湖北工業大學
HUBEI UNIVERSITY OF TECHNOLOGY

Course Title	General Chemistry I
Course Code	CHEM 1111
Semester	Spring 2027
Course Length	4 Weeks, 60 Contact Hours
Credits	4
Instructor	TBA
Office	TBA
Email	TBA
Prerequisite	N/A

Course Description:

This course is the first in a two-semester sequence designed to provide a comprehensive introduction to the fundamental principles of chemistry. Topics include the nature of matter, atomic structure, chemical bonding, states of matter, and basic chemical reactions. Emphasis is placed on developing problem-solving skills and understanding the role of chemistry in real-world applications.

Course Goals:

Students who successfully complete this course will demonstrate competency in the following general education core goals:

- **Critical thinking skills** – Students will engage in creative and/or innovative thinking, and/or inquiry, analysis, evaluation, synthesis of information, organizing concepts, and constructing solutions.
- **Communication skills** – Students will demonstrate effective written, oral, and visual communication.
- **Teamwork** – Students will demonstrate the ability to work effectively with others to support a shared purpose or goal and consider different points of view.
- **Social responsibility** – Students will demonstrate intercultural competency and civic knowledge by engaging effectively in local, regional, national, and global communities.

Student Learning Outcomes:

Upon completion of this course, students will be able to:

- understand the structure of atoms and the periodic table;
- predict chemical reactivity based on molecular structure and bonding;
- apply the principles of stoichiometry to chemical reactions;
- analyze the behavior of gases, liquids, and solids using kinetic molecular theory;

- develop laboratory skills, including data collection, analysis, and reporting.

Textbooks/Supplies/Materials/Equipment/ Technology or Technical Requirements:

Chemistry: The Central Science, 12th (or latest) Edition, by Brown, LeMay, Bursten, Murphy, Woodward, and Stoltzfus. Pearson Education.

Course Requirements:

Homework Assignments (15%):
Regular homework will be assigned to reinforce lecture material and develop problem-solving skills. Assignments will include a mix of conceptual questions and quantitative problems, requiring students to apply learned concepts to new situations. Timely submission is crucial, as these assignments are designed to prepare students for exams and laboratory work.

Laboratory Work (25%):
Lab Reports (15%): Each lab session will require a written report, which includes an introduction, procedure, data analysis, and conclusions. Reports are due one week after the lab session.
Lab Quizzes (10%): Short quizzes will be given at the start of each lab to ensure you have read the lab manual and understand the procedures.

Quizzes (10%):
Periodic quizzes will assess understanding of recent topics and encourage consistent study habits. These short assessments may include multiple-choice questions, short answers, and problem-solving exercises. Quizzes serve as a feedback mechanism, highlighting areas where students may need additional practice or clarification.

Midterm Exam (20%):
The midterm exam will evaluate students' grasp of the material covered in the first half of the course. The exam will test conceptual understanding, analytical skills, and the ability to integrate knowledge across topics. The format may include multiple-choice questions, short answers, and comprehensive problems.

Final Exam (30%):
The cumulative final exam will cover all course content, with an emphasis on the latter half of the semester. It will assess students' overall understanding, critical thinking, and ability to synthesize information from various topics. Success in the final exam requires a thorough comprehension of all course materials and effective problem-solving skills.

Assessments: Activity	**Percent Contribution**
Homework Assignments	15%
Laboratory Work	25%
Quizzes	10%
Midterm Exam	20%
Final Exam	30%

Grading:

Final grades will be based on the sum of all possible course points as noted above.

Grade	Percentage of available points
A	94-100
A-	90-93
B+	87-89
B	84-86
B-	80-83
C+	77-79
C	74-76
C-	70-73
D	64-69
D-	60-63
F	0-59

Course Schedule:
The schedule of activities is subject to change at the reasonable discretion of the instructor. Minor changes will be announced in class, major ones provided in writing.

CHEM 1111 Schedule

Lecture	Topic	Readings
L1	Syllabus Overview Introduction to Chemistry; Matter and Measurement Classifications of Matter Properties of Matter	Chapter 1
L2	Atoms, Molecules, and Ions The Atomic Theory of Matter The Discovery of Atomic Structure	Chapter 2
L3	Atomic Weights The Periodic Table	Chapter 2
L4	Molecules and Molecular Compounds Ions and Ionic Compounds **Lab 1**	Chapter 2
L5	Stoichiometry: Calculations with Chemical Formulas and Equations Chemical Equations	Chapter 3
L6	Some Simple Patterns of Chemical Reactivity Formula Weights	Chapter 3
L7	Reactions in Aqueous Solution General Properties of Aqueous Solutions	Chapter 4
L8	Acids, Bases, and Neutralization Reactions Solution Stoichiometry and Chemical Analysis **Lab 2**	Chapter 4
L9	Thermochemistry The Nature of Energy The First Law of Thermodynamics	Chapter 5
L10	Electronic Structure of Atoms The Wave Nature of Light Quantized Energy and Photons	Chapter 6
L11	Line Spectra and The Bohr Model Quantum Mechanics and Atomic Orbitals	Chapter 6

