University of International Business and Economics

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International Summer School

CHE 100 Introduction to Chemistry

Term: May 25– June 25, 2020
Instructor: Guirong Wang
Home Institution: Beijing University of Chemical Technology
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Class Hours: Monday through Thursday, 120 minutes each day
Office Hours: TBD
Discussion Session: 2 hours each week

Total Contact Hours: 64 contact hours (45 minutes each)
Credit: 4 units

If you wish to speak to me outside the allotted office hours, please come by or make an appointment.

Course Description:

This course is designed to introduce students to the fundamental principles of chemistry. We will begin with the atomic and molecular nature of matter and its changes, unit conversions, the periodic table and nomenclature. We will discuss the mole concept, stoichiometry, oxidation-reduction and precipitation reactions, and solution chemistry. We will finish the semester discussing quantum chemistry and examine the atomic theory, modes of bonding, periodicity, Lewis structures, VSEPR theory, intermolecular forces and the gas laws.

Course Goals:

i) To develop an understanding of the atomic and molecular nature of matter and of the chemical reactions that describe their transformations.
ii) To develop quantitative and critical thinking skills necessary to solve chemical problems using the concepts of balanced chemical reactions, stoichiometry, and solution chemistry.
iii) To gain an understanding of the periodic table as an organizing concept of chemical properties.
iv) To use the principles of the VSEPR to gain an understanding for the relationship between molecular structures, geometry and use these to discuss bond polarity, solubility, types of intermolecular forces.

Course Material:

- *Chemistry: A Molecular Approach, 4th ed.* by Nivaldo J. Tro, ISBN: 97 8-0134112831
- Non-programmable Scientific Calculator

Electronic Devices:

All electronic communication devices must be turned off during class time. You will not be allowed to use electronic devices during exams or quizzes (no cell phones calculators).

Homework Assignments:

Mandatory graded Assignments will be assigned associated with your textbook at. These assignments will help you to assess your understanding of the material and identify areas of difficulty and allow you to work at your own pace to achieve mastery the material.
Either assignment or quiz, have specified due dates and will be graded. It is your responsibility to complete the assignments by the set deadlines. Assignments count for 10% of each student's final numerical grade.

Attendance Policy for Classes, Quizzes & Exams:

It is highly recommended that you make every effort to attend all classes, as the quizzes and the three one-hour exams are based solely on the lecture. No additional "credit" is given in this course.
Make-up quizzes or exams will only be permitted due ***to illness or family emergency***. If you are unable to attend class on a quiz or exam day because of illness or emergency, you are expected to contact me ***before class*** by phone, WeChat or e-mail. Failure to notify me in one of these ways will result in you not receiving consideration for a make-up quiz or examination. A Doctor's note is required in case of an illness.

Academic Honesty:

The relationship between students and faculty is based upon trust and the continued maintenance of this trust is necessary for education to be successful. Students need to trust faculty to make appropriate judgments about the content and structure of the course. Faculty members need to trust that the work turned in by students represents their own effort. Violation of this trust undermines the educational process. As a result, there is no tolerance for breach of academic integrity such as cheating, plagiarizing, or inappropriate sharing of laboratories or quizzes.

Anyone caught cheating or plagiarizing will receive an F in the course.

Cheating can include sharing answers, as well as stealing answers. Plagiarism means copying words from someone's work, even if you "change the sentence a bit." If you share your laboratory report you are as guilty as the person copying it. If you do use material from an appropriate source, make sure you reference it properly in your reports. If you have any questions about the proper way to reference sources, please ask.

Final Exam:

The final exam will be comprehensive and accounts for 20% of your final grade.

Final Exam: Friday, June 25th

Grade Calculations:

Regular class attendance and completion of chapter readings are necessary to succeed in this course. Your final course grade will be calculated as follows:

Lecture Attendance and Participation	10%
Assignments	20%
Quizzes (5)	20%
Midterm exam	25%
Cumulative Final Exam	25%

Grading Scale:

Assignments and examinations will be graded according to the following grade scale:

A	90-100	**C+**	72-74
A-	85-89	**C**	68-71
B+	82-84	**C-**	64-67
B	78-81	**D**	60-63
B-	75-77	**F**	below 60

Tentative Schedule

Week 1	**Topics**	**Textbook readings**
Mon	**Overview** • Scientific Method • Classification of Matter	1-5
Tue	**Overview** • Physical and Chemical Changes and Properties • Units of Measurements	9-13
Wed	**Atoms and Elements** • Basic Principles of Atomic Theory and Structure. • Subatomic Particles	53-55
Thurs	**Atoms and Elements** • Atomic Mass • The Mole Concept	65-69

Week 2		
Mon	**Molecules, Compounds, and Chemical Equations** • Chemical Bonds • Ionic Compounds	87-90
Tue	**Molecules, Compounds, and Chemical Equations** • Molecular Compounds – Nomenclature • Formula Mass, Mole Concept of Compounds	101,107
Wed	**Molecules, Compounds, and Chemical Equations** Writing and Balancing Equations	107,119
Thurs	**Molecules, Compounds, and Chemical Equations** Mole Concept and stoichiometry calculations	141
Week 3		
Mon	**Chemical Quantities and Aqueous Reactions** Properties of Solutions	
Tue	**Chemical Quantities and Aqueous Reactions** Solubility of Ionic Compounds and Precipitation Reactions	158-162
Wed	**Chemical Quantities and Aqueous Reactions** • Acid-Base and Gas-Evolution Reactions • Oxidation-Reduction Reactions • Combustion Reactions	167-175
Thurs	**Gases** • Ideal Gas Law • Kinetic Molecular Theory	208, 224
Week 4		
Mon	Quantum Theory	297-308
Tue	**Periodic Properties of the Elements** Electron Configuration – Pauli Exclusion Principle, Aufbau Principle, Hund's Rule	339-347
Wed	**Periodic Properties of the Elements** Periodic Trends – Size of Atoms, Ionic Radii, Ionization Energy, Electron Affinity	352-356
Thurs	**Chemical Bonding I** Ionic, Covalent and Metallic Bonds	384-394

Week 5		
Mon	**Chemical Bonding I** Electronegativity and Bond Polarity	396-399
Tue	**Chemical Bonding II** • VSEPR Theory – Molecular Geometry • Valence Bond Theory – Hybridization	428-437
Wed	**Intermolecular Forces** • Dispersion, Dipole-Dipole, Ion-Dipole Forces, and Hydrogen Bonding • States of Matter and Physical Properties	486-489
Thurs	FINAL EXAM	