HIGHLAND COMMUNITY COLLEGE

Syllabus

CHM 107 Introductory Chemistry w/Lab
5 Credit Hours (Lecture and Lab)
Prerequisites: None
C&I Revision Date: 05/09/2025

Department:

Chemistry

Yellow: revised content

Course Description:

This course provides a basic introduction to many chemistry topics including states of matter, atoms, reactions and stoichiometry, electron configurations, molecule structure, gases, and solution chemistry. This course is recommended for students pursuing non-science and allied health degrees. Students pursuing degrees which require more than one semester of chemistry should take CHM 111.

Course Competencies:

The learning outcomes and competencies detailed in this syllabus meet or exceed the learning outcomes and competencies specified by the Kansas Core Outcomes Groups for this course as approved by the Kansas Board of Regents. (Kansas Regents Shared Number Course and Title: **KSRN Course CHM 1030 General Chemistry with Lab for Non-Majors.**

Upon completion of the course, the student should be able to:

1. Solve problems using dimensional analysis, significant figures, and units of measurement as they apply to chemistry.
2. Explain the chemical context of topics as they relate to the natural sciences and society.
3. Demonstrate knowledge of atoms, the periodic table, molecular structure, and bonding.
4. Recognize differences between phases of matter.
5. Identify and analyze different types of chemical reactions, including energetics and stoichiometry.
6. Solve problems involving solutions and gases.
7. Execute laboratory skills in accordance with proper laboratory and chemical safety practices.
8. Collect, evaluate, and interpret qualitative and quantitative data from laboratory procedures in an accurate, responsible, and meaningful manner.

Course Content:

A. Chemistry in our lives
    1. Scientific method
    2. Science and society
B. Measurements
    1. Significant figures
    2. SI and Imperial unit conversions
    3. Density
C. Matter and energy
    1. Phases of matter
    2. Categories of matter: pure substance, mixture, pure element, compound, homogeneous mixture, heterogeneous mixture
    3. Physical and chemical properties
    4. Temperature

D. Atoms and elements
    1. Subatomic particles
    2. Atomic symbols of neutral and charged atoms
    3. Average atomic mass
    4. Common periodic table categories
E. Names and formulas of compounds
    1. Diatomic molecular compounds
    2. Ionic compounds with predictable ions
    3. Ionic compounds with variable metal ions
    4. Ionic compounds with polyatomic ions
F. Chemical quantities
    1. Convert between grams, moles, and number of atoms of a pure element
    2. Molar mass of a compound
    3. Convert between grams and moles of a compound
    4. Empirical formulas
G. Chemical reactions
    1. Balance chemical reactions
    2. Solubility in water of ionic compounds
    3. Predict the products of a precipitation reaction
    4. Complete and net ionic equations
H. Chemical quantities in reactions
    1. Stoichiometry using moles and grams
    2. Heat of reaction
I. Electronic structure and periodic trends
    1. Electron configurations and orbital diagrams of elements up to Ba
    2. Periodic trends
    3. Importance of noble gas electron configurations
J. Molecular structure
    1. Lewis structures of molecules
    2. Electron geometry and molecule geometry of molecules
    3. Polar bonds and polar molecules
K. Gases
    1. Pressure unit conversions
    2. Ideal gas law
L. Solutions
    1. Mass percent
    2. Molarity
    3. Osmosis
    4. Molality
    5. Freezing point depression, boiling point elevation
M. Chemical equilibrium
    1. K_{eq} expressions and calculations
    2. LeChâtelier's principle
N. Acids and bases
    1. Identify acid and base reactants
    2. Conjugate acids and bases
    3. pH calculations
    4. Titrations
O. Oxidation-reduction
    1. Oxidation states of pure elements, ionic compounds, molecules, and polyatomic ions
    2. Identify oxidation and reduction, reducing agent and oxidizing agent

3. Activity series

P. Optional overviews of nuclear chemistry, organic chemistry, and/or biochemistry, or other optional modern topics in chemistry

Q. Laboratory experiments should be held in a majority of course weeks. Laboratory experiments can explore any topic above.

Learning Assessments:

Competencies may be evaluated by multiple measures, including homework, quizzes, regular exams, lab assignments, and a final exam.

Instructional Materials:

Textbook: Tro, N.J. (2018). *Introductory Chemistry.* (6th ed.). New York, NY: Pearson. ISBN-13: 978-0321910295

Lab Manual, in-person classes: Corwin, C.H. (2019). *Introductory Chemistry: Concepts and Critical Thinking.* (7th ed.). New York, NY: Pearson. ISBN-13: 978-0134720142

Lab Material, online and hybrid classes: Achieve Chemistry Simulations.

Guidelines for Requesting Accommodations Based on Documented Disability or Medical Condition

It is the intention of Highland Community College to work toward full compliance with the Americans with Disabilities Act, to make instructional programs accessible to all people, and to provide reasonable accommodations according to the law.

Students should understand that it is their responsibility to self-identify their need(s) for accommodation and that they must provide current, comprehensive diagnosis of a specific disability or medical condition from a qualified professional in order to receive services. Documentation must include specific recommendations for accommodation(s). Documentation should be provided in a timely manner prior to or early in the semester so that the requested accommodation can be considered and, if warranted, arranged.

In order to begin the process all students **must** complete the "Disabilities Self-Identification Form" on our Disability Services website.

This form can also be accessed at the Highland Community College homepage under Students Services/Student Resources/Disability Service or by contacting the Disabilities Coordinator.

A Note on Harassment, Discrimination and Sexual Misconduct

Highland Community College seeks to assure all community members learn and work in a welcoming and inclusive environment. Title VII, Title IX, and College policy prohibit harassment, discrimination and sexual misconduct. Highland Community College encourages anyone experiencing harassment, discrimination or sexual misconduct to talk to report to the Vice President for Student Services, the Human Resources Director or complete an online report about what happened so that they can get the support they need and Highland Community College can respond appropriately.

There are both confidential and non-confidential resources and reporting options available to you. Highland Community College is legally obligated to respond to reports of sexual misconduct, and therefore we cannot guarantee the confidentiality of a report, unless made to a confidential resource. Responses may vary from support services to formal investigations. As a faculty member, I am required to report incidents of sexual misconduct and thus cannot guarantee confidentiality. I must provide our Title IX coordinator with relevant details such as the names of those involved in the incident. For more information about policies and resources or reporting options, please review our Equity Grievance Policy.