

Fall 2024 KAIST General Chemistry Courses

■ CH101 General Chemistry I, Chemistry Around Us

Time (Tuesdays and Thursdays)	Class	Lecturer
09:00~10:30	A	Professor Kiyoung Park
13:00~14:30	B	Professor Soon Hyeok Hong

A new foundational required chemistry course that deals with chemical understanding of our society's environmental, energy, and food issues, as well as food, nutrition, and health.

Target Students:

1. Students curious about the relationship between chemistry and our society and life.
2. Freshmen at KAIST who do not plan to major in a chemistry-related field.
3. Students who have sufficiently acquired knowledge of general chemistry and do not wish to take a redundant general chemistry course.

■ CH101 General Chemistry I, Chemical Principles

Time (Tuesdays and Thursdays)	Class	Lecturer
09:00~10:30	C	Professor Hyunwoo Kim
13:00~14:30	D	Professor David G. Churchill

A traditional foundational required chemistry course covering the basic chemical principles necessary for understanding compounds and chemical reactions.

(Essential content that students studying natural sciences and engineering must know.)

Target Students:

1. Students who have not studied chemistry in depth during high school.
2. Freshmen at KAIST who will major in chemistry / materials / life sciences.
3. Students who wish to enhance their understanding of chemistry through high-level chemistry lectures.

■ CH101 General Chemistry II

Time (Tuesdays and Thursdays)	Class	Topics	Lecturer
13:00~14:30	A	MetalloChemistry in Biology	Professor Mi Hee Lim
13:00~14:30	B	Chemistry of Plastic Age	Professor Sang Youl Kim

This is an elective introductory course in chemistry that introduces how existing chemical concepts are applied to the latest research findings.

Target Students:

1. Students who intend to major in chemistry / materials / life sciences.
2. Students who want to study chemistry in more depth.
3. Students who wish to experience and understand the latest research findings in chemistry.

■ Notice for All General Chemistry Courses

1. **Grading: A-F**
2. There is a minimum score requirement for each subject based on a 100-point scale. If the minimum requirement is not met, an **F grade** will be given

2024 Fall Semester

Syllabus for General Chemistry I-Chemical Principles

1. Course: **General Chemistry I (CH101)** [lecture: Experiment: Credit = 3:0:3]

2. Lecture Timetable

Time (Tuesdays and Thursdays)	Class	Professor	Lecture Room(E11)
09:00~10:30	C	Hyunwoo Kim	303

3. Summary of Lecture

This General Chemistry I lecture covers essential topics such as atomic structure, chemical bonds, organic and inorganic molecules, and chemical equilibria. It includes discussions on quantum chemistry, thermodynamics, and basic organic reactions, explaining how these reactions can be understood through the principles of thermochemistry and quantum chemistry. This comprehensive overview provides a solid foundation for understanding the fundamental principles and applications of chemistry.

4. Material for Teaching:

- o Principles of Modern Chemistry, 8th ed, Oxtoby/Gillis/Campion (Brooks/Cole)
- o Lecture materials will be provided through the KLMS website of each class (<https://klms.kaist.ac.kr/>).

5. General Guidelines

All basic lecture notes can be downloaded at the General Chemistry Website:

<http://www.gencheminkaist.pe.kr> or a link be found at <http://chem.kaist.ac.kr>.

- 1) Practice Sessions led by TAs are scheduled from 8:00 to 8:50 pm on Mondays. These sessions are optional, providing an opportunity for students who seek additional discussion and problem-solving to participate.
- 2) The grading system will be determined based on the total scores achieved by students. The distribution of A grades (including A+, A_o, and A-) will be less than 50% of the total class.

To earn credit for the course, students must obtain **a minimum score of 45 points**. If a student's score falls below 45 points, they will receive an F grade.

Grading Criteria and Points Distribution

I. Mid-term Exam: 34 points II. Final Exam: 34 points

(Out of 8-10 questions: 1-3 will come from assignments, 1-2 from students' questions, and 1-2 from lecture notes)

III. Homework: 16 points

- Chapter summary: 8 points (1 point for each chapter, maximum of 3 pages, **Only handwritten assignments** will be accepted, each submission is awarded **either 0.5 or 1 point, depending on the content**)
- Chapter problem: 8 points (1 point for each chapter, each submission is awarded **either 0.5 or 1 point, based on the answers provided**)

IV. Attendance & Attitude: 16 points

- Maximum of 16 points (1 point for each attendance of lectures and practice sessions)
- This course does not penalize absences, so there is **no recognized attendance**.

