



INORGANIC CHEMISTRY II

CHEM 202

Course Description

The course emphasizes the applications of chemistry in the field of medicine. Chemical reactions, equilibrium, acids and bases, conjugate acids and bases, thermodynamics, colligative properties of solutions, gas laws electrochemistry and topics related to biochemistry are included. This course enables the students to improve their problem solving skills, and mathematical skills. The course structure is designed to enhance the connections between theory and practice by engaging students in systematic, integrated discussion and lectures.

Credit: 3 credits

Repeatable: No

Course Structure

The course will be presented in different formats: Lectures with PowerPoint, self-directed learning, discussions and student assignments etc.

Competencies

This course emphasizes competencies to enhance skills essential for a future health care professional.

- Knowledge
 - **Demonstrate content knowledge and skills in foundational courses required by biomedical professionals**
 - **Demonstrate information literacy**
 - Demonstrate quantitative reasoning
 - **Demonstrate longitudinal learning through coursework**
- Critical Thinking
 - Develop the skills of self-reflection and peer assessment to improve personal performance.
 - **Demonstrate the ability to analyze literature and written material**
 - **Demonstrate the ability to distinguish between well-reasoned and poorly reasoned arguments**
- Communication Skills
 - **Demonstrate effective presentation skills to faculty and peers.**
 - **Demonstrate effective listening skills**
 - **Demonstrate effective written communication**

Objectives:

Upon completion of CHEM 202 course, the student should be able to describe:

- Basic concepts of molecular forces, their classification (Intra and Inter-molecular forces), practical identification of molecular forces and their application in understanding the physical and chemical properties of compounds.
- Concept of acids, bases, conjugates acids and conjugate bases. Identification of acids and bases, conjugate acid, conjugate base, conjugate acid- conjugate base pairing, acid and base strength and their importance.
- Types of chemical reactions. Classification and identification
- Basic concept of Chemical equilibrium and the factors affecting it. Application of the various factors affecting chemical equilibrium to a reaction in equilibrium
- Classification of chemical equilibrium, determination of the K factor and its application and interpretation to a chemical reaction.
- Concept of colligative properties of a solution and the various factors affecting such. Application of each factor to a biological process.
- Basic concept of solution (hypotonic, hypertonic and isotonic solution) and application.
- Concept of Redox reactions. Balancing of redox reaction
- Determination of oxidation number. Understanding and application of the rules regarding the determination of oxidation number.
- Identification of Oxidizing and reducing agent and their biological applications
- Concept of chemical kinetic and factors affecting and their biological application.
- Air composition. Concept of air, composition of air and its impact on human health
- Gas laws and their applications

Schedule: Dates and times to be posted at the beginning of the term on the online calendar.

Course Topics/Outline

Activity #	Lecture Topics
Week1	Concept of molecular forces. Classification of molecular forces. Identification and application of the various types of molecular forces. Practical worksheet on molecular forces
Week 2	Colligatives properties of a solution. Factors affecting colligatives properties of a solution. Biological application. Open discussion on the applications of colligatives properties of solution.
Week 3	Acids and Bases. Bronsted-lowry, Lewis and Arrhenius. Conjugate acids and bases. Conjugate acid and base pairing. Discussion on acid and base strength and their importance in medicine; QUIZ 1
Week 4	Types of chemical reactions. Identification and application (Combustion reaction, Displacement reactions: Double and single, Decomposition and Combination reaction). Practical application.
Week 5	Determination of oxidation state (number). Rules for writing oxidation number. Identification of oxidizing and reducing agents and their application. Practical worksheet on oxidation number; Quiz 2
Week 6	Review of Materials from Week 1 to 5

Week 7	Mid-Term Examination
Week 8	Chemical equilibrium. Types and factors affecting chemical equilibrium. Biological application
Week 9	Chemical Kinetic. Concept, factors affecting chemical kinetics, Quiz 3
Week 10	Gas Laws and their application.
Week 11	Air composition: Concept, air composition and their impact on human health. Discussion on air quality and human health.
Week 12	Balancing redox reaction: Half method of balancing redox reactions
Week 13	Pre Examination Review
Week 14	Final Examination

Assignments:

Students are given generalized research topic based on our course outline and class objectives.

Textbooks and Reference Materials:

Frederick A. Bettelheim, William H. Brown, Mary K. Campbell, Shawn O. Farrell, Omar J. Torres. Introduction to General, Organic and Biochemistry. 11th edition. Publisher: Cengage Learning.

Evaluation: Students are evaluated by three quizzes, a midterm exam, a final exam, assignments and their attendance.

Points:

	Points*
Assignments	10%
Quizzes	25%
Mid Term	30%
Final exam	30%
Attendance	5%
Total points	100%

*Points are approximate and may be adjusted during the term. Students will be notified of changes.

Grade:

Percent of Points	Letter Grade
95-100%	A(h)
90-94%	A
85-89%	B+
80-84%	B
75-79%	C+
70-74%	C
<70%	F

Attendance:

Students are expected to attend at least 80% of all scheduled learning activities. Attendance in the class will be recorded. Students attended 80% or more will be awarded with 5-10% on total scoring system. Please note that absences due to illness or misadventure will be factored into the 20% of allowable absences if informed respective faculty or the Dean of Students.

Policies:Professional Demeanor

The student should be thoughtful and professional when interacting with faculty and other students. Inappropriate behavior includes the use of offensive language, gestures, or remarks with sexual overtones. Students should maintain a neat and clean appearance, and dress in attire that is generally accepted as professional.

Honesty

Students are expected to demonstrate honesty and integrity in all aspects of their education and in their interactions with faculty, administration, physicians, patients, and fellow students. They will not cheat, plagiarize, or assist others in the commission of these acts.

Faculty and Office Hours:

Dr. Eric Audain, Assistant Professor

Students can schedule appointments by email or during lecture.