Lassen Community College Course Outline

CHEM 1B General Chemistry II 5.0 Units

I. Catalog Description

This is the second semester of a one-year course sequence in chemistry intended for majors in the natural sciences (chemistry, biochemistry, biology, physics, pre-medicine), mathematics, and engineering.

This course uses an OER resource.

Diversity Statement

Our commitment to diversity requires that we strive to eliminate barriers to equity and that we act deliberately to create a safe and inclusive environment where individual and group differences are valued and leveraged for the growth and understanding as an educational community.

Prerequisite(s):

C-ID CHEM110 or CHEM 1A; Eligible for transfer-level mathematics.

Advisories:

Knowledge of exponential functions and logarithms is strongly recommended. These are part of the pre-calculus curriculum.

Additional Course Information

Transfer Status:

- Transfers to both CSU/UC
- Local GE Area: 5
- Cal-GETC Area: 5A & 5C
- *C-ID CHEM 120S*

Total Number of Hours by Instructional Method:

- 51 Hours Lecture, 102 Hours Lab, 102 Expected Outside Class Hours, 255 Total Student Learning Hours
- Scheduled: Spring (even)

II. Coding Information

- Repeatability: Not Repeatable, Take 1 Time
- Grading Option: Graded or Pass/No Pass
- Credit Type: Degree Applicable
- TOP Code: 190500
- CIP Code: 400501
- SAM Code:

☐ A-Apprenticeship
☐ B-Advanced Occupational
☐ C-Clearly Occupational
☐ D-Possibly Occupational
☒ E-Non-Occupational

III. Course Objectives

Course Student Learning Outcomes

Upon completion of this course the student will be able to:

1. Demonstrate an understanding of the language, laws, theories and processes that are central to understanding chemical kinetics and various type of chemical equilibria, and conduct appropriate calculations related to the concepts.
2. Apply critical thinking and analytical skills to approach a research problem as related to the study of Chemistry.
3. Communicate an understanding of the subject matter as related to the study of Chemistry.

Course Objectives

Upon completion of this course the student will be able to:

Lecture Objectives

1. Demonstrate an understanding of the fundamental principles of chemistry, including: Atomic and Molecular Structure, bonding, basic treatment of Quantum Theory, Periodic Properties, Stoichiometry, Gas Laws, States of Matter and an introduction to Solutions
2. Apply mathematics to solving Chemistry problems
3. Analyze experimental data
4. Formulate solutions to quantitative problems
5. Anticipate, recognize, and respond properly to hazards in laboratory procedures and managing chemical waste
6. Keep accurate and complete experimental records
7. Perform accurate and complete experimental records
8. Perform accurate quantitative measurements
9. Interpret experimental results and draw reasonable conclusions
10. Analyze data statistically, assessing the reliability of experimental results, and discussing the sources of systematic and random error in experiments
11. Communicate effectively through oral and written reports

As all of these basic skills are repeated throughout a Chemistry curriculum, one or more of these skills may be saved for the second semester of General Chemistry.

These topics and skills are expected to be at a level higher than when first introduced in Introductory Chemistry. (Adapted from the ACS Curriculum recommendation: link to ACS resource)

Lab Objectives

1. Apply mathematics to solving Chemistry problems

2. Analyze experimental data
3. Formulate solutions to quantitative problems.
4. Anticipate, recognize, and respond properly to hazards in laboratory procedures and managing chemical waste
5. Keep accurate and complete experimental records
6. Perform accurate quantitative measurements
7. Interpret experimental results and drawing reasonable conclusions
8. Analyze data statistically, assessing the reliability of experimental results, and discussing the sources of systematic and random error in experiments
9. Communicate effectively through oral and written reports

IV. Course Content

A. Outline of Topics

Lecture Content

1. Solutions
2. Equilibrium
3. Acids & Bases
4. Solubility Equilibria
5. Electrochemistry
6. Thermodynamics
7. Kinetics
8. Nuclear Chemistry

Laboratory Content

The laboratory sequence will support the above topics including primarily (≥80%) hands-on qualitative and quantitative experiments that incorporate data analysis. Experimental activities appropriate for the course include safety training, solution preparation, chemical measurements, titration, gravimetric analysis, and spectrophotometry. One or more of these may occur during the second semester course.

V. Assignments

Appropriate Readings

- Standard college level texts, articles and papers from the chemical literature.

Writing Assignments

- Essay examinations and laboratory reports.

Expected Outside Assignments

- Readings, problem solving, report writing.

Specific Assignments that Demonstrate Critical Thinking

- Hands-on qualitative and quantitative experiments including analysis of data and error. Drawing conclusions from the experimental result and presenting the experimental results in laboratory reports.

VI. Universal Design for Learning Principles

Definitions and/or examples of UDL methods can be found in the Curriculum Handbook.

☒ Multiple Means of Engagement
☒ Multiple Means of Representation
☒ Multiple Means of Action and Expression

VII. Representative Texts and Supplies

1. Open Educational Resource Textbook: *Chemistry 2e*, Paul Flowers, Klaus Theopold, Richard Langley. 2nd ed. Openstax (2019). Available in class canvas section (free), or online through this link, or through the LCC Bookstore (minimal cost for printing). © Jul 9, 2025 OpenStax. Textbook content produced by OpenStax is licensed under a Creative Commons Attribution License.
2. A laboratory manual will be prepared and provided by the instructor: Chem 1B Laboratory Manual, LCC Chemistry Department, 2025.

☒Zero Textbook Cost/Open Educational Resource
☐Textbook Cost is $0.01 to $30.00
☐Textbook Cost is $30.01 to $40.00
☐Textbook Cost is over $40.00

VIII. Disciplines

Chemistry

IX. Course Status

1. Current Status: Active
2. Original Approval Date: 5/15/1990
3. Course Originator:
4. Board Approval Date: 1/13/2026
5. Chancellor's Office Approval Date:
6. Revised By: Theresa Wilson, Ph.D.
7. Curriculum/Academic Standards Committee Revision Date: 12/2/2025
8. See the following page for Methods of Evaluation and Methods of Delivery.

X. Methods of Evaluation

List general evaluation methods. Handbook Descriptions
Only include the appropriate evaluation modalities

☒ Traditional Evaluation
☐ Correspondence Evaluation
☐ Hybrid Evaluation
☐ Online Evaluation
☐ Other (Please List):

Traditional Evaluation
Term paper (topic choice, thesis statement, outline, bibliography, rough draft, final draft), homework, classroom discussion, essay, journals, lab demonstrations and activities, multiple choice quizzes, and participation.

XI. Methods of Delivery

Check those delivery methods for which this course has been separately approved by the Curriculum/Academic Standards Committee. Handbook Descriptions

☒ Traditional Classroom Delivery
☐ Correspondence Delivery
☐ Hybrid Delivery
☐ Hybrid With Lab Delivery
☐ Online Delivery

Traditional Classroom Delivery
Lecture, discussion, audio/visual aids, demonstration, group exercises, guest speakers, lab, individualized programs and other as needed.