CHEN 1203 — General Chemistry II

MW 10:40AM–11:30AM, JSCBB A115

Course Description

This course continues the two-semester general chemistry sequence.

Instructor and TA Information

Name: Prof. Andrew Goodwin
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Course Materials

Nivaldo J. Tro, Chemistry: A Molecular Approach, 6th Edition. You should be able to access the textbook through Canvas, Accessing Pearson (in the lefthand menu). Mastering Chemistry is not required.

Free supplemental resources: LibreTexts, Wikipedia.

We will also post LearnChemE Screencasts throughout the semester to help with learning.

Additional practice problems (no credit) will be posted as well.

Course Learning Outcomes

- Convert enthalpy and entropy to reaction tendencies and extractable work.
- Connect reactant concentrations to reaction rate.
- Relate free energy to tendencies towards equilibrium and resultant concentrations or yields.
- Calculate pH of multicomponent acid and base solutions.
- Predict electrical work from electrochemical reactions.

ABET Outcomes Addressed

- an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
- an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
- an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Assignments

Homework will be due Wednesdays at 11:59PM. The first homework will be due W 1/21. These assignments will be posted in Homework, as well as through Gradescope. All assignments will be submitted through Gradescope. There will be 9–10 assignments and you will be allowed one dropped assignment per semester.

Exams

Two midterms will be given, in-class, at the dates shown in the Course Schedule. The final exam will be given Friday May 1, 10:30am–1:00pm, in JSCBB A115 (according to the Final Exam Schedule).

For each test you will be allowed pencils, erasers, a calculator, and a small cheat sheet. No devices with internet access will be allowed unless by instructor exception.

Grading

- Class attendance/clickers: 10% (3 drops allowed)
- Homework: 20% (1 drop allowed)
- Midterms: 2 x 15% = 30%
- Final exam: 40%

Note that since exams count for most of your grade, you must be sure that you are learning the material sufficiently! Do not simply rely on your classmates (or other resources) for help!

Course Policies

Class attendance is mandatory and will be enforced by iClicker. You are allowed 3 absences, no questions asked.

Late policy: 10 point deduction per hour, up to 50 points. Late work will not be accepted 24 hours after the due date/time.

Course Schedule

Date	Unit/Module	Topics	Readings
1/12	Introduction, enthalpy	Welcome! Introduction, Energy and Enthalpy	
1/14	Entropy and Free Energy	Defining Entropy and Free Energy; Spontaneity	19.2-19.5
1/19	*N/A*	Martin Luther King Jr. Holiday, NO CLASS	
1/21	Entropy and Free Energy	Second Law of Thermodynamics; Entropy of State Changes	19.2-19.5

Date	Unit/Module	Topics	Readings
1/26	Entropy and Free Energy	Gibbs Free Energy, State Changes	19.6-19.9
1/28	Entropy and Free Energy	Gibbs Free Energy at Nonstandard Conditions	19.9-19.10
2/2	Chemical Kinetics	Rate Laws and Reaction Order	15.1-15.3
2/4	Chemical Kinetics	Integrated Rate Law, Effect of Time, Activation Energy	15.4-15.5
2/9	Chemical Kinetics	Mechanisms and Multistep Processes	15.5-15.6
2/11	Chemical Kinetics	Arrhenius Equations, Activation Energy, Mechanisms	15.5-15.6
2/16	REVIEW/CATCH-UP		
2/18	MIDTERM 1		
2/23	Chemical Equilibria	Equilibrium and Equilibrium Constants	19.10, 16.1-16.3

Date	Unit/Module	Topics	Readings
2/25	Chemical Equilibria	Effects of T and P	16.4-16.5
3/2	Chemical Equilibria	Equilibrium Concentration and Reaction Quotient	16.6-16.8
3/4	Chemical Equilibria	Equilibrium Concentration and Reaction Quotient	16.6-16.8
3/9	Acids, Bases, and Solutions	Expressing and Defining Solubility, Precipitation	14.2, 14.7, 18.5-18.6
3/11	Acids, Bases, and Solutions	Acid and Base Definitions, Acidity Constants, Role of Water	17.1-17.5
3/16-3/18	*N/A*	SPRING BREAK, NO CLASS	
3/23	Acids, Bases, and Solutions	Role of Water, Finding pH from pKa	17.5-17.6
3/25	Acids, Bases, and Solutions	Mixtures of Acids and Bases, Buffers, Polyprotic acids	17.9-17.10, 18.2-18.4
3/30	Acids, Bases, and Solutions	Mixtures of Acids and Bases, Buffers, Polyprotic acids	17.9-17.10, 18.2-18.4

