

Beijing Jiaotong University

2020 Summer Session

CHEM 101 Introduction to Chemistry with Lab

Course Outline

Term: June 29 - July 24, 2020

Class Hours: 14:00-15:50 (Monday through Friday)

Course Code: CHEM 101

Instructor: Dr. Aleksandar Jeremic

Home Institution: The George Washington University

Office Hours: Tuesdays (13:00-14:00) or By Appointment

Email: jerema@gwu.edu

Credit: 4

Class Hours: This course will have 60 class hours, including 32 lecture hours, 8 lecturer office hours, 8-hour TA discussion sessions, 4-hour review sessions, 8 laboratory hours.

Course Description

Introduction to Chemistry will provide students with an overview of the current trends and body of knowledge in Chemistry, including basics of the scientific method and of the analysis of scientific data.

Course Objectives

The main course goal is to allow students to reach a comprehensive understanding of the issues and methods in Chemistry, in order to decide whether to pursue studies in the field. In the process of reaching this goal, our objectives are that each student will:

- Become familiar with current scientific theories and research in the major topic areas of Chemistry.



- Discover the personal relevance of course material in their everyday and professional lives, in order to make fully informed decisions.
- Develop the skills necessary to evaluate and think critically about information concerning chemical and biological phenomena obtained from research, the general public, and the media.
- Be well prepared for advanced courses in Chemistry/Life Sciences.

Required Textbooks

-*Beginning Chemistry*, David Ball, (version 1.0)

Download for free at <https://2012books.lardbucket.org/pdfs/beginning-chemistry.pdf>

Publisher: LardBucket (*Creative Commons* licensed)

Publish Date: December 28, 2012

Several readings will be required throughout the course, either to prepare for class or to complete an assignment. Additional material will be posted online to provide a free and easy access to everyone.

Grading & Evaluation

Lab (20%) – Midterm exam (40%) – Final exam (40%)

90-100% (A), 80-89% (B), 70-79% (C), 60-69% (D), $\leq 60\%$ (F)

Intermediary assignments will be posted throughout the course, to help students assess their needs and to ensure that all the important topics are well understood. Assignments and labs are also an opportunity for students to ask questions concerning unclear notions, as the main objective is not to grade but to help everyone reach an optimal level of comprehension.

Midterm and final exams will target all topics previously covered in class. Lecture notes, labs and assignments are important to succeed in the midterm and final exams, yet some questions will be specifically intended to stimulate students' critical thinking. Attendance is extremely important for success in this class. It is expected that each student will commit fully to the assignments and readings required. Exams will cover the required texts as well as material presented or discussed in class.

Course Schedule

Week 1:

Lecture 1: Atomic Theory

Lecture 2: Molecules and Chemical Nomenclature

Lecture 3: Electronic Configurations and Periodic Table

Lecture 4: Masses of Atoms and Molecules

LAB 1: Calculations and periodic table



Week 2:

Lecture 5: Ions and Ionic Compounds

Lecture 6: Types of Chemical Reactions and Equations

Lecture 7: Stoichiometry and the Mole in Chemical Reactions

Lecture 8: Practice Problems / Review Session I

LAB 2: Experimental design and hypothesis testing

Week 3:

Lecture 9: **MIDTERM EXAM**

Lecture 10: Enthalpy and Chemical Reactions

Lecture 11: The Chemical Equilibrium and the Law of Mass Action

Lecture 12: Chemical Bonds: Ionic and Covalent Bonds

LAB 3: Data collection and analysis

Week 4:

Lecture 13: Properties of Solids / Liquids and Intermolecular Forces

Lecture 14: Solutions: Dilutions, Concentrations and pH

Lecture 15: Practice Problems / Review Session II

Lecture 16: **FINAL EXAM**

LAB 4: Writing laboratory report