

Course Outline of Record

1. Course Code: CH-001A
2. a. Long Course Title: General Chemistry I
b. Short Course Title: GEN CHEMISTRY I
3. a. Catalog Course Description:
This is the first course of a two-semester sequence covering the basic principles and concepts of chemistry with emphasis on chemical calculations. Inorganic chemistry is stressed, and the material includes a discussion of atomic structure, chemical bonding, molecules, reaction types, states of matter, and the properties of solutions. The laboratory part of the course complements the lectures and includes qualitative analysis.
b. Class Schedule Course Description:
This is the first course of a two-semester sequence covering the basic principles and concepts of chemistry, with emphasis on chemical calculations.
c. Semester Cycle (if applicable): This course is offered in the Fall and Spring every year.
d. Name of Approved Program(s):
 - CHEMISTRY AS Degree and Transfer Preparation
4. Total Units: 5.00 Total Semester Hrs: 126.00
Lecture Units: 4 Semester Lecture Hrs: 72.00
Lab Units: 1 Semester Lab Hrs: 54.00
Class Size Maximum: 24 Allow Audit: No
Repeatability No Repeats Allowed
Justification 0
5. Prerequisite or Corequisite Courses or Advisories:
Course with requisite(s) and/or advisory is required to complete Content Review Matrix (CCForm I-A)
Prerequisite: CH 003 or one year high school chemistry
Prerequisite: MATH 040
6. Textbooks, Required Reading or Software: (List in APA or MLA format.)
 - a. Beran., J.A. (2014). *Laboratory for Principles of General Chemistry* (10th /e). New York, NY John Wiley & Sons Inc..
College Level: Yes
Flesch-Kincaid reading level: 12
 - b. Jespersion, N.D.Brady, J.E. & Hyslop, A. (2015). *Chemistry: The Molecular Nature of Matter* (7th /e). New York, NY John Wiley & Sons Inc..
College Level: Yes
Flesch-Kincaid reading level: 12
7. Entrance Skills: *Before entering the course students must be able:*
 - a. Describe the different forms of matter.
 - CH 003 - Understand the fundamental concepts of chemistry with their applications to human affairs.
 - CH 003 - Solve chemistry problems with the coupled recognition that calculation methods in chemistry are shared in other domains such as business, economics, and technology.
 - CH 003 - Develop learning habits, responsibility and discipline
 - b. Describe the different types of chemical reactions.
 - CH 003 - Understand major historical chemistry discoveries which have been a part of human social and technological development.
 - CH 003 - Develop learning habits, responsibility and discipline
 - c. Use simple instruments used in examining chemical behavior.

- CH 003 - Demonstrate use of tools and instruments involved in making findings in chemical behavior.

d. Solve simple chemical problems.

- CH 003 - Solve chemistry problems with the coupled recognition that calculation methods in chemistry are shared in other domains such as business, economics, and technology.

e. Analyze data in a graphical manner

- MATH 040 - Recognize when a table, graph, or equation is linear.
- MATH 040 - Create a linear model in the form of a table, graph, or equation.
- MATH 040 - Find the equation of a line and apply it to solve problems with a constant of change.
- MATH 040 - Solve 2x2 and 3x3 systems of linear equations.

f. Utilize the concept of functions.

- MATH 040 - Comprehend that the key characteristic of an exponential function is its constant growth (decay) factor.
- MATH 040 - Recognize when a table, graph, or equation is exponential and when a word problem can be modeled with an exponential function.

g. Solve quadratic equations.

- MATH 040 - Solve quadratic equations by factoring, completing the square, taking square roots or the quadratic formula.
- MATH 040 - Solve root equations.

h. Create ideas and expound them in brief essay form.

- CH 003 - Demonstrate critical thinking skills when reading, composing and participating in class discussions

8. Course Content and Scope:

Lecture:

1. Review of mathematics, measurement units and dimensional analysis.
2. Matter and its nature.
3. Atomic structure and its relationship to periodicity.
4. Energy and chemical change
5. Types of chemical reactions, including metathesis, acids and bases, REDOX and metathesis reactions.
6. Chemical bonding and the nature of molecules and molecular shapes.
7. States of matter, gas laws and kinetic molecular theory of gases.
8. Solutions, their formation and colligative properties.

Lab: *(if the "Lab Hours" is greater than zero this is required)*

1. Students will learn about safety and how to determine quantities of material gravimetrically and volumetrically using chemical balances, pipettes and burettes.
2. They will learn how to safely mix reagents and perform different chemical reactions including oxidation-reduction reactions.
3. Students will learn to perform quantitative analyses using titration.
4. They will learn about acids, bases and salts.
5. Students will do a calorimetry experiment with three parts and lots of graphing using excel
6. Students will learn how to do a synthesis reaction of Potassium Alum
7. They will determine the molar mass of a solid and the molar volume of a gas
8. They will use sensors, LabQuest, Logger Pro from Vernier

9. Course Student Learning Outcomes:

1. Identify the essential parts of a problem and formulate a coherent and empirically valid strategy for solving the problem.
2. Use scientific and chemical terminology to provide explanations of observed scientific phenomena.
3. Describe the role of chemistry in society.
4. Describe chemistry issues related to daily life and the environment.
5. Use modern chemical equipment in the laboratory.
6. Perform experiments and draw valid conclusions.

