



Minzu University of China
CHEM 101 General Chemistry I (with lab)
Summer 2020

Basic Information

Class hours: Monday through Thursday, 2 hours each day
Discussion: Friday, 1 hour (60 minutes)
Review Section: Saturday, 1 hour (60 minutes)
Office Hour: 2 hours (According to professors' teaching plan)
Field trip: According to professors' teaching plan
Credit: 4
Total contact hours: 60 (50 minutes each)
Instructor: TBA

Textbook

Silberberg, Chemistry, The Molecular Nature of Matter and Change, 7 edition, 2015. Or equivalent textbooks with the same coverage and scope of contents.

Course Summary

General chemistry is an important foundation for chemistry, materials science, environmental science, biological science, and others. The course is aimed to provide fundamentals and theories to understand the principles governing atomic and molecular structures, chemical properties of, and reactivities of elements and compounds. It explores to understand matters in gaseous, liquid, and solid states. It also helps understand chemical changes at atomic/molecular level. Students will master the fundamental knowledge in chemical science required for next level of chemistry courses and other disciplines.

Course Objectives

This course is designed to enable students through learning:

1. to comprehend the basic physical and chemical laws governing the reactivity and property of matter.
2. to develop basic scientific skills (written & verbal) consistent with those necessary for successful performance in this course.
3. to obtain a solid foundation necessary for success in subsequent courses in the chemistry sequence.
4. to acquire basic laboratory techniques and attitudes that are essential to scientific inquiry.
5. to further develop the ability to reason in a disciplined logical manner and to become formal thinkers.

Learning Outcomes

After competing this course, students should be able to:

1. Define the fundamental properties of matter.
2. Determine the basic nuclear and electronic structure of atoms.
3. Identify trends in chemical and physical properties of the elements in the Periodic Table.
4. Describe bonding and the shape of molecules and ions.
5. Solve stoichiometric problems.
6. Write chemical formulas.
7. Write and balance chemical equations.
8. Describe the forms of energy and their conversion.
9. Define the types and characteristics of chemical reactions.
10. Use gas laws and basics of the Kinetic Molecular Theory to solve gas problems.



11. Convert units of measure.
12. Demonstrate an understanding of the scientific method.
13. Demonstrate skills in data analysis and graphing.

Course Outline

Week 1	Topics	Textbook readings
Mon	Study of Chemistry- overview	1
Tue	Study of Chemistry- overview	1
Wed	Components of Matter	2
Thurs	Stoichiometry of Formulas and Equations	3
Week 2		
Mon	Stoichiometry of Formulas and Equations	3
Tue	Major Classes of Chemical Reactions	4
Wed	Gases	5
Thurs	Gases	5
Week 3		
Mon	MIDTERM	1,2,3,4,5
Tue	Thermochemistry	6
Wed	Thermochemistry	6
Thurs	Quantum Theory	7
Week 4		
Mon	Chemical Periodicity	8
Tue	Chemical Bonding	9
Wed	Chemical Bonding	9
Thurs	Covalent Bonding	11
Week 5		
Mon	Shapes of Molecules	10
Tue	Intermolecular Forces	12
Wed	Review	
Thurs	Group Presentations of Lab Reports	
Fri	FINAL EXAM	5, 7, 8, 9, 10, 11, 12

The tentative outline will be adjusted slightly as the course progresses to better serve the learning process.

Lab Activities

Week 1	Identification of Reaction Products
	Recognize evidence of chemical change and write proper equations for the reactions observed.
Week 2	Net Ionic Equations and Reactions in Aqueous Solution
	Predict products for reactions among salts, acids, and bases
Week 3	Oxidation-Reduction: Predictions and Equations
	Using patterns of oxidation-reduction reactions to predict redox behavior.
Week 4	Determination of the Gas constant R
	Evaluate the magnitude of the gas constant R in the ideal gas law equation.

Lab projects may be subject to adjustment based on availability of chemicals and facility conditions.



