

Syllabus: General Chemistry (II)**Academic Semester: 2024 Spring****Lectures: Monday 10:10-12:00 pm; Wednesday 9:00-9:50 am / week at 化 114**

Lecturer	王育恒 (Wang, Yu-Heng)
Email	wangyh2@mx.nthu.edu.tw (Put the course number CHEM102004 in the subject heading)
Office Location	Chemistry Building, R401
TA Office Hour	Make an appointment one day in advance to have an on-site instruction

A. Course Description

This course is a two-semester, accelerated, first-year college course in chemistry. The goals are: 1) to build your skills in problem-solving, mathematical, and analytical reasoning, and 2) to build your knowledge of the fundamental chemical principles of atomic and molecular structure, kinetics, and thermodynamics. In this class, we will apply these principles to condensation-hydrolysis reactions and acid-base reactions.

Lecture. Lectures organize the material, outline goals, and cover the basic principles of each topic. The lecture is not intended to describe or explain everything you will learn in the course; rather, it will indicate important topics to study and allow you to think about these topics and see if you understand them. You should take notes during the lecture that reflect your understanding. Students are expected to read the textbook and work on the problems as appropriate to augment the material presented in class.

Exams. There will be three 60-minute midterm exams and one 100-minute final exam scheduled as in this syllabus, and the exams will be comprised of multiple-choice questions (22 questions for the midterm exam and 44 questions for the final exam). The final exam is cumulative and comprehensive, and it will cover all the materials in the course. The location of each exam will be in 化 114. **No make-up exams will be given, and an unexcused absence from an exam will result in a grade of zero. Students who miss the final exam will have 25% deducted from their final grade.**

Exercise. Students are expected to read the textbook and work on the exercises as appropriate to augment the material presented in class. For example, sample exercises from each textbook chapter should be practiced, although they are not required to be turned in for grading. You should begin working on these exercises as soon as we have covered the relevant material in class so that you have the earliest indication of questions or difficulties to be addressed. You are encouraged to collaborate with your classmates on exercises and seek help with any topics you find difficult. Please start early and ask questions! An in-depth understanding of these exercises is by far the best predictor of success in this course.

B. Goals, Objectives, and Core Learning Outcomes

This course is designed to help you to learn chemistry. Your professor and graduate TA will do their best to guide you in mastering the material, but no course or instructor can learn for you. You will need to devote considerable outside-of-class time to studying chemistry. When encountering problems you cannot solve, refer to the textbook, your notes, a tutorial, or your fellow students. Forming a study group to work through problems is an excellent way to study chemistry. Throughout this course, emphasis will be placed on understanding chemistry and learning to think effectively in solving problems. Successful problem-solving requires a basic knowledge of

principles, facts, and terms: a vocabulary of chemistry. Some of this background and vocabulary should have been obtained from your high school chemistry course. From time to time, you may need to review the material you studied in high school to understand the new material presented in this course. This course is designed to help you learn as much chemistry as possible and perform at the highest possible level. The pace is fast; you should be prepared to work considerably harder than in high school.

Students are expected to sharpen their quantitative skills in a scientific context:

- CH3. Chemical Reactions and Reaction Stoichiometry (Zumdahl: Chapter 4)
- CH7. Periodic Properties of the Elements (Zumdahl: Chapter 18)
- CH15. Chemical Equilibrium (Zumdahl: Chapter 6)
- CH16. Acid-Base Equilibria (Zumdahl: Chapter 7)
- CH17. Additional Aspects of Aqueous Equilibria (Zumdahl: Chapter 8)
- CH20. Electrochemistry (Zumdahl: Chapter 11)
- CH22. Chemistry of the Nonmetals (Zumdahl: Chapter 18)
- CH23. Transition Metals and Coordination Chemistry (Zumdahl: Chapter 19)
- CH24. The Chemistry of Life Organic and Biological Chemistry (Zumdahl: Chapter 21)

C. Required Knowledge

Basic knowledge of chemistry at the high school level and English at the undergraduate level

D. Required Materials

Textbook: Brown, et al., *Chemistry: The Central Science in SI Units (14th edition)*, Pearson Education: New York, 2017, or S. S. Zumdahl, D. J. DeCoste, *Chemical Principles*, 8th edition, 2017.

