

City University of New York (CUNY)

## CUNY Academic Works

---

Open Educational Resources

City College of New York

---

2019

### General Chemistry 2

Themis Lazaridis  
*CUNY City College*

[How does access to this work benefit you? Let us know!](#)

More information about this work at: [https://academicworks.cuny.edu/cc\\_oers/218](https://academicworks.cuny.edu/cc_oers/218)

Discover additional works at: <https://academicworks.cuny.edu>

---

This work is made publicly available by the City University of New York (CUNY).  
Contact: [AcademicWorks@cuny.edu](mailto:AcademicWorks@cuny.edu)

# Chem 10401, General Chemistry 2 Spring 2019

## CC Sections

### Lecture:

MWF 11:00-11:50 am, Room MR-3

### Lab (MR-1008/1012/1013):

3 hr, various times, depending on Section

### Recitation (MR-1029):

1.5 hr, various times, depending on Section

Instructor: Prof. Themis Lazaridis  
email: tlazaridis@ccny.cuny.edu, tel: 650-8364  
Office: MR-1337

### Office hours:

M, F 12:00-1:00 pm

## Course Description

This course is the second of a two-semester sequence and provides an in-depth introduction to the fundamental laws and techniques of chemistry for majors in science and engineering. Topics include: intermolecular forces, solutions and their physical properties, chemical kinetics, equilibrium, acids and bases, solubility and complex ion equilibria, thermodynamics, electrochemistry, and nuclear chemistry. It consists of three components (lecture, laboratory, and recitation), which are integrated to provide a comprehensive but thorough introduction to the principles of chemistry. The laboratory component introduces students to common laboratory methods including visible spectroscopy and titration.

Prerequisite: Chem 10301 with a grade of C or better

## Textbook

“Chemistry” by Paul Flowers et al, 1<sup>st</sup> edition – (free pdf available on <https://openstax.org/details/books/chemistry>). Chem 10401 covers chapters 10-17 and 21. A hardcopy can be purchased on the internet for about \$55, as well as each of the two halves for about half the price. If you have already purchased “Chemistry. 4<sup>th</sup> Edition”, McGraw-Hill, 2016 by Julia Burdge, you can use that too (chapters 11 and 13-20). Pretty much any General Chemistry textbook will do.

## Online assignments

Online assignments will account for 10% of the grade and will use the ALEKS system. Here is how you should register for ALEKS:

1. Go to web address: [www.aleks.com](http://www.aleks.com) and click the “**Register Now**” Button.
2. Enter your email address.
  - a. If you already have a ALEKS account you will be prompted for your password.
  - b. If you do not have a ALEKS account you will be asked to create one.
3. Enter the course code: **UAUGA-96XHE**, complete the brief tutorial and proceed to the initial assessment called “**Knowledge Check**” (1-2 hours). You can stop anytime and start where you left off. From your performance in this assessment, ALEKS will learn about your knowledge state and will decide on how to proceed. It is therefore **extremely important** that you take this initial assessment very seriously. There are four important guidelines to follow in this regard.
  - a. *Be sure your work is your own. If you get help, ALEKS will overestimate your knowledge and provide you with problems you are not prepared to learn. This will result in more time spent in ALEKS.*
  - b. *Use the "I Haven't Learned This" button carefully. If a question is completely strange, this button will allow ALEKS to more efficiently determine what you know. Clicking this button when you do know a topic will give you much more work to complete, however. If a question is familiar but you are uncertain of the answer, it is better to respond with an incorrect answer.*
  - c. *Answer the questions very carefully. If you make silly mistakes or typos, ALEKS will likely conclude that you know much less than you actually do. Take the necessary time to think about your answers. Solving some of them might require up to 10 minutes. Check your answers for units, significant figures, sign, and possible typos.*
  - d. *Do not exhaust yourself during the initial assessment or in any assessment that might follow. You can log out at any time; when you log in again, ALEKS will put you back exactly where you left.*
4. After you finished the initial knowledge check you can start working on the **Prerequisite Review**. Those are 65 topics covering concepts that you should have learned in high school or in CHEM 10301. Try to complete the prerequisite review by the first week of the semester.
5. You are expected to complete the CHEM 10401 Objectives (tentatively, a total of 98 topics by the end of the semester. It is expected that this takes an average of 7 hours/week, including progress assessments discussed in the next item. Some students take significantly longer so plan accordingly. You will know you are done when your score in the ALEKS grade book is 100%.
6. Complete periodic knowledge checks as they are provided. You will need to complete an assessment that is very similar to the initial assessment and you will take a comparable amount of time to complete. When completed you can return to work on the objectives.

### Exams and grading

There will be three midterms during the semester and a comprehensive final examination. The lowest grade of the three midterms will be dropped.

