



## CHEM 021: General Chemistry II

Term: 2020 Winter Session

Instructor: Staff

Language of Instruction: English

Classroom: TBA

Office Hours: TBA

Class Sessions Per Week: 5

Total Weeks: 3

Total Class Sessions: 15

Class Session Length (minutes): 240

Credit Hours: 4

### Course Description:

CHEM 021 is the continuous study of general chemistry course based on CHEM 011. This course is designed to help students get a comprehensive understanding on the principles and applications in the field of general chemistry. Through the semester, students will explore the following topics: Chemical Kinetics, Acid and Base, chemical thermodynamics, equilibrium, electrochemistry and basic nuclear chemistry. Students will learn about the scope, methodology, and application of chemistry. This course aims to help students apply the analytical and quantitative skills learned to explain the physical world and for their future studies in advanced chemistry.

*Prerequisites: CHEM 011*

### Course Materials:

#### 1. Textbook

*Chemistry: The Molecular Nature of Matter and Change*, 8th Ed., by Martin S. Silberberg

#### 2. Lecture notes

### Course Format and Requirements:



Material involves taking time to think things through, develop the knowledge (or process) and practice this. It is also very helpful to test yourself on your knowledge development. Using the quiz or exam as a means to test if you have learned something could be too late to determine you still have a gap in knowledge. Remember, lecture is very important in seeing process and models and hearing concepts and their derivation and application BUT is not the beginning and end of learning. It would be unusual to learn something simply from sitting in lecture.

### Grading Scale:

**A+: 98%-100%**

**A: 93%-97%**

**A-: 90%-92%**

**B+: 88%-89%**

**B: 83%-87%**

**B-: 80%-82%**

**C+: 78%-79%**

**C: 73%-77%**

**C-: 70%-72%**

**D+: 68%-69%**

**D: 63%-67%**

**D-: 60%-62%**

**F: Below 60%**

### Course Assignments:

#### **Homework Assignment**

#### **6 Quizzes**

#### **Exams**

Two midterms and one final exam will be given in this class. The exams will be most similar to the questions in the textbook, and the recitation quiz questions. Sample exams will be distributed prior to each midterm. A sheet of standard formulas and physical constants will be provided with each exam. All other notes, books, programs or other prepared materials may not be used during the test. Calculators may not be shared.

Course Assessment:

Homework Assignment	10%
6 Quizzes	15%
Midterm Exam 1	20%
Midterm Exam 2	20%
Final Exam	35%
<b>Total</b>	<b>100%</b>

Course Schedule:

Week	Topics	Activities
1.	Go through syllabus Review on CHEM 011 <b>Chemical Kinetics:</b> Introduction to Rate Rate Law: Concentration on the Reaction Rate The integrated Rate Law Temperature, Reaction Rate and Reaction Mechanism Catalysis <b>Chemical Equilibrium:</b> Constants in a chemical equilibrium Expressing and Calculating Equilibrium Constants Predicting the Direction of Change Finding Equilibrium Concentrations Le Chatelier's Principle-The Equilibrium Law	Homework Assignment Quiz 1 Quiz 2 Midterm 1



2.	<p><b>Acid and Bases:</b></p> <p>The Nature and Definition of Acids and Bases</p> <p>Strength of acid related to structure</p> <p>The pH value, Strong Acids, Weak Acids;</p> <p>Base solutions</p> <p>The Acid- Based Properties of Ions and Salts</p> <p>Polyprotic Acid</p> <p>Lewis Acids and Bases</p> <p><b>Aqueous Ionic Equilibrium:</b></p> <p>Introduction to Buffers</p> <p>Buffer Effectiveness</p> <p>Titrations and PH Curve</p> <p>K<sub>sp</sub> and solubility;</p> <p>Selective Precipitation and Complex Ion Equilibrium</p> <p><b>Free Energy and Thermodynamics:</b></p> <p>1st Law of Thermodynamics</p> <p>Entropy and the Second Law of Thermodynamics</p> <p>Conservation of Energy, Internal Energy, Enthalpy</p>	<p>Homework Assignment</p> <p>Quiz 3 and Quiz 4</p> <p>Midterm 2</p>
3.	<p><b>Free Energy and Thermodynamics:</b></p> <p>3rd Law of Thermodynamic</p> <p>Free energy</p> <p><b>Electrochemistry:</b></p> <p>Galvanic/Voltaic Cells</p>	<p>Homework Assignment</p> <p>Quiz 5 &amp; Quiz 6</p> <p>Final exam</p>



	Balancing Reactions in Galvanic Cells Standard Electrode Potentials; Cell Potential, Free Energy and the Equilibrium Constants Cell Potential and Concentration Batteries and Electrolysis Corrosion <b>Radioactivity and Nuclear Chemistry:</b> Nuclear transmutation; Biological effects of radiation Course Summary and Review for Final	
--	--	--

### Academic Integrity:

Students are encouraged to study together, and to discuss lecture topics with one another, but all other work should be completed independently.

Students are expected to adhere to the standards of academic honesty and integrity that are described in the Shanghai Normal University's *Academic Conduct Code*. Any work suspected of violating the standards of the *Academic Conduct Code* will be reported to the Dean's Office. Penalties for violating the *Academic Conduct Code* may include dismissal from the program. All students have an individual responsibility to know and understand the provisions of the *Academic Conduct Code*.

### Special Needs or Assistance:

Please contact the Administrative Office immediately if you have a learning disability, a medical issue, or any other type of problem that prevents professors from seeing you have learned the



course material. Our goal is to help you learn, not to penalize you for issues which mask your learning.