	Representations of Orbitals	
L12	**Midterm Exam**	/
L13	Periodic Properties of the Elements Development of the Periodic Table Effective Nuclear Charge	Chapter 7
L14	Sizes of Atoms and Ions Ionization Energy Metals, Nonmetals, and Metalloids	Chapter 7
L15	Basic Concepts of Chemical Bonding Lewis Symbols and the Octet Rule	Chapter 8
L16	Ionic Bonding Bond Polarity and Electronegativity	Chapter 8
L17	Molecular Geometry and Bonding Theories Molecular Shape and Molecular Polarity	Chapter 9
L18	Hybrid Orbitals Multiple Bonds Molecular Orbitals	Chapter 9
L19	Gases Characteristics of Gases Pressure	Chapter 10
L20	The Gas Laws The Ideal-Gas Equation **Lab 3**	Chapter 10
L21	Gas Mixtures and Partial Pressures The Kinetic-Molecular Theory of Gases **Lab 4**	Chapter 10
L22	Liquids and Intermolecular Forces A Molecular Comparison of Gases, Liquids, and Solids	Chapter 11
L23	Intermolecular Forces Phase Changes	Chapter 11
L24	Solids and Modern Materials Classifications of Solids Structures of Solids **Lab 5**	Chapter 12
L25	Metallic Solids Ionic Solids Molecular Solids	Chapter 12
	Final Exam	/

Accommodation Statement

Academic accommodations may be made for any student who notifies the instructor of the need for an accommodation. It is imperative that you take the initiative to bring such needs to the instructor's attention. Students who may require assistance in emergency evacuations should contact the instructor as to the most appropriate procedures to follow.

Academic Integrity Statement

Each student is expected to maintain the highest standards of honesty and integrity in academic and professional matters. The University reserves the right to take disciplinary action, up to and including dismissal, against any student who is found

guilty of academic dishonesty or otherwise fails to meet the standards. Any student judged to have engaged in academic dishonesty in coursework may receive a reduced or failing grade for the work in question and/or for the course.

Academic dishonesty includes, but is not limited to, dishonesty in quizzes, tests, or assignments; claiming credit for work not done or done by others; hindering the academic work of other students; misrepresenting academic or professional qualifications within or without the University; and nondisclosure or misrepresentation in filling out applications or other University records.

Other Items:

General Lab Instructions

The laboratory sessions are designed to provide hands-on experience with chemical principles and techniques. To ensure a safe and productive learning environment, please adhere to the following instructions and safety guidelines:

Preparation

- Read the lab manual and any provided materials before each lab session. Understand the objectives, procedures, and safety precautions.

Safety Guidelines

- **Personal Protective Equipment (PPE):**
  - ☐ Always wear appropriate PPE, including safety goggles, lab coats, and gloves, as required.
  - ☐ Do not wear open-toed shoes, sandals, or loose clothing that could catch fire or get caught in equipment.
- **Chemical Handling:**
  - ☐ Handle all chemicals with care. Read labels carefully before use.
  - ☐ Never taste or smell chemicals directly. Use the wafting technique to detect odors.
  - ☐ Dispose of chemicals according to the instructions provided. Do not pour chemicals down the drain unless instructed to do so.
- **Emergency Procedures:**
  - ☐ Familiarize yourself with the location of safety equipment, including eyewash stations, safety showers, fire extinguishers, and first aid kits.
  - ☐ In case of a chemical spill, notify the instructor immediately and follow the appropriate cleanup procedures.
  - ☐ If you or a classmate is injured, inform the instructor right away.
- **Lab Conduct:**
  - ☐ No eating, drinking, or chewing gum in the lab.
  - ☐ Keep your workspace clean and organized. Clean up spills immediately and dispose of waste properly.
  - ☐ Do not perform unauthorized experiments or deviate from the prescribed procedures without instructor approval.

Always prioritize safety and ask your instructor if you have any questions or concerns about the lab procedures or safety measures.

Attendance and Expectations
All students are required to attend every class, except in cases of illness, serious family concerns, or other major problems. We expect that students will arrive on time, be prepared to listen and participate as appropriate, and stay for the duration of a meeting rather than drift in or out casually. In short, we anticipate that students will show professors and fellow students maximum consideration by minimizing the disturbances that cause interruptions in the learning process. This means that punctuality is a must, that cellular phones be turned off, and that courtesy is the guiding principle in all exchanges among students and faculty. You will be responsible for the materials and ideas presented in the lecture.

Assignment Due Dates
All written assignments must be turned in at the time specified. Late assignments will not be accepted unless prior information has been obtained from the instructor. If you believe you have extenuating circumstances, please contact the instructor as soon as possible.

Make-Up Work
The instructor will not provide students with class information or make-up assignments/quizzes/exams missed due to an unexcused absence. Absences will be excused and assignments/quizzes/exams may be made up only with written documentation of an authorized absence. Every effort should be made to avoid scheduling appointments during class. An excused student is responsible for requesting any missed information from the instructor and setting up any necessary appointments outside of class.

Access, Special Needs and Disabilities
Please notify the instructor at the start of the semester if you have any documented disabilities, a medical issue, or any special circumstances that require attention, and the school will be happy to assist.