

Instructor: Dr. Joseph Awino (q177@iastate.edu)

Office: 2760 Gilman Hall

Phone: 4-5562

Lecture: MWF 1:10–2:00 PM in 1001 Troxel

Delivery Mode: Face-to-face

Office Hours: MW 12:00 –12:50 PM, or immediately after each lecture on MWF, or by appointment.

Head TA: Benjamin Schelske (q177@iastate.edu)

*Chem 177 and 177L/177N are co-requisite courses, i.e., students in Chem 177 are required to take Chem 177L at the same time or to have already received credit in 177L. Co-requisite course requirements are strictly enforced: **Students who do not meet the co-requisite should drop the course or they will receive an F in the course.** Students who drop or audit Chem 177 will be required to drop 177L and vice versa.*

Canvas: We will use Canvas as the official electronic course interface. Log in often for important announcements, course materials, and grade information.

Textbook: Chemistry 10th Edition, Steven S. Zumdahl | Susan A. Zumdahl | Donald J. DeCoste. ISBN: 9781305957572. The book is part of Immediate Access Program at Iowa State University (ISU).

Required nonprogrammable/non-graphing scientific calculators (with $\ln x$, e^x , $\log x$, 10^x , y^x functions). Calculators with graphing and text capabilities may not be used during exams and quizzes. All calculators are subject to inspection during exams and quizzes; improper calculators may be temporarily confiscated. Bring your own calculator to each class and recitation.

Recitation: On Thursdays, you will meet with your TA in smaller groups to review problem sets. Students are required to attend all recitation sessions. Quizzes will be administered toward the end of the recitation. **There is no make-up for missed recitation quizzes.** **NOTE:** *If no TA shows up for recitation, one of you may go to 1608 Gilman to find a substitute TA. The department will provide a substitute as soon as possible.*

Assessments

Homework: Problems will be posted in Canvas. You are highly encouraged to work as a team, but you must submit your own work as an attachment in pdf format. Grading will be done according to the criteria available in Canvas.

Exams: There will be **Three** midterm exams scheduled during class sessions on **Mondays** of the following dates: **Sep. 12; Oct. 10;** and **Nov. 14.** The schedule for a final, two-hour cumulative American Chemical Society (ACS) exam will be announced later. **There will be no make-up exams.** Those who have conflicts or are representing the university in various activities must contact the instructor at least 10 days before the actual exam date and present valid documentation. **Regrade requests** will be accepted up to one week after the midterm score is posted. To request a regrade, email the Head TA with a detailed description of your regrade request. Make sure to include *your section number* in the subject line.

Optional Exam: Excused absences must be supported by valid documentation. Thielen Student Health Center does not provide documentation for excuses to miss exams. Pre-booked family vacation flights do not count either. If you miss **one** midterm exam due to excused absence, you will be given an opportunity to replace the zero score by taking an optional comprehensive exam scheduled on **Monday, Dec 5.** Those who miss two exams will be asked to drop the course. Students who did not miss an exam but would like to take the optional exam to replace their lowest score are encouraged to do so. However, they must commit to study because the score from an optional exam will still count even if it is lower than the score they intended to replace. Such students must sign up with their TA at least 10 days before the actual exam day. At the discretion of the instructor, and in exceptional cases, a grade considering proportionally higher weighting of the final exam may be assigned in lieu of a replacement for the missed exam.

Grades: Grades will be assigned based on 60% midterm exams, 20% final exam, 10% homework, and 10% recitation quizzes. The instructor will use a scale that takes into consideration an overall class performance. However, the following grade cut-offs are guaranteed: **Grade** (% Score): **A**(≥ 92), **A-**(≥ 90), **B+**(≥ 86), **B**(≥ 82), **B-**(≥ 79), **C+**(≥ 75), **C**(≥ 70), **C-**(≥ 67), **D+**(≥ 62), **D**(≥ 58), **D-**(≥ 50), **F**(< 50).

Course Policies

Lectures: Attendance of lectures is strongly recommended. If you miss a lecture, it is your responsibility to find out any information that was passed across in class by getting in touch with your colleagues.

Classroom Etiquette: Use of mobile phones, tablets, and laptops is prohibited except when asked to do so during the administration of quizzes/tests. They must be kept in the pocket or backpack in complete silent mode. *Any disruptive behavior/activities in the class that might affect your concentration and that of fellow students will not be tolerated and may have severe consequences including a zero in the assignment or quiz associated with the class, or an F grade for the course, and your behavior will be reported to the Dean of student's office.*

Free Expression: Iowa State University supports and upholds the First Amendment protection of [freedom of speech](#) and the principle of [academic freedom](#) in order to foster a learning environment where open inquiry and the vigorous debate of a diversity of ideas are encouraged. Students will not be penalized for the content or viewpoints of their speech as long as student expression in a class context is germane to the subject matter of the class and conveyed in an appropriate manner.

