Principles of Chemistry I

Last Updated: Wed, 07/09/2025

Course prefix: CHEM

Course number: 1211K

Section: C

CRN (you may add up to five):
89675

Instructor First Name: Michael

Instructor Last Name: Evans

Semester: Fall

Academic year: 2025

Course description:

Welcome to Chemical Principles I! In this course you will learn the fundamental principles of stoichiometry, chemical thermodynamics, and atomic and molecular structure to propel you to success in future chemistry courses and any career touching on chemistry (and there are *many!*). The course is designed to promote daily engagement with the course material and to reward mastery of the material by the final exam via Grade Improvement.

Course learning outcomes:

Learning Goals and Outcomes | *Lecture*

- *Identify* steps in the scientific method.
- *Apply* concepts of measurement and significant figures to laboratory practices and chemical problems.
- *Correlate* position on the periodic table to properties of elements and bonds.
- *Calculate* amounts of chemical species using information from chemical formulas and chemical equations.
- *Correlate* information from balanced chemical equations to the microscopic scale.
- *Explain* atomic structure using the quantum mechanical model of the atom.
- *Explain* periodic trends using theories of electronic structure.
- *Predict* molecular properties and behavior based on molecular structure and bonding theories.
- *Interpret* thermochemical equations and data and *evaluate* energies of systems.
- *Summarize* the behaviors of gases and *explain* them using the kinetic-molecular theory.

- *Correlate* the molecular level process that occur during heating, cooling, and phase changes to the amount of energy removed or added to a system during each process.

Learning Goals and Outcomes | Laboratory

- *Collect* and *interpret* data regarding gaseous and aqueous reactions.
- *Integrate* the concepts of stoichiometry with measurements made in the laboratory.
- *Observe* the physical properties of substances and *relate* them to intermolecular force strength.
- *Apply* concepts related to density and miscibility.
- *Identify* the hazards and risks associated with a chemistry laboratory experiment.
- *Recognize* the value of maintaining a laboratory notebook and *apply* sound note-taking practices.
- *Develop* skills in written and oral scientific communication.

Required course materials:

Textbook

- *Interactive General Chemistry* by Macmillan Learning. This is an interactive e-book included with access to the online homework platform Macmillan Achieve (see below). Purchase access to the textbook and Achieve using the Macmillan Learning link on the lecture Canvas site.

Additional Materials

- *Laboratory notebook.* You should have a dedicated notebook for recording data and observations during lab demonstrations and simulations. It does not need to make duplicate pages as you write.
- *Microsoft Office suite.* You will need access to Word, Excel, and PowerPoint for this course. All can be downloaded free of charge for GT students through OIT.

Grading policy:

Daily Work*..... 250 pts.

Laboratory†..... 225 pts.

Exam 1..... 100 pts.

Exam 2..... 100 pts.

Exam 3..... 100 pts.

Final Exam..... 225 pts.

* Daily work consists of online homework, in-class questions, preparation quizzes, and learning reflections. See below for additional details.

† Students earning below 60% in the laboratory component of the course (less than 135 of 225 points) will receive a grade of F and will be required to repeat both the lecture and the laboratory components. See the lab syllabus for laboratory requirements

Letter grades will be assigned using the following ranges. To encourage mastery of concepts and skills the course will not be curved.

A..... 1000 – 900 pts.

B..... 899 – 800 pts.

C..... 799 – 700 pts.

D..... 699 – 600 pts.

F..... 599 – 0 pts.

Students earning below 60% in the lecture component of the course (less than 465 of 775 points) will receive a grade of F and will be required to repeat both the lecture and the laboratory components.

Attendance policy:

Comprehensive guidelines regarding class attendance and excused absences can be found in the Georgia Tech catalog. Please read through the policies in their entirety.

Rules and Regulations Section IV

Student Absence Regulations

Due to the structure of Daily Work, late submissions for homework, GSR surveys, iClicker questions, and other Daily Work assignments are not accepted. Laboratory assignments are not generally accepted late without the use of one or more tokens. (See the lab syllabus for details.)

Academic honesty/integrity statement:

Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act according to the highest ethical standards. For information on Georgia Tech's Academic Honor Code, please visit this page or this page.

Any student suspected of cheating or plagiarizing on a quiz, exam, or assignment will be reported to the Office of Student Integrity, who will investigate the incident and identify the appropriate penalty for a violation.

If at any time throughout the semester you have a question involving academic integrity or the Honor Code, please do not hesitate to reach out to your instructor or a First-year Chemistry faculty member.

Collaboration and Group Work

You are encouraged to work with classmates on in-class problem solving and to study with others outside of class. Collaboration on homework assignments is acceptable, and you should keep in mind that the effort you put into these assignments will be reflected in what you gain from them. Discussion of the material in laboratory assignments is appropriate; however, all work submitted in reports must be prepared independently.

Student-Faculty Expectations Agreement
At Georgia Tech we believe that it is important to strive for an atmosphere of mutual respect, acknowledgement, and responsibility between faculty members and the student body. See Student-Faculty Expectations in the Catalog for an articulation of some basic expectation that you can have of me and that I have of you. In the end, simple respect for knowledge, hard work, and cordial interactions will help build the environment we seek. Therefore, we encourage you to remain committed to the ideals of Georgia Tech while in this class.

We expect students to arrive prepared for class, to participate in class activities and discussions, and to utilize office hours for additional help when needed.

In return, students should expect instructors to arrive prepared for class, to engage them in activities and discussions that further their understanding of course material, and to be available during office hours.

Students should expect to spend, on average, 6 – 8 hours per week outside of the classroom and laboratory to excel in this course. This includes time spent reading the textbook, taking and reviewing notes, working problems, and writing laboratory reports. To succeed in this course, students *must* develop a pattern of preparing for class, attending class, and then reviewing after each class period.

Core IMPACTS statement(s) (if applicable):

Core IMPACTS refers to the core curriculum, which provides students with essential knowledge in foundational academic areas. This course will help master course content, and support students' broad academic and career goals.

This course should direct students toward a broad Orienting Question:

- How do I ask scientific questions or use data, mathematics, or technology to understand the universe?

Completion of this course should enable students to meet the following Learning Outcome:

- Students will use the scientific method and laboratory procedures or mathematical and computational methods to analyze data, solve problems, and explain natural phenomena.

Course content, activities and exercises in this course should help students develop the following Career-Ready Competencies:

- Inquiry and Analysis
- Problem-Solving
- Teamwork