

Fall 2018, CH103 General Chemistry II

with Education 4.0

➤ **Syllabus URL** <http://www.gencheminkaist.pe.kr>

➤ **Summary of Lecture**

Introduction of fundamental concepts on chemical and physical equilibria, electrochemistry, chemical kinetics, spectroscopy, and polymer and biological compounds. Professors who are experts in various fields (electrochemistry, spectroscopy, organic, inorganic, and biochemistry) will serve basic principles and current trends for corresponding chapters by means of class rotations. This class is designed as an Active Learning Class (Track 2) in Education 4.0 Program.

➤ **Material for Teaching**

Principles of Modern Chemistry, 7th ed, Oxtoby/Gillis/Campion (Brooks/Cole)
(Auxiliary) Advanced Chemistry with Vernier

➤ **Teaching Plan**

1st – 7th week: demonstration of the representative experiments and discussions
9th – 15th week: rotation class by experts in four different fields of chemistry

➤ **Evaluation Criteria**

**95-100pts: A+, 90-95pts: A0, 85-90pts: A-, 80-85pts: B+, 75-80pts: B0, 70-75pts: B-,
65-70pts: C+, 60-65pts: C0, 55-60pts: C-, 50-55pts: D+, 45-50pts: D0, 40-45pts: D-,
0-40pts: F**

1) Mid-term Exam: 40pts

2) Final Exam: 40pts

3) Problem Sheets and Reports: 15pts

4) Attendance & Attitude: 5pts (1-pt deduction for each missing class and unacceptable attitude; can be negative)

➤ **Lecture Schedule**

Week	Chapter	Period	Lecture coverage	Demo experiment and Report
1 st	15.1-15.7	8/28 8/30	Acids and Bases	Acid-Base Titration
2 nd	15.8-16.1	9/4 9/6	Acid-Base Equilibrium	
3 rd	16.2-17.1	9/11 9/13	Solubility and Electrochemical Cells	Determining the K_{sp}
4 th	17.2-17.5	9/18 9/20	Nernst Equation	Electrochemistry: Voltaic Cells
5 th	17.6-17.9	9/27	Batteries	
6 th	18.1-18.5	10/2 10/4	Reaction Mechanism	Rate Determination and Activation Energy
7 th	18.6-18.8	10/11	Molecular Theories and Catalysis	
8 th (10/17)	Mid-term		(Chapters 15-18)	
9 th	20.1-20.3	10/23 10/25	Bonding in Organic Molecules	Midterm Claim (10/22)
10 th	20.5 7.1-7.7	10/30 11/1	Polymeric Materials NMR	
11 th	23.1-23.3	11/6 11/8	Natural Polymers and Biochemistry	
12 th	8.1-8.4	11/13 11/15	Molecular and Electronic Spectroscopy	Reports on Polymer and Biochemistry
13 th	8.5-8.6 20.4	11/20 11/22	Computational Chemistry Coordination Chemistry	
14 th	23.4	11/27 11/29	Crystal Field Theory and Inorganic Chemistry	
15 th		12/4 12/6	Review	Reports on Computational and Inorganic Chemistry
16 th (12/12)	Final		(Chapters 7,8,20,23)	Final Claim