Academic Misconduct: The [student disciplinary regulations](#) will be enforced for any form of academic misconduct. This includes but not limited to: Copying or sharing answers on tests/assignments/quizzes, altering graded exam papers and submitting for regrade, plagiarism, and bribery (offering someone else money or service to gain an academic advantage). Depending on the act, a student could receive a zero on the test/assignment, F grade for the course, and could be suspended or expelled from the University. See the [Conduct Code](#) for more details and a full explanation of the ISU Academic Misconduct policies. *Instances of suspected academic misconduct are to be reported to the Dean of Students' office.*

Prep week: This course follows ISU Prep Week policy. Optional exam and online homework may be due.

Other Policies: This course will adhere to university policies on accommodations, inclusiveness, academic integrity, and so on, as described in the Syllabus Statements.

Additional Course Resources

Chemistry Help Center: Teaching assistants are in 1761 Gilman; M–R (10 AM–5 PM), and F (10 AM–1 PM).

Supplemental Instruction: Information on supplemental instruction can be found on the [SI website](#).

Learning Objectives:

In general, upon successful completion of the course, students will have refined their study skills and be able to describe chemical phenomena using macroscopic, particulate and symbolic representations; and will have learned to appreciate the importance of chemistry and science in their everyday life. More in detail, students will be able to:

- Solve chemical problems with scientific data: (a) uses algebra or unit conversions as needed; (b) uses graphical or tabulated data as needed.
- Describe fundamental components of chemical structures: (a) uses atomic structure; (b) uses chemical symbols and chemical formulas; (c) uses chemical nomenclature and terminology.
- Explain fundamental features of chemical reactions: (a) uses balanced chemical equations; (b) calculates stoichiometric problems involving moles, mass and number of molecules, limiting reactant, theoretical yield and percent yield.
- Explain chemical reactions in solution including: (a) categorizing precipitation reactions; (b) categorizing acid-base neutralization reactions; (c) categorizing redox reactions; (d) moles and molarity relationships.
- Explain characteristics of gases and how they are different than condensed forms of matter (liquids and solids): (a) summarize the postulates of the kinetic theory of gases; (b) use the kinetic theory of gases to describe the relationship between pressure, volume, temperature and amount of gases; (c) calculate quantitative features of chemical systems that include gases.

- Explain the central role of energy in chemistry and chemical reactions: (a) define the enthalpy of reaction; (b) explain the measurement of energy using calorimetry; (b) translate energy implications of reactions using Hess's law; (c) calculate energy implications using any of the above.
- Describe atomic structure and its importance in understanding chemistry: (a) explain the wave-particle duality of light, Bohr model, and particles of energy and quantum theory; (b) use the periodic table to explain electronic structure, properties of elements, electronegativity, electron affinity, atomic sizes and other periodic properties of elements.
- Explain the origin and implication of chemical bonding: (a) produce Lewis structures including related resonance structures when appropriate; (b) calculate the formal charges of an atom in resonance structure; (c) predict the average carbon-carbon bond length and bond strength in a given chemical structure.
- Explain the concept of valence-shell-electron-pair-repulsion (VSEPR) theory and its implications in determining the geometry of the molecule: (a) describe models for molecular shapes, hybridization, molecular orbitals and compounds with multiple bonds; (b) use molecular orbital diagrams to explain the properties of molecular compounds.
- Explain intermolecular forces and their varying strengths to describe the properties of the compounds in the solid, liquid, or gas phase.

Tentative Lecture Schedule

Week	Dates	Chapter
1	Aug. 22 – 26	Ch. 1: Chemical Foundations
2	Aug. 29 – Sep. 2	Ch. 2: Atoms, Ions, and Molecules
3	Sep. 5 – 9	Ch. 3: Stoichiometry (No Lecture on Sep. 5)
4	Sep. 12 – 16 Monday, Sep. 12	Ch. 4: Solution Stoichiometry Exam 1
5	Sep. 19 – 23	Ch. 4: Solution Stoichiometry Ch. 5: Gases
6	Sep. 26 – Sept. 30	Ch. 5: Gases Ch. 6: Thermochemistry
7	Oct. 3 – 7	Ch. 6: Thermochemistry
8	Oct. 10 – 14 Monday, Oct. 10	Ch. 7: Atomic Structure and Periodicity Exam 2
9	Oct. 17 – 21	Ch. 7: Atomic Structure and Periodicity Ch. 8: Bonding, General Concepts
10	Oct. 24 – 28	Ch. 8: Bonding, General Concepts
11	Oct. 31 – Nov. 4	Ch. 9: Covalent Bonding, Orbitals
12	Nov. 7 – 11	Ch. 9: Covalent Bonding, Orbitals
13	Nov. 14 – 18 Monday, Nov. 14	Ch. 10: Liquids and Solids Exam 3
14	Nov. 21 – 25	<i>Thanksgiving Break, No Classes</i>
15	Nov. 28 – Dec. 2	Ch. 10: Liquids and Solids
16	Dec. 5 – 9 Monday, Dec. 5	Prep Week, Final Exam Review Optional Exam
17	Dec. 12 – 15	Final Exam *

* To be determined. Do NOT make prior travel plans until after the final exam has been scheduled.