- 35% Midterms: I (Chapters 10-12), II (Chapters 13-15), III (Chapters 16-17 & 21)
- 35% Final Exam (Chapters 10-17 & 21 cumulative)
- 15% Laboratory
- 10% Online assignments
- 5% Recitation

The conversion from points to letter grades is done as follows:

96-100 :	A+	77-79:	C+
90-95 :	A	72-76:	C
88-89 :	A-	70-71:	C-
86-87:	B+	60-69:	D
82-85:	B	0-59:	F
80-81:	B-		

No makeups are offered for the midterm exams. A makeup for the final exam is offered only under compelling circumstances.

### **Learning outcomes**

After completing this course, students should be able to:

1. Discuss states of matter and properties of solutions and the factors that affect solubility, and understand and interpret colligative properties, molality, and colloids and their applications to solutions.
2. Understand chemical kinetics, reaction rates, factors that influence the reaction rates, reaction mechanisms, and catalysis.
3. Develop conceptual knowledge of equilibrium, equilibrium constant, and their applications to systems at equilibrium, and apply Le Chatelier's principles and its applications to systems at equilibrium.
4. Develop knowledge about acid-base equilibria, the pH scale, perform calculations into the pH of solutions of acids and bases of varying strengths, predict the strength of an acid or base by examining its structural properties, and apply principles of buffered solutions and the role they play in the environment and biological system.
5. Explore solubility, factors that affect solubility, and the separation of ions by precipitation.
6. Define entropy and the Second Law of Thermodynamics and how to relate it to everyday life, define Gibbs free energy and its relation to the enthalpy and entropy, and manipulate equations and make sense out of relating the free energy, enthalpy, entropy, and the equilibrium constants.
7. Develop the skills for balancing oxidation-reduction reactions, explore electrochemical cells and the effect of concentration on the cell potential, and be aware of how batteries operate and building different types of batteries.

8. Explore nuclear chemistry by exploring radioactivity, patterns of nuclear stability, rates of decay, nuclear fission, nuclear fusion, and the energy changes that accompanies a nuclear reaction.
9. Develop the capabilities to solve problems by combining several concepts in chemistry.
10. Write a laboratory report including data and analysis.
11. Be able to conduct a variety of experiments (titrations, spectroscopic) including accurate recording of results and preparation of calibration curves.
12. Work as part of a problem solving team to solve chemistry problems.

### **Tips**

Learning Chemistry is cumulative – if you miss a class you will miss a significant building block, which will affect your exam performance, scores, and final grade as well as your ability to understand material in future courses. So, attendance for all lectures, labs, and workshops while required is critical to your success. Further, your own practice by doing homework and becoming engaged with the material as well as engaged with your classmates in workshop and lab discussions of chemical concepts will help you build your knowledge to succeed. Learning these skills will prepare you for your chosen major and professional career. You will need a simple scientific calculator for this course.

Plan at least three hours of study (reading the chapter and completing the problem sets - “homework”) time for every hour you spend in class. Do the problem sets individually (without help from friends or classmates) initially. Please look at a related problem in the solution manual to help you solve the assigned problem. If you are still unable to solve the problem, then ask a friend, classmate, workshop leader, TA, or Professor for help. Attend workshop: finish the Self-Test, finish the workshop problems, and ask questions. Seek help when you have difficulty (office hours, tutoring, study groups with workshop).

### **Free tutorial service**

Check with the CCAPP office at the Plaza level of Marshak.

### **Statement on Academic Integrity**

The CCNY policy on academic integrity will be followed in this course. The document can be found through the CCNY website by clicking on Current Students → Academic Services → Policy on Academic Integrity. All students must read the details regarding plagiarism and cheating in order to be familiar with the rules of the college. Cases where academic integrity is compromised will be prosecuted according to these rules. In addition, the Policy of Academic Integrity can be found in the Undergraduate Bulletin 2007-2009 in Appendix B.3 on page 312.

### **Disabilities**

Qualified students with disabilities will be provided reasonable academic accommodations if determined eligible by the AccessAbility Center (AAC). Prior to granting disability accommodations in this course, the instructor must receive written

verification of a student's eligibility from the AAC, which is located in NAC 1/218. It is the student's responsibility to initiate contact with the AAC and to follow the established procedures for having the accommodation notice sent to the instructor.

### **Tentative lecture schedule**

1/25: Introduction	3/29: 2nd Midterm (Ch. 13-14)
1/28: Chapter 10	4/1: Chapter 16
1/30:	4/3:
2/1:	4/5:
2/4:	4/8:
2/6: Chapter 11	4/10: Chapter 17
2/8:	4/12:
2/11:	4/15:
2/13:	4/17:
2/15: Chapter 12	4/19-28: <i>Spring break</i>
2/20:	4/29:
2/25:	5/1:
2/27: Review	5/3: 3rd Midterm (Ch. 15-17)
3/1: 1st Midterm (Ch. 10-12)	5/6: Chapter 21
3/4: Chapter 13	5/8:
3/6:	5/10:
3/8:	5/13: Review
3/11:	
3/13: Chapter 14	
3/15:	5/16-22: Final Exam: Chapters 10-17, 21
3/18:	
3/20:	
3/22:	
3/25: Review	
3/27: Chapter 15	