Class Handouts: You should obtain an electronic copy of each handout before the lecture.

Calculator: An inexpensive calculator with logarithmic/exponential/scientific notation capabilities is required. The calculator can be used on the exams.

E. The Honor Pledge

To enhance the learning environment at National Tsing Hua University and develop student academic integrity, each student agrees to the following Honor Pledge: "I pledge, on my honor, to conduct myself with the foremost level of academic integrity." A student who lives by the Honor Pledge is a student who does more than not cheat, falsify, or plagiarize.

A student who lives by the Honor Pledge:

- Espouses academic integrity as an underlying and essential principle of the National Tsing Hua University community;
- Understand that each act of academic dishonesty devalues every degree that is awarded by this institution;
- He/She is a welcomed and valued member of National Tsing Hua University.

F. Academic Misconduct

Academic dishonesty is incompatible with the practice of science or any profession. If evidence of dishonesty is found, the policy of the National Tsing Hua University will be followed. This includes any form of plagiarism, copying, collusion, or cheating during an examination of any kind. All such cases are reported to the NTHU. Violations may result in failure on a particular assignment, failure in a course, suspension or expulsion from the University, or other penalties. Each student in this course is expected to work entirely on her/his own while taking the exams. Academic misconduct in lectures may result in a penalty consistent with university policy.

G. AI Permissive Policies

This course encourages students to explore the use of generative artificial intelligence (GAI) tools such as ChatGPT for all assignments and assessments. Any such use must be appropriately acknowledged and cited. It is each student's responsibility to assess the validity and applicability of any GAI output that is submitted; you bear the final responsibility. Violations of this policy will be considered academic misconduct.

H. Method of Evaluation

Your grade will be based on a **maximum of 110 points** divided as follows:

	<i>Examinations (#)</i>	<i>Percentage</i>	<i>Total Points</i>
Midterm Exam	× 3	22%	66
Final Exam	× 1	44%	44

Total Available Points = 110 Points

Letter grades will be assigned at the end of the semester based on the following scale:

<i>Total Points</i>	<i>Letter Grade (GPA)</i>
90–110	A+
85–89	A
80–84	A–
77–79	B+
73–76	B
70–72	B–
67–69	C+
63–66	C
55–62	C–
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50–54	D
< 50	E

*Final grades will be based on an absolute scale. You are competing against this scale, not against other students, and it is to your benefit to help each other. For example, if you earn a total of 90 points, you are guaranteed an A+, no matter how many other students earn that number of points.

*The final grade will be rounded to the nearest whole number.

Tentative Course Schedule

<i>Week</i>	<i>Date</i>	<i>Topic</i>	<i>Note</i>
1	2/19–2/23	CH3. Chemical Reactions and Reaction Stoichiometry	
2	2/26–3/1	CH7. Periodic Properties of the Elements	No Lecture on 2/28 (Peace Memorial Day)
3	3/4–3/8	CH22. Chemistry of the Nonmetals	
4	3/11–3/15	Midterm Exam I 3/13 (Wed), 08:30-09:30	
5	3/18–3/22	CH15. Chemical Equilibrium	
6	3/25–3/29	CH16. Acid-Base Equilibria	
7	4/1–4/5		No Lecture on 4/3 (Intercollegiate Activities)
8	4/8–4/12	Midterm Exam II 4/10 (Wed), 08:30-09:30	
9	4/15–4/19	CH17. Additional Aspects of Aqueous Equilibria	
10	4/22–4/26	CH20. Electrochemistry	
11	4/29–5/3		
12	5/6–5/10	Midterm Exam III 5/6 (Mon), 10:10-11:10	
13	5/13–5/17	CH23. Transition Metals and Coordination Chemistry	
14	5/20–5/24	CH24. The Chemistry of Life Organic and Biological Chemistry	
15	5/27–5/31		
16	6/3–6/7	Final Exam 6/3 (Mon), 10:10-11:50	
17	6/10–6/14	No Lecture	
18	6/17–6/21		