Date	Unit/Module	Topics	Readings
4/1	REVIEW/CATCH-UP		
4/6	MIDTERM 2		
4/8	Electrochemistry	Oxidation and Reduction Reactions	20.2
4/13	Electrochemistry	Galvanic Cells, Components, Calculating Voltage	20.3-20.4
4/15	Electrochemistry	Relation of Voltage to Free Energy and Equilibrium	20.5-20.6
4/20	Electrochemistry	Electricity-Driven Reactions (maybe)	20.7-20.8
4/22	Review/catch-up		
5/1, 10:30am-1pm	FINAL EXAM		

Classroom Behavior

Students and faculty are responsible for maintaining an appropriate learning environment in all instructional settings, whether in person, remote, or online. Failure to adhere to such behavioral standards may be subject to discipline. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with race, color, national origin, sex, pregnancy, age, disability, creed, religion, sexual orientation, gender identity, gender expression, veteran status, marital status, political affiliation, or political philosophy.

Accommodation for Disabilities, Temporary Medical Conditions, and Medical Isolation

If you qualify for accommodations because of a disability, please submit your accommodation letter from Disability Services to your faculty member in a timely manner so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities in the academic environment. Information on requesting accommodations is located on the Disability Services website. Contact Disability Services at 303-492-8671 or DSinfo@colorado.edu for further assistance. If you have a temporary medical condition, see Temporary Medical Conditions on the Disability Services website.

If you have a temporary illness, injury or required medical isolation for which you require adjustment, please contact Prof. Goodwin as soon as is safe to do so. You are not required to state the nature of your illness, nor is a "doctor's note" required. We will then discuss options for either making up the work or calculating your grade through an alternate method.

Preferred Student Names and Pronouns

CU Boulder recognizes that students' legal information does not always align with how they identify. If you wish to have your preferred name (rather than your legal name) and/or your preferred pronouns appear on your instructors' class rosters and in Canvas, visit the Registrar's website for instructions on how to change your personal information in university systems.

Honor Code

All students enrolled in a University of Colorado Boulder course are responsible for knowing and adhering to the Honor Code. Violations of the Honor Code may include but are not limited to: plagiarism (including use of paper writing services or technology [such as essay bots]), cheating, fabrication, lying, bribery, threat, unauthorized access to academic materials, clicker fraud, submitting the same or similar work in more than one course without permission from all course instructors involved, and aiding academic dishonesty. Understanding the course's syllabus is a vital part of adhering to the Honor Code.

All incidents of academic misconduct will be reported to Student Conduct & Conflict Resolution: StudentConduct@colorado.edu. Students found responsible for violating the Honor Code will be assigned resolution outcomes from Student Conduct & Conflict Resolution and will be subject to academic sanctions from the faculty member. Visit Honor Code for more information on the academic integrity policy.

Sexual Misconduct, Discrimination, Harassment and/or Related Retaliation

CU Boulder is committed to fostering an inclusive and welcoming learning, working, and living environment. University policy prohibits protected-class discrimination and harassment, sexual misconduct (harassment, exploitation, and assault), intimate partner abuse (dating or domestic violence), stalking, and related retaliation by or against members of our community on- and off-campus. The Office of Institutional Equity and Compliance (OIEC) addresses these concerns, and individuals who have been subjected to misconduct can contact OIEC at 303-492-2127 or email OIEC@colorado.edu. Information about university policies, reporting options, and OIEC support resources including confidential services can be found on the OIEC website.

Please know that faculty and graduate instructors are required to inform OIEC when they are made aware of incidents related to these concerns regardless of when or where something occurred. This is to ensure the person impacted receives outreach from OIEC about resolution options and support resources. To learn more about reporting and support a variety of concerns, visit the Don't Ignore It page.

Accommodation for Religious Obligations

Campus policy requires faculty to provide reasonable accommodations for students who, because of religious obligations, have conflicts with scheduled exams, assignments, or required attendance. Please communicate the need for a religious accommodation in a timely manner. In this class, please email Prof. Goodwin regarding any religious absences or accommodations as soon as possible. See the campus policy regarding religious observances for full details.

Mental Health and Wellness

The University of Colorado Boulder is committed to the well-being of all students. If you are struggling with personal stressors, mental health or substance use concerns that are impacting academic or daily life, please contact Counseling and Psychiatric Services (CAPS) located in C4C or call (303) 492-2277, 24/7.

Acceptable Use of AI in this Class

AI is not allowed for any assignments in this class. You may use AI to help with understanding concepts from class, but all answers provided in any submitted assignment or test must be AI-free.