CHEM-120: GENERAL CHEMISTRY 1

Effective Term
Fall 2026

CC Approval
12/05/2025

AS Approval
12/11/2025

BOT Approval
12/18/2025

COCI Approval
03/04/2026

SECTION A - Course Data Elements

CB04 Credit Status
Credit - Degree Applicable

Discipline

Minimum Qualifications	And/Or
Chemistry (Master's Degree)	

Subject Code
CHEM - Chemistry
Course Number
120

Department
Chemistry

Division
Science and Engineering (SE)

Full Course Title
General Chemistry 1

Short Title
General Chemistry 1

CB03 TOP Code
1905.00 - Chemistry, General

CIP Code
40.0501

CB08 Basic Skills Status
NBS - Not Basic Skills

CB09 SAM Code
E - Non-Occupational

Rationale
Update prerequisite.

SECTION B - Course Description

Catalog Course Description

An introduction to principles of chemistry, with an emphasis on mathematical applications. Topics include atomic structure, chemical reactions, gram-mole-atom conversions, stoichiometry, aqueous solutions, concentrations, titrations, limiting reactants, gas behavior, kinetic molecular theory, bonding, molecular structure, quantum theory, and coordination chemistry.

SECTION C - Conditions on Enrollment

Open Entry/Open Exit

No

Repeatability

Not Repeatable

Grading Options

Letter Grade or Pass/No Pass

Allow Audit

Yes

Requisites

Prerequisite(s)

Completion of a course taught at or above the level of intermediate algebra and high school chemistry or CHEM-110 with a minimum grade of C or appropriate placement.

Requisite Justification

Requisite Description

Course Not in a Sequence

Subject

CHEM

Course #

110

Level of Scrutiny

Content Review

Upon entering this course, students should be able to:

1. Use algebraic expressions to solve problems as they apply to chemistry.
2. Using ratios, solve ideal gas law expressions, problems using concentration and dilution, gram/mole/atom conversions, and stoichiometric expressions.
3. Relate atomic structure and electron configuration to bonding and properties of solutions.
4. Using logarithms, calculate pH and the concentration of ions in acid and basic solutions.

SECTION D - Course Standards

Is this course variable unit?

No

Units

5.00

Lecture Hours

54.00

Lab Hours

108.00

Outside of Class Hours
108

Total Contact Hours
162

Total Student Hours
270

Distance Education Approval

Is this course offered through Distance Education?
Yes

Online Delivery Methods

DE Modalities	Permanent or Emergency Only?
Entirely Online	Permanent
Hybrid	Permanent
Online with Proctored Exams	Permanent

SECTION E - Course Content

Student Learning Outcomes

	Upon satisfactory completion of the course, students will be able to:
1.	Communicate chemical and physical processes at the molecular level and how they relate to the macroscopic environment.
2.	Solve both qualitative and quantitative chemistry problems while demonstrating the reasoning clearly and completely.
3.	Implement laboratory techniques correctly using appropriate safety procedures and express them clearly in written laboratory reports.

Course Objectives

	Upon satisfactory completion of the course, students will be able to:
1.	The American Chemical Society (ACS) General Chemistry Guide and the General Chemistry examinations provide information on topics and indicate an appropriate level of this sequence of courses, including learning goals and objectives. At the conclusion of the course, each student should be able to employ standard laboratory techniques appropriate to the course content. These may include but are not limited to the following.
2.	Explain how chemicals and chemical processes are investigated and concepts developed based on the experimental evidence.
3.	Model the process of science in chemistry, by asking questions of chemical systems. Use these questions as the basis for designing experiments which will then be completed. Develop explanations based on the data to develop structural and behavioral models.
4.	Demonstrate safe laboratory procedures when handling chemicals, chemical glassware and instruments, and the proper disposal of chemical waste.
5.	Discuss and illustrate the application and role of chemical principles and processes important for society and the environment.
6.	Analyze a problem and develop a plan to solve it. Produce notes about the plan that can be understood and followed by others dealing with the same problem.
7.	Judge when insufficient data is provided in a problem as well as selecting appropriate data from extraneous information to solve a problem.
8.	Describe and illustrate how to measure chemicals and their properties by appropriate laboratory equipment and apparatus. Isolate and identify chemicals based on their properties.
9.	Manipulate chemical concepts and experimental information to predict what to expect from the action of chemical systems and processes.

Course Content

1. Overview of Chemistry
2. Chemical nomenclature
3. Atoms, molecules and ions

4. States of matter
5. Descriptive chemistry - chemistry of the main group elements
6. Stoichiometry
7. Chemical reactions
8. Significant figures and propagation of error
9. Reaction types including but not limited to single and double replacement, neutralization, combustion, combination, decomposition and oxidation-reduction
10. Solution chemistry
11. Gases laws and kinetic molecular theory
12. Atomic structure and periodicity
13. Quantum theory
14. Molecular structure and bonding
15. Coordination chemistry

Other topics may include:

1. Kinetics
2. Nuclear chemistry
3. Organic chemistry

Laboratory Activities:

The laboratory sequence will support the above topics including both qualitative and quantitative experiments, analysis of data and error propagation.

