

CHEM 2315 & 2115: General Chemistry I & Lab

Course Description

CHEM 2315:

This course is for science majors. Affirming the harmony between scientific inquiry and the Christian faith, the course provides an introduction to foundational concepts in general chemistry, including chemical reactions, the mole concept, properties and states of matter, atomic structure, periodic properties, chemical bonding, and molecular structures.

CHEM 2115:

This is the laboratory portion of CHEM 2315. The course includes hands-on experimentation, analysis, and interpretation based on the foundational concepts of general chemistry. It invites students to consider how the order and beauty found in chemistry principles can inspire responsible stewardship of God's creation.

Course Outcomes

Course Outcomes for CHEM 2315:

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

1. Define the fundamental properties of matter.
2. Determine the basic nuclear and electronic structure of atoms.
3. Identify trends in chemical and physical properties of the elements using the Periodic Table.
4. Describe the bonding in and the shape of simple molecules and ions.
5. Solve stoichiometric problems.
6. Write chemical formulas.
7. Write and balance equations.
8. Use the rules of nomenclature to name chemical compounds.
9. Define the types and characteristics of chemical reactions.
10. Use the gas laws and basics of the Kinetic Molecular Theory to solve gas problems.
11. Determine the role of energy in physical changes and chemical reactions.
12. Convert units of measurement and demonstrate dimensional analysis skills.
13. Classify matter, compounds, and chemical reactions.
14. Articulate how the study of matter and its interactions reveal order and beauty in creation.
15. Evaluate how scientific inquiry can be viewed as a means of exploring and stewarding God's world.

Course Outcomes for CHEM 2115:

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

1. Follow safe and proper handling of laboratory equipment and chemicals.
2. Convert units of measurement and demonstrate dimensional analysis skills.
3. Conduct basic laboratory experiments following written procedures.
4. Make relevant observations and record experimental data completely and accurately.
5. Use basic laboratory equipment and apply basic methodologies used in the chemistry laboratory.
6. Analyze laboratory data and laboratory results for accuracy and precision.
7. Use graphical methods to make a logical interpretation of experimental results.
8. Interpret experimental data and laboratory results and relate them to theoretical principles.

9. Identify reliable sources of information for background information on chemistry experiments.
10. Articulate how the study of matter and its interactions reveal order and beauty in creation.
11. Evaluate how scientific inquiry can be viewed as a means of exploring and stewarding God's world.

Relation to Core Curriculum Mission and Outcomes

CHEM 2315: CHEM 2315 contributes to HCU's Core Curriculum mission and outcomes by inviting students to study the material world as an ordered, intelligible aspect of God's creation, where even foundational ideas like the gas laws or atomic theory reveal patterns that can be explored with both rigor and wonder. Faith integration encourages students to see coherence between scientific discoveries and theological meaning, fostering curiosity about how creation is structured and sustained while also cultivating humility about the limits of human understanding. In this way, the course not only builds scientific literacy but also promotes Christian wisdom, helping students grow as thoughtful learners who can engage complex questions with both intellectual rigor and a posture of reverence.

CHEM 2115: CHEM 2115 contributes to HCU's Core Curriculum mission and outcomes by inviting students to study the material world as an ordered, intelligible aspect of God's creation, where foundational techniques like spectrophotometry and titration reveal patterns that can be explored with both rigor and wonder. Through laboratory investigation and problem-solving, students develop habits of inquiry and intellectual discipline, learning to integrate quantitative reasoning with broader philosophical and theological reflection. Faith integration encourages students to see coherence between scientific discovery and theological meaning, fostering curiosity about how creation is structured and sustained while also cultivating humility about the limits of human understanding. In this way, the course not only builds quantitative literacy but also promotes virtues such as patience, honesty, and charity in collaborative work, helping students grow as thoughtful learners who can engage complex questions with both intellectual rigor and a posture of reverence.

Course Distinctives:

The following distinctives and values inform our CHEM 2315 curriculum design:

- **Jesus Christ, the Word:** We teach chemistry from a belief that Jesus Christ is the Word, who participated in the creation of the world and who at the Incarnation was made flesh and lived among us as both God and man (John 1).
- ***Moral Formation through Discussion and Writing:*** Learning to think well is supported by practice in reading, writing, and discussion. In these practices, students are taught to think and speak in truth and love (Ephesians 4:15). Scientific literacy and intellectual humility are emphasized as essential virtues supporting excellent reading, discussing, researching, and writing.