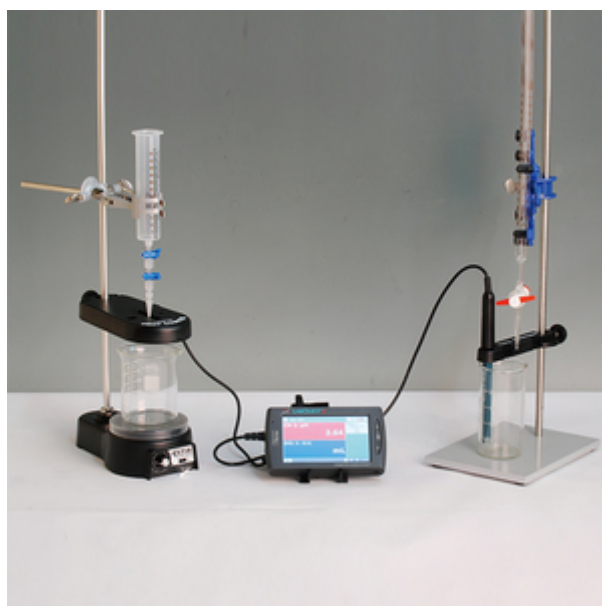
*grey rows: Rotation of the lectures

➤ **Demo Experiments during 1st – 7th weeks**

1) 8/30, Acid-Base Titration

Material: Chapter 7 in Advanced Chemistry with Vernier

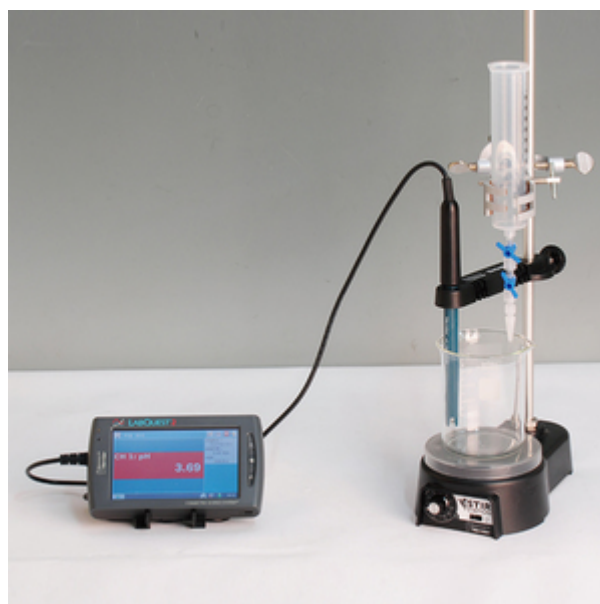
Objectives: Determine the equivalence point of a weak acid-strong base titration



2) 9/13, Determining the K_{sp} of Calcium Hydroxide

Material: Chapter 23 in Advanced Chemistry with Vernier

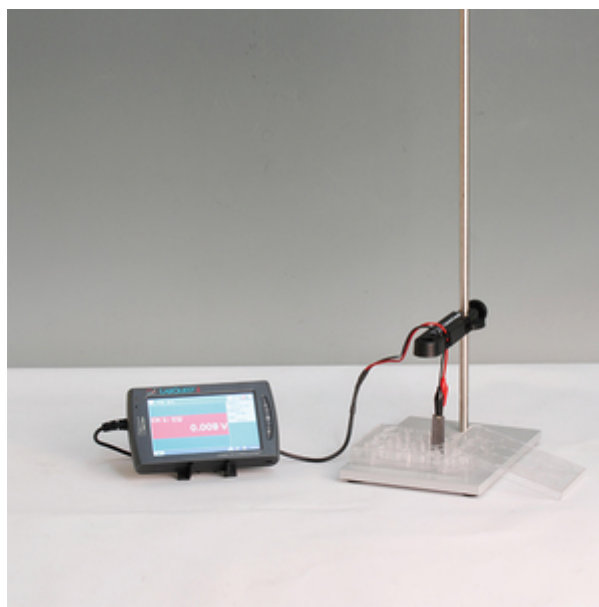
Objectives: Titrate a saturated $\text{Ca}(\text{OH})_2$ solution with a standard HCl solution.



3) 9/20, Electrochemistry: Voltaic Cells

Material: Chapter 20 in Advanced Chemistry with Vernier

Objectives: Prepare a Cu-Pb voltaic cell and measure its potential.



4) 10/4, Rate Determination and Activation Energy

Material: Chapter 35 in Advanced Chemistry with Vernier

Objectives: Measure and record the effect of temperature on the reaction rate and rate constant, and calculate the activation energy, E_a , for the reaction.



➤ **Rotation classes during 9th – 15th weeks**

- **Physical Chemistry:** Molecular and Electronic Spectroscopy (2 Classes)
Introduction to Computational Chemistry (1 Class)
- **Organic and Polymer Chemistry:** Bonding in Organic Molecules (1 Class)
Polymeric Materials and Chemistry (2 Classes)
- **Inorganic Chemistry:** Coordination Chemistry and Crystal Field Theory (2 Classes)
Current Trends in Inorganic Chemistry (1 Classes)
- **Biochemistry:** Nuclear Magnetic Resonance Spectroscopy for Biomolecules (2 Classes)
Introduction to Biochemistry (1 Class)