Methods of Instruction

Methods of Instruction

Types	Examples of learning activities
Lecture	
Other	Chemical demonstrations. Video presentations. Individual and group problem solving in the classroom. Individual and group laboratory experiments. Peer oriented guided instruction where the students help one another under the guidance of an instructor.

Online Adaptation

Types	Examples of learning activities
Activity	
Directed Study	
Discussion	
Group Work	
Individualized Instruction	
Journal	
Lecture	

Instructor-Initiated Online Contact Types

Announcements/Bulletin Boards
Chat Rooms
Discussion Boards
E-mail Communication
Telephone Conversations
Video or Teleconferencing

Student-Initiated Online Contact Types

Chat Rooms
Discussions
Group Work

Course design is accessible

Yes

Methods of Evaluation

Methods of Evaluation

Types	Examples of classroom assessments
Exams/Tests	Four exams will be given, including the final exam. Exams will be fill in, multiple choice, true/false, and short answer, and will be graded on a point scale. A sample question may be, how many grams of sulfur are there in 10 grams of FeSO4? or What is pressure of 0.4 mole of gas at STP? or perhaps, please write down four possible quantum numbers for Sulfur.
Quizzes	Weekly quizzes will be given. Quizzes will be fill in, multiple choice, true/false, and short answer, and will be graded on a point scale. A sample question may be, what is the empirical formula of a compound that is 75% carbon and 25% hydrogen? or What is the velocity of hydrogen at STP? or perhaps, please write down the complete orbital configuration for bromine.
Projects	Group Projects - At the end of each semester, groups of students are assigned a mini-research project that must be solved experimentally. The students develop the methods and procedures used in lab, do the experiment and then write a lab report explaining the experiment and the results achieved. Typical projects include Calculation of the Solubility Product of Lead Iodide and A Determination of the Composition of an Unknown Compound.
Homework	Students will have assigned reading and homework will be assigned. Typical assignment may be, Read Chapter 11 and do homework problems 11.1 through 11.20. Reading and homework is evaluated with quizzes, exams, and class discussion.
Lab Activities	Students are required to attend a weekly lab. Students will work individually and in groups. All labs will be checked off by the instructor prior to the student leaving the lab. Labs are graded and returned to the student upon completion. A typical lab will include the collection of experimental data, data analysis, graphical representations of the data, a report on the results and error analysis as well as a section on objectives, procedure, and conclusions. A sample lab might be, The Titration of an Unknown Acid, or Calculation of the Gas Constant, R.
Other	Final Exam - A comprehensive final exam will be given. This exam will be fill in, multiple choice, true/false, short answer, and multistep chemical processes where work must be shown. The exam will be graded on a point scale. A sample question may be, how many grams for sulfur are there in 10 grams of FeSO4? or What is pressure of 0.4 mole of gas at STP? or perhaps, please write down four possible quantum numbers for Sulfur.
Other	Regular attendance in the laboratory is required. All labs will be checked off by the instructor prior to the student leaving the lab.

Assignments

Reading Assignments

Daily reading of text; weekly reading of lab manual (ex: Read Chapter 2,"The Periodic Table," Sections 2.1 through 2.4 in your text and read the first lab, "Basic Laboratory Techniques.")

Writing Assignments

Problem sets are provided for homework. Laboratory write-ups are assigned weekly. Sample tests/study sheets are provided for each of the four exams.

SECTION F - Textbooks and Instructional Materials

Material Type

Textbook

Author

Tro

Title

Principles of Chemistry: A Molecular Approach

Edition/Version
2nd

Publisher
Prentice Hall

Year
2012

Material Type
Textbook

Author
Fawl, S

Title
Insights into Chemistry

Edition/Version
2nd

Publisher
Fountainhead Press

Year
2018

Material Type
Manual

Author
Fawl

Title
Laboratory Manual, General Chemistry

Publisher
NVC Reproduction Services

Year
08-22-2012

SECTION G - Diversity, Equity and Inclusivity

How does your course and/or course outline of record reflect strategies for accommodating and engaging diverse student populations, advancing equitable outcomes, and fostering inclusion for all students?

This course supports diverse student populations through the use of multiple representations of concepts, varied applications, and technology. Strategies may also include collaborative learning, transparent assessment practices, low-cost resources, alternative formative assessment, structured opportunities for direct communication with the instructor, and opportunities for students to connect course material to their own experiences, fostering equitable outcomes and an inclusive classroom environment.

Course Codes (Admin Only)

CB00 State ID
CCC000558182

CB10 Cooperative Work Experience Status
N - Is Not Part of a Cooperative Work Experience Education Program

CB11 Course Classification Status
Y - Credit Course

CB13 Special Class Status
N - The Course is Not an Approved Special Class

CB23 Funding Agency Category
Y - Not Applicable (Funding Not Used)

CB24 Program Course Status
Program Applicable

Allow Pass/No Pass
Yes

Only Pass/No Pass
No