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Assessment

Problem Sets (4 or more)	10 %
Quizzes (8 or more)	20 %
Labs & Lab Project Presentation	20 %
Mid-term Exam	25 %
Final Exam	25 %

Grades

A+ 97-100; A 94-96; A- 90-93;
B+ 87-89; B 84-86; B- 80-83;
C+ 77-79; C 74-76; C- 70-73;
D+ 67-69; D 64-66; D- 60-63; F < 60

Exam Format

Exams may consist of multiple choice, fill-in-the-blanks, matching, and problems. The questions will cover concepts and skills learned during lecture and lab.

Exam, Quiz, and Homework

Exams are cumulative. The knowledge learnt through previous chapters is always relevant to later chapters in some ways. Thus, it is impossible to separate the knowledge link. Make sure to take the exams in the designated time because there will be no makeup exams. No make-up quizzes will be available either. During the exams and quizzes, no smart devices such as phones, watches, and tablets are allowed. Cell phones cannot be used as a substitute for a calculator. Passing pen/pencil, eraser, and calculator is not allowed.

Homework is necessary for success in the course. The completion of 80% homework is the minimum required to pass the course. Try each problem on your own first and realize the exact “choking” points when facing any obstacles. Try again but focus on the choking point first. Do not accumulate any problems. Make sure to solve them in a timely fashion either through the group discussion/recitation session or office hour help session.

Reading

Make sure you read each chapter before the beginning lecture of the chapter. Such proactive engagement allows you to recognize new topics and new terminologies involved. That also gives you an opportunity to review the contents/concept you have already touched/learned before. You will be more productive in the classroom with focused determination of knowledge acquisition. Read after each class! With quiz and homework in mind, the reading definitely helps achieve the execution of those tasks. Reading at this stage should include the organization of notes making necessary connections of knowledge “dots”, and develop skills to solve problems and to interpret pertinent issues.

Attendance

Attendance is required for this course, and students are expected to attend class regularly and to be punctual. Failure to meet either of these expectations may affect the final course grade. Each student enrolled in this course is allowed zero (0) unexcused absences. Excessive absences will jeopardize chances for further participation in the course. The arrival late by 15 minutes is considered as “half-attendance” or “half-absence” for the class. The accumulation of a total of three full absences will lead to the reduction of 6 points from the final grade. Being punctual is not only to give you the chance to earn credit from quizzes but also to avoid the disruption of the ongoing class activity. Because of safety concerns, one should expect to be denied entrance to and participation in the laboratory should one arrive late. No makeup lab is available.

How to Prepare and Participate in Lecture

It is highly recommended that you read the chapters before lecture. Because of the concentrated nature of the course, you are responsible for keeping up with the readings each day. During lectures we will have quizzes over the material, these quizzes assume you have read the chapters for that day.

Each week, problem sets will be given from those at the end of the chapters. These problem sets will be collected during the review sessions on Saturday. It is expected that you will attend the discussions on Friday.



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and the Review on Saturday. These sessions will provide opportunity for the students to review problem sets and ask questions about lecture topics. Of course, questions during lecture is always encouraged.

Class Policies

Cell Phones- during lecture your cell phones should be turned off. Laptop computers and tablets are permitted.

Academic Misconduct

Academic misconduct will not be tolerated. Each student should do their own work. To avoid plagiarism, always make sure that you correctly reference any material you use. Any images copied from the Internet should have the URL copied underneath the image. When using material from a source, we always paraphrase the material in our own words and then reference the source.

Referencing Sources

When preparing the lab reports, one will need to find some reference material and use those references correctly. Within the text of the report, references are listed at the end of a sentence or paragraph that includes material from that reference. The reference will appear as follows: (first author last name, year of publication). If the reference is a web site, then the listing is: (title of web site, year referenced). At the end of the lab report, you will list the references in alphabetical order of the first author 欽 樾 last name as follows in this example:

Blair T, and Miller, HA.(2013), Effect of Vitamin K on Cell Growth Inhibition and Apoptosis on the U937 Cell Line, Journal of Cancer Therapy, 3, 167-172.

If you reference a web site, try to determine the author. If no author name available, use the following:
Tree of Life web project at <http://tolweb.org/tree/>. Accessed on April 2, 2018.

Absences

Please try to attend lecture, if you have an issue that prevents attendance, please let me or the TA know. Attendance to the lab is mandatory.