V. Plagiarism of Homework:

- First instance: Warning with a deduction of 10 points, second instance: F grade

6. Waiver Examination

The waiver examination on General Chemistry I will be held at the beginning of the semester, but only for those, who did not take any previous General Chemistry I classes.

7. Lecture Schedule

Week (Tuesdays, Thursdays)	Chapters#	Topics	Due date for Homework (Chap. Summary & problem)	Practice session (Mon, 20:00 ~ 20:50)	Notes
1 st (9/3, 9/5)	3	Atomic Shells and Classical Models of Chemical Bonding			No Attendance Check
2 nd (9/10, 9/12)	3, 4	Introduction to Quantum Mechanics			
3 rd (9/17, 9/19)	4	Introduction to Quantum Mechanics	Chap3 (Fri, ~23:59)		9/17 No class
4 th (9/24, 9/26)	4, 5	Quantum Mechanics and Atomic Structure	Chap4 (Fri, ~23:59)	9/23 Chapter 3	
5 th (10/1, 10/3)	5	Quantum Mechanics and Atomic Structure		9/30 Chapter 4	
6 th (10/8, 10/10)	6	Quantum Mechanics and Molecular Structure	Chap5 (Fri, ~23:59)	10/7 Chapter 5	10/3 No class
7 th (10/15, 10/17)	6	Quantum Mechanics and Molecular Structure 10/11: Study day, no class	Chap6 (Fri, ~23:59)	10/14 Chapter 6	
8 th (10/23)	Mid-term Exam	Chapters 3, 4, 5, 6			(19:00 ~ 21:00)

9 th (10/29, 10/31)	7	Bonding in Organic Molecules			10/28: Midterm Claim
10 th (11/5, 11/7)	7, 8	Bonding in Organic Molecules	Chap7 (Fri, ~23:59)		
11 th (11/12, 11/14)	8	Bonding in Transition Metal Compounds and Coordination Complexes		11/11 Chapter 7	
12 th (11/19, 11/21)	14, 15	Chemical Equilibrium Acid-Base Equilibria	Chap8 (Fri, ~23:59)	11/18 Chapter 8	
13 th (11/26, 11/28)	15, Extra	Acid-Base Equilibria Introduction to Organic Reactions			
14 th (12/3, 12/5)	Extra	Introduction to Organic Reactions	Chap 14,15 (Fri, ~23:59)	12/2 Chapter 14,15	
15 th (12/10, 12/12)			Chap Extra (Fri, ~23:59)	12/9 Chapter Extra	No Class
16 th (12/18)	Final Exam	Chapters 7, 8, 14, 15, Extra			(19:00 ~ 21:00)

Each lecturer will decide specific chapter-lecture schedules.

* Submit via **Turnitin website** (<https://www.turnitin.com/>) by midnight on Saturday of the week. Points will not be awarded for late submissions.

8. Chapter Problems

Chapter	Topic	Problems
3	Atomic Shells and Classical Models of Chemical Bonding	87, 90, 93, 102, 106 Ionic bond, formal charges, octet rule, VSEPR theory, oxidation number
4	Introduction to Quantum Mechanics	48, 50, 55, 57, 60 Photoelectric effect (2), Quantization of energy, Heisenberg indeterminacy principle, Particle-in-a-box model
5	Quantum Mechanics and Atomic Structure	43, 48, 51, 54, 59 Energy and wavelength, Atomic orbitals, Electronic configuration, Ionization energy and photoelectric effect, Periodic table
6	Quantum Mechanics and Molecular Structure	65, 68, 70, 71, 73 MO of diatomic molecule (2), Molecular orbital theory and the meaning of coefficients (2), Application of MO theory to predict molecular structure
7	Bonding in Organic Molecules	40, 41, 42, 43, 44
8	Bonding in Transition Metal Compounds and Coordination Complexes	47, 49, 56, 64, 65
14, 15	Chemical Equilibrium Acid-Base Equilibria	83, 92, 78, 94, 97
Extra	Introduction to Organic Reactions	