Chemistry 200 (General Inorganic Chemistry I) Syllabus and Schedule

Basic Course Information

Semester:	Fall 2024	Instructor Name:	Dr. Alto Benedicto
Course Title & #:	Chemistry 200	Email:	alto.benedicto@imperial.edu
CRN #:	10032	Units:	5
Class Dates:	Aug 12 to Dec 7, 2024	Office #:	2779
Class Times:	4:45 PM – 6:10 PM (Lec) in Rm 2723; 6:30 PM – 9:40 PM (Lab) in Rm 2716	Office Hours:	MWTh 6:30 am – 7:30 am (Zoom); T 5:50 pm -6:30 pm (Rm 2716); W 6:10 pm – 6:30 pm (Rm 2716)
Class Days:	MW	Office Phone #:	(760) 355-5751
Classroom:	2723 (Lec); 2716 (Lab)	Emergency Contact:	Dept. Secretary (760) 355-6155

Course Description

Basic principles and calculations of chemistry with emphasis on stoichiometry and dimension analysis applied to various problem types. Fundamental principles and theory of atomic and molecular structure as related to bonding and molecular geometry. Study of kinetic molecular theory, the first law of thermodynamics, periodic relationships of the elements, physical states of matter, solution chemistry, and oxidation-reduction. The laboratory is closely related to lecture topics and includes methods of classical experimentation as well as certain instrumental analysis. (C-ID CHEM 110) (CSU, UC).

Course Prerequisite(s) and/or Corequisite(s)

Chem 100.

Student Learning Outcomes

Upon course completion, the successful student will have acquired new skills, knowledge, and or attitudes as demonstrated by being able to:

1. Solve chemical problems using modern atomic theory (ISLO 2, ISLO 4)
2. Perform chemical experiments in a scientific manner, using proper techniques, analysis, and safety equipment. (ISLO 2, ISLO3, ISLO4)

Course Objectives

Upon satisfactory completion of the course, students will be able to:

1. Students will demonstrate the ability to perform dimensional analysis calculations as they relate to problems involving percent composition and density.
2. Students will write chemical formulas, name inorganic compounds, and demonstrate a knowledge of basic atomic theory.

3. Students will relate chemical equations and stoichiometry as they apply to the mole concept, molarity, and acid-base titrations. Students will derive formulas from percent composition.
4. Students will identify the basic types of chemical reactions including precipitation, neutralization, and oxidation-reduction.
5. Students will demonstrate knowledge of atomic structure and quantum mechanics and apply these concepts to the study of periodic properties of the elements.
6. Students will relate the general concepts of atomic structure to a study of ionic bonding.
7. Students will relate the general concepts of covalent bonding and molecular structure.
8. Students will demonstrate the first law of thermodynamics both in theoretical and practical contexts and apply the theory to the solution of Hess' Law.
9. Students will manipulate the various gas laws in both theory and practice to solve mathematical problems relating to the behavior of both ideal and non-ideal gases.
10. Students will describe the general properties of liquids and solids including intermolecular attractions and phase changes.
11. Students will relate the general properties of solutions and employ knowledge of concentration to explain colligative properties. Students will investigate the phenomenon of vapor pressure.
12. Students will demonstrate knowledge of computer-assisted methods of data acquisition, analysis and presentation.

Textbooks & Other Resources or Links

1. **Two sites used by IVC for our textbooks:**
    a. https://chem.libretexts.org
        i. For the textbook: click https://chem.libretexts.org/Bookshelves/General_Chemistry/Chemistry_(OpenSTAX)
        ii. For exercises: click https://chem.libretexts.org/Bookshelves/General_Chemistry/Exercises%3A_General_Chemistry/Exercises%3A_OpenStax

    b. Chemistry, by Paul Flowers, Klaus Theopold, Richard Langley, Stephen F. Austin, and William R. Robinson (OpenStax, 2015, ISBN: 1-938168-39-9)
        i. For this textbook: click https://openstax.org/details/books/chemistry

2. *Chemistry in the Laboratory*, by James M. Postma, Julian Roberts, and J. Leland Hollenberg (W.H. Freeman and Company, 7th Ed, **ISBN**: 1-4292-1954-8)
3. Chemistry 200 Supplementary Laboratory Manual available at **IVC Chemistry/STEM Club** ($20)
4. ~~Eight (8) Scantron Sheets Form No. 889-E (submitted on the second day of class) and~~ pencil
5. safety goggles ($5 - $10; needed on second class day), non-programmable scientific calculator ($15 - $25), close-toed shoes.
6. registration with Macmillan Learning Achieve for online HW ($50) – requires credit card.
   You can register by going to our course in Canvas, and then clicking Macmillan Learning (located on left margin) while INSIDE our Canvas course and follow instructions.