10. Course Objectives: *Upon completion of this course, students will be able to:*
- Describe atomic structure to the level of atomic orbitals and explain the relationship to periodicity.
 - Distinguish between different types of chemical bonds.
 - Describe the shapes of molecules in terms of valence bond theory, hybrid orbitals and molecular orbitals.
 - Solve problems in stoichiometry.
 - Recognize and describe the different varieties of chemical reactions, including balancing REDOX equations.
 - Describe the kinetic molecular theory of matter, states of matter and use the gas laws in calculations.
 - Describe the properties of solutions and perform relevant calculations.
11. Methods of Instruction: *(Integration: Elements should validate parallel course outline elements)*
- Discussion
 - Laboratory
 - Lecture
 - Participation
 - Supplemental/External Activity
 - Technology-based instruction
12. Assignments: *(List samples of specific activities/assignments students are expected to complete both in and outside of class.)*
- In Class Hours: 126.00
- Outside Class Hours: 144.00
- In-class Assignments

1. Complete all laboratory experiments in the manual.

 - Out-of-class Assignments

1. Read all relevant material.
2. Complete all assigned homework problems.
3. Complete all laboratory experiments in the manual
13. Methods of Evaluating Student Progress: *The student will demonstrate proficiency by:*
- Written homework
The laboratory assignments will be graded for ability to follow directions and for clarity of presentation.
 - Laboratory projects
They have to read a scientific article and type an abstract on that article.
 - Group activity participation/observation
Students work in groups of two.
 - True/false/multiple choice examinations
Periodic examinations will be given on the subject matter, they will include essay and multiple choice questions.
 - Mid-term and final evaluations
There will be a comprehensive final examination on the lecture material.
14. Methods of Evaluating: Additional Assessment Information:
15. Need/Purpose/Rationale -- *All courses must meet one or more CCC missions.*
- IGETC Area 5: Physical and Biological Sciences (mark all that apply)
- A: Physical Science with Lab
 - A: Physical Science without Lab
 - A: Physical Science, Lab only
- CSU GE Area B: Physical and its Life Forms(mark all that apply)
- B1 - Physical Science
 - B3 - Laboratory Sciences
- PO-GE C1-Natural Sciences

Explain concepts and theories related to physical, chemical, and biological natural phenomena.

Apply the scientific process and its use and limitations in the solution of problems.

Use college-level mathematical concepts and methods to understand, analyze, and explain issues in quantitative terms.

IO - Scientific Inquiry

Identify components of the scientific method.

Collect and analyze data. Skills of data collection include an understanding of the notion of hypothesis testing and specific methods of inquiry such as experimentation and systematic observation.

Analyze quantitative and qualitative information to make decisions, judgments, and pose questions.

IO - Critical Thinking and Communication

Apply principles of logic to problem solve and reason with a fair and open mind.

16. Comparable Transfer Course

University System	Campus	Course Number	Course Title	Catalog Year
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17. Special Materials and/or Equipment Required of Students:

Calculator with scientific functions.

18. Materials Fees: Required Material?

Material or Item

Cost Per Unit

Total Cost

19. Provide Reasons for the Substantial Modifications or New Course:

Change Math prerequisite from MATH-012 to MATH-040.

20. a. Cross-Listed Course (*Enter Course Code*): *N/A*

b. Replacement Course (*Enter original Course Code*): *N/A*

21. Grading Method (*choose one*): Letter Grade Only

22. MIS Course Data Elements

a. Course Control Number [CB00]: CCC000331587

b. T.O.P. Code [CB03]: 190500.00 - Chemistry, General

c. Credit Status [CB04]: D - Credit - Degree Applicable

d. Course Transfer Status [CB05]: A = Transfer to UC, CSU

e. Basic Skills Status [CB08]: 2N = Not basic skills course

f. Vocational Status [CB09]: Not Occupational

g. Course Classification [CB11]: Y - Credit Course

h. Special Class Status [CB13]: N - Not Special

i. Course CAN Code [CB14]: *N/A*

j. Course Prior to College Level [CB21]: Y = Not Applicable

k. Course Noncredit Category [CB22]: Y - Not Applicable

l. Funding Agency Category [CB23]: Y = Not Applicable

m. Program Status [CB24]: 1 = Program Applicable

Name of Approved Program (*if program-applicable*): *N/A*

Attach listings of Degree and/or Certificate Programs showing this course as a required or a restricted elective.)

23. Enrollment - Estimate Enrollment

First Year: 24

Third Year: 24

CH 001A-General Chemistry I

24. Resources - Faculty - Discipline and Other Qualifications:

a. Sufficient Faculty Resources: Yes

b. If No, list number of FTE needed to offer this course: *N/A*

25. Additional Equipment and/or Supplies Needed and Source of Funding.

N/A

26. Additional Construction or Modification of Existing Classroom Space Needed. (*Explain:*)

N/A

27. FOR NEW OR SUBSTANTIALLY MODIFIED COURSES

Library and/or Learning Resources Present in the Collection are Sufficient to Meet the Need of the Students Enrolled in the Course: Yes

28. Originator Joana G Ciurash Origination Date 10/11/16