



Beijing Jiaotong University

2020 Summer Session

CHEM 101 Introduction to Chemistry with Lab

Course Outline

Term: July 13-August 7, 2020

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

Course Code: CHEM 101

Instructor: Ravichandra Bachu, Ph.D.

Home Institution: Carnegie Mellon University

Office Hours: By Appointment

Email: rbachu.cmuq@gmail.com

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:

This course begins with a very brief survey of some fundamental principles of chemistry. These will form the basis for introducing the relationships between the structure of molecules and their chemical properties and behavior. Major topics will include stoichiometry, solution chemistry, atomic structure, chemical bonding, thermochemistry, gases, and intermolecular interactions. Structures of inorganic compounds, including transition metal complexes, will be included. Relevant examples will be drawn from such areas as environmental, materials, and biological chemistry.

Required Textbooks:

All course readings and lecture slides are available on the course website (TBD) or will be handed out



before lectures. For additional reading we will also use an online textbook found at OpenStax Chemistry (open source e-book): <https://openstax.org/details/books/chemistry>

Grading & Evaluation:

Lab 15%

Homework 15%

Midterm exams 30%

Final exam 40%

Homework will be given every week and is due on the first day of the following week.

Grade	Score
A	94 - 100
A-	90 - 93
B	83 - 89
B-	80 - 82
C	73 - 79
C-	70 - 72
D	63 - 69
D-	60 - 62
F	Fail

Course Schedule:

	Lecture	Topic
1	1	Dimensional analysis and significant figures
	2	Introduction to Atomic structure, Periodic table
	3	Naming simple compounds, Stoichiometry
	4	Empirical & molecular formulas, Solutions
		Lab-1 Scientific methods and calculations
2	5	Solution stoichiometry, Titrations, redox reactions
	6	EM radiation, spectroscopy, Quantum mechanics
	7	Electronic configuration, periodic trends
	8	Ionic and covalent bonds
		Lab-2 Titrations
3	9	Midterm exam 1
	10	Lewis dot structures, Resonance
	11	VSEPR theory, VB theory and hybridization
	12	Intermolecular forces
		Lab-3 Spectroscopy
4	13	MO theory
	14	Energy, enthalpy, work
	15	Thermochemistry
	16	Final exam
		Lab-4 Thermochemistry