz or have another person impersonate or otherwise represent themselves as you in any exam or quiz.

Counseling, ADAP & Psychiatric Services (CAPS) (848) 932-7884 / 17 Senior Street, New Brunswick, NJ 08901/ www.rhscaps.rutgers.edu/ CAPS is a university mental health support service that includes counseling, alcohol and other drug assistance, and psychiatric services staffed by a team of professional within Rutgers Health services to support students' efforts to succeed at Rutgers University. CAPS offers a variety of services that include individual therapy, group therapy and workshops, crisis intervention, referral to specialists in the community and consultation and collaboration with campus partners.

Violence Prevention & Victim Assistance (VPVA) (848) 932-1181 / 3 Bartlett Street, New Brunswick, NJ 08901 / www.vpva.rutgers.edu/ The Office for Violence Prevention and Victim Assistance provides confidential crisis intervention, counseling, and advocacy for victims of sexual and relationship violence and stalking to students, staff, and faculty. To reach staff during office hours when the university is open or to reach an advocate after hours, call 848-932-1181.

Scarlet Listeners (732) 247-5555 (http://www.scarletlisteners.com) Free and confidential peer counseling and referral hotline, providing a comforting and supportive safe space.

Weather and Other Emergencies: Check the Rutgers website (http://campusstatus.rutgers.edu/) to confirm if classes are cancelled due to weather or other emergencies. Changes in schedule and other adjustments will be announced in the lecture and on Canvas. Campus status information will also be available through: RU-info Channel on RU-TV Channel 3, RU-info Call Center at 732/932-INFO (4636), or via these local media outlets (class cancellations only): WCTC (1450 AM), WRSU (88.7 FM), WRNJ (1510 AM), WKXW (101.5 FM), WCBS (880 AM), WINS (1010 AM), News 12 New Jersey (Channel 12).