Course Requirements and Instructional Methods

1. Attendance and remaining during the entire class period is mandatory for Chem 200 Lab Classes. A Lab roll call will be initiated by the instructor within the first 5 minutes of Lab class. If you are sent out during class

(e.g., failure to obey safety rules such as wearing Safety Goggles, etc.), you will be marked absent for that Lab, and will garner zero points for the experiment.

2. There is **no make-up Exams or Lab Classes**. A score of **zero (0)** will be recorded unless the absence is attributed to representation of official college functions. It is the student's responsibility to show proof of such function **prior** to the date of absence.
3. During the Exam, the only things allowed are: **pencil, nonprogrammable calculator, and I.D.** You will be supplied with a Periodic Table ~~and a Scantron. You may use the Exam Questionnaire as scratch paper. The Exam Questionnaire, Periodic Table, and Scantron are to be submitted at the end of the Exam~~. **Possession of electronic devices (phones, iPod, programmable calculator, etc.) during Exam is considered cheating** and will be dealt with according to IVC policy.
4. Each student is REQUIRED to **buy the Chem 200 Supplement Lab Manual** and to **sign up for online HW no later than the second day of class**. Personal laptop is highly encouraged for online HW during Lab Class.
5. **Due dates for Online HWs are found in the Class Schedule of Topics (see last page).** For technical assistance beyond the instructor, call Macmillan Technical Support on 1-800-936-6899. Also, there's online tutoring with a live person in **Online Tutoring** (embedded inside Canvas).
6. Prior to the start of Lab Class, read the relevant experiment and answer any Pre-Lab Questions. **Pre-Lab Questions sheet should be torn from the Lab Manual and submitted to the instructor within two (2) minutes from start of Lab Class to gain full points**. So, tear out the relevant Pre-Lab sheets before coming to class, and don't be late!!!
7. Before leaving the Lab Class, make sure the **instructor has signed** your Lab Data Sheet. Data should be recorded in **ink**. Cross-out mistakes with a single strike-through line. **Data Sheets and Post-Lab Questions are to be submitted within the first two minutes of the next time Lab meeting**.
8. Lab clean-ups are done 15 minutes before the end of lab. A **wet towel** should be used to wipe the lab bench in order to gain full points. Make sure the sink and work area is clean. Points will be deducted to the entire class if the common work areas (fume hood, analytical balances) are dirty.
9. There is no bonus work available. Kindly seek assistance immediately to clarify any questions.
10. If this is an Hybrid section, with the lecture discussion being done online, you must have access to a computer and an Internet connection. No other special technical skills are needed other than knowledge on how to use Canvas.

Out of Class Assignments: The Department of Education policy states that one (1) credit hour is the amount of student work that reasonably approximates not less than one hour of class time and two (2) hours of out-of-class time per week over the span of a semester. WASC has adopted a similar requirement.

Course Grading Based on Course Objectives

Assessment Type	How many	Total Points
Lecture Exams	5 @ 60	300 pts
Lecture Final Exam	1 @ 200	200 pts
Online Homework (in Achieve)	11 @ 15 3 @ 20; 1 @ 30	255 pts
Lab Experiments, Exercises	6 @ 20 4 @ 20	200 pts
PhET Simulations, Labster Simulations	1 @ 10 1 @ 6, 1 @12	28 pts
Lab Exam and 4 Discussions	1 @ 50 1@5; 3@2	61 pts

OVERALL POINTS = 1,044 pts

Grading Scale Percentage	Letter Grade
85.00% to 100 %	A
75.00% to 84.99%	B
60.00% to 74.99%	C
50.00% to 59.99%	D

Course Policies

- A student who fails to attend the first meeting of a class or does not complete the first mandatory activity of an online class will be dropped by the instructor as of the first official meeting of that class. Should readmission be desired, the student's status will be the same as that of any other student who desires to add a class. It is the student's responsibility to drop or officially withdraw from the class. See General Catalog for details.
- Regular attendance in all classes is expected of all students. **A student whose continuous, unexcused absences exceed the number of hours the class is scheduled to meet per week may be dropped**. For online courses, students who fail to complete required activities for two consecutive weeks may be considered to have excessive absences and may be dropped.
- Absences attributed to the representation of the college at officially approved events (conferences, contests, and field trips) will be counted as 'excused' absences.
- **Absences during Lab Classes or leaving during Lab Classes** automatically result in a **grade of zero (0) for the Lab Experiment.**

Academic Honesty

- IVC values critical thinking and communication skills and considers academic integrity essential to learning. Using AI tools as a replacement for your own thinking, writing, or quantitative reasoning goes against both our mission and academic honesty policy and will be considered academic dishonesty, or plagiarism unless you have been instructed to do so by your instructor. In case of any uncertainty regarding the ethical use of AI tools, students are encouraged to reach out to their instructors for clarification.

