

國立中正大學課程大綱

National Chung Cheng University Course Syllabus

2025.09.15 修訂

學年/學期 (Academic Year / Semester)	114-1		
課程名稱 (Course name)	General Chemistry (I)		
課碼 (Course code)	2601101_03	學分數 Credit(s)	3
授課教師 (Instructor)	Prof. Joyce Shuchun Yu (于淑君) Tel: 05-272-0411 ext. 66407, email: chejyy@ccu.edu.tw		
課程助教 (Teaching Assistant)	林泊鐸 (ext. 61405, email: a0953007246@gmail.com) 蔡聿貞 (ext. 61405, email: g12260025@alum.ccu.edu.tw)		
授課方式(teaching methods)	☒ Lecture ☒ Student Presentation ☐ Seminar ☐ Lab ☐ other		
先修科目 (Prerequisite)	Students who plan to register for General Chemistry(II) must have taken General Chemistry(I). You should also be familiar with the following topics and skills at an 11th or 12th grade level: • Kinetic energy, potential energy, forces ($F = ma$), velocity, a conceptual idea of momentum • Vectors and how to graph them • Factoring simple polynomials • Use of the quadratic equation • Multi-step problem solving		
課程介紹與教學目標 (Course Description and Objectives)	Course Description—(3 credits): This course continues the study of the fundamental principles and laws of chemistry. Topics include Atoms, Molecules, Ions, Stoichiometry, Chemical Reactions, Solution Stoichiometry, Gases, Chemical Equilibrium, Acids and Bases, as well as Applications of Aqueous Equilibria. Upon completion, students should be able to demonstrate an understanding of chemical concepts as needed to pursue further study in chemistry and related professional fields. Objectives: Students who successfully complete this course should be able to: • Define chemical kinetics and chemical equilibrium • Define spontaneity and identify such processes • Explain the three laws of thermodynamics • Determine potentials and worked performed by galvanic cells • Describe electrolysis and corrosion via electrochemical terms • Explain radioactive decay and transmutation, and differentiate fission and fusion • Explain transition metals, coordination compounds, isomerism, and explain color changes in chemical terms • Identify metallic elements qualitatively • Improve computer skills learned in General Chemistry(I)		

教科書及學習工具 (Textbooks and Tools)	Required Textbook: Steven S. Zumdahl and Donald J. DeCoste <i>Chemical Principles</i>, 8/e Asia Edition, CENGAGE Learning, 2017. Call Number: ISBN-13: 9789814834216; ISBN-10: 9814834211 GenAI Tools: ChatGPT; Google Gemini; NaturalReader; Grok ** To ensure respect for intellectual property rights and textbook copyrights, please use only legitimate copies of the required textbooks. (請尊重智慧財產權。為維護教材版權，請務必使用正版教科書。)
學習評量與成績配分 (Assessment and Grade Scale)	• Midterm Exam.....25% (Week-09, 114/11/05)* • Final Exam.....25% (Week-18, 115/01/05)* • Quizzes.....15% • Problem Sets & Homework.....20% • Group Oral Presentations.....15% (Week-17, 114/12/29)* * These dates may be rescheduled depending on students' learning progress.
課程要求 (Course Requirements)	Attendance is required
課程進度 (Course Schedule)	
Week	Contents (<i>to be adjusted based on students' learning outcomes</i>)
Week 01 (09/08, 09/10)	• Course Description ✧ Grouping Students ✧ Introduction to generative AI tools ✧ Chemistry English Proficiency pre-test • Atoms, Molecules, and Ions ✧ The Early History of Chemistry ✧ Fundamental Chemical Laws
Week 02 (09/15, 09/17)	• Atoms, Molecules, and Ions ✧ Dalton's Atomic Theory ✧ Molecules and Ions ✧ the Periodic Table ✧ Naming Simple Compounds
Week 03 (09/22, 09/24)	• Stoichiometry ✧ Atomic Masses and Molar Mass ✧ Percent Composition of Compounds ✧ Determining the Formula of a Compound ✧ Balancing Chemical Equations
Week 04 (09/29_holiday) (10/01)	• Stoichiometry ✧ Stoichiometric Calculations ✧ Calculations Involving a Limiting Reactant ✧ Solving a Complex Problem • Types of Chemical Reactions and Solution Stoichiometry

Week 05 (10/06_holiday) (10/08)	• Types of Chemical Reactions and Solution Stoichiometry ✧ The Nature of Aqueous Solutions: Strong and Weak Electrolytes ✧ Types of Chemical Reactions ✧ Precipitation Reactions ✧ Describing Reactions in Solution
Week 06 (10/13, 10/15)	• Types of Chemical Reactions and Solution Stoichiometry ✧ Selective Precipitation ✧ Stoichiometry of Precipitation Reactions ✧ Acid–Base Reactions ✧ Oxidation–Reduction Reactions
Week 07 (10/20, 10/22)	• Gases ✧ The Gas Laws of Boyle, Charles, and Avogadro ✧ The Ideal Gas Law ✧ Gas Stoichiometry ✧ Dalton’s Law of Partial Pressures
Week 08 (10/27, 10/29)	• Gases ✧ The Kinetic Molecular Theory of Gases ✧ Effusion and Diffusion ✧ Collisions of Gas Particles with the Container Walls ✧ Intermolecular Collisions Real Gases
Week 09 (11/03, 11/05)	• Gases ✧ Chemistry in the Atmosphere • Midterm Exam (114/11/05) <i>tentative</i>
Week 10 (11/10, 11/12)	• Chemical Equilibrium ✧ The Equilibrium Condition and Constant ✧ Equilibrium Expressions Involving Pressures ✧ Heterogeneous Equilibria ✧ Applications of the Equilibrium Constant
Week 11 (11/17, 11/19)	• Chemical Equilibrium ✧ Applications of the Equilibrium Constant ✧ Le Chatelier’s Principle ✧ Equilibria Involving Real Gases
Week 12 (11/24, 11/26)	• Acids and Bases ✧ The Nature of Acids and Bases ✧ Calculating the pH of Acid Solutions ✧ Bases ✧ Polyprotic Acids
Week 13 (12/01, 12/03)	• Acids and Bases ✧ Acid–Base Properties of Salts ✧ Acid Solutions in Which Water Contributes to the H^+ Concentration ✧ Strategy for Solving Acid–Base Problems: A Summary
Week 14 (12/08, 12/10)	• Applications of Aqueous Equilibria ✧ Solutions of Acids or Bases Containing a Common Ion ✧ Buffered Solutions ✧ Titrations and pH Curves ✧ Acid–Base Indicators

Week 15 (12/15, 12/17)	• Applications of Aqueous Equilibria ✧ Titration of Polyprotic Acids Containing a Common Ion ✧ Solubility Equilibria and the Solubility Product ✧ Precipitation and Qualitative Analysis
Week 16 (12/22, 12/24)	• English listening, speaking, reading and writing post-test • Submit the self-assessment form and group mutual assessment form • Curriculum and teaching evaluation questionnaire survey
Week 17 (12/29, 12/31) <i>tentative</i>	• <i>Oral Presentation</i>
Week 18 (115/01/05) <i>tentative</i>	• <i>Final Exam</i>