Anyone caught cheating or plagiarizing will receive a zero (0) on the exam or assignment, and the instructor may report the incident to the Campus Disciplinary Officer, who may place related documentation in a file. Repeated acts of cheating may result in an F in the course and/or disciplinary action. Please refer to the General Catalog for more information on academic dishonesty or other misconduct. Acts of cheating include, but are not limited to, the following: (a) plagiarism; (b) copying or attempting to copy from others during an examination or on an assignment;(c) communicating test information with another person during an examination; (d) allowing others to do an assignment or portion of an assignment; (e) using a commercial term paper service.

IVC Student Resources

IVC wants you to be successful in all aspects of your education. For help, resources, services, and an explanation of policies, visit http://www.imperial.edu/studentresources or click the heart icon in Canvas.

TUTORING RESOURCES:

Our Class Tutor _____ hours are (MWF: _____)(TThS: _____) (Zoom ID 930 5535 9930—ask for _____)

Anticipated Class Schedule/Calendar ***Tentative, subject to change without prior notice***

Week	DATE	CHAPTER READINGS (online lecture)	Laboratory Schedule **Macmillan Achieve HW due Sat 11:55pm**
1	Aug 12- 17	Chap 1: The Chemical World (Classification of Matter/Changes; Measurement—Sig Figs, Dimensional Analysis, Accuracy)	Labster 1: Lab Safety 'due' (in Canvas) *Canvas Discussion 1 due* **HW 1 due**
2	Aug 19- 24	Chap 2: Atoms, Molecules, Ions (Atomic Theory; Atomic Number, Mass Number, Isotopes; Nomenclature of Hydrates)	M-2: Mass and Volume Relationships ***PhET Sim: Build An Atom due in Canvas*** **HW 2 due**
3	Aug 26- 30	Chap 3: Composition of Substances and Solutions (Moles, Molar Mass, % Composition, Empirical & Molec Formula, Molarity)	M-18: Net Ionic Equations **HW 3 due**
4	Sept 2(H)- 7	Chap 4: Stoichiometry (Balanced Eqn, Classifying Rxns, Yields)	Exercises on Stoichiometry **HW 4 due**
5	Sept 9- 14	Chap 6: Electronic Structure and Periodic Properties (Bohr Model, QM model, Quantum Numbers, Electron Configurations, Orbital Diagrams, Periodic Trends)	M-A Nomenclature **Lecture Exam 1** (Chap 1,2,3,4) on Wed **HW 6 due**
6	Sept 16- 21	Chap 7: Chemical Bonding I (exceptions to Lewis structure, Ionic/Covalent/Metallic Bonding, Formal Charges, Resonance, Molecular Geometry, Polarity)	IVC 4: Titration day 1 IVC 4: Titration day 2 **HW 7 due**
7	Sept 23- 28	Chap 8: Chemical Bonding II: (Valence Bond vs Molecular Orbital Theory)	IVC 4: Titration day 3 M-B: Lewis structures **HW 8 due**
8	Sept 30- Oct 5	Chap 9: Gases (Ideal Gas Law, Real Gases, Effusion vs Diffusion, Stoichiometry)	**Lecture Exam 2** (Chap 6,7,8) on Wed **HW 9 due**
9	Oct 7- 12	Chap 10: Liquids and Solids (Intermolecular Forces, Phases Diagrams, Lattice Structures, Calorimetry)	M-34: Redox day 1 M-34: Redox day 2 **HW 10 due**
10	Oct 14- 19	Chap 11: Solutions and Colloids: (Solubility; Colligative Properties; Colloids, molality)	M-34: Redox day 3 **Lecture Exam 3** (Chap 9,10,11, stoichiometry) on Wed **HW 11 due**
11	Oct 21- 26	Chap 13: Chemical Equilibrium (Equilibrium Constant, Le Chatelier's Principle, ICE box)	Exercises on Equilibrium ICE box **HW 13 due**
12	Oct 28- Nov 2	Chap 14: Acid-Base Equilibria (definitions, pH, weak acids, pKa, polyprotic acid, buffers)	Labster 13: Advanced Acid and Base **HW 14a due**
13	Nov 4- 9	Chap 15: Solubility Equilibria (Ksp, complex ion formation, common ion effect)	Exercises on Titration of Weak Acid/Base **HW 15 due**
14	Nov 11(H)- 16	Chap 5: Thermochemistry (Calorimetry, Hess Law, Std Enthalpy of Formation)	**Lecture Exam 4** (Chap 13,14) on Wed **HW 14b due**
15	Nov 18- 23	Ch 16: Thermodynamics 1st Law (Bond Dissociation Energy, Born-Haber cycle) NOTE: Omit Second and Third Law for next course	Exercises on Hess Law & Born-Haber Cycle LOCKER CHECKOUT **HW (5 and 16) due**
16	Dec 2- 7	**Lecture Exam 5** (Chap 15,5,16) on Mon **Lab Finals on Mon** (Lab Techniques) (1 hour)	**LEC FINAL EXAM** on Wed (2 hr 10 min)