

# **CHEM 020: INTRO TO GENERAL CHEMISTRY**

# In Workflow

- 1. SCI Chair (joshuad@cos.edu)
- 2. SCI Dean (franciscob@cos.edu)
- 3. Curriculum Coordinator (sarahha@cos.edu)
- 4. Articulation Officer (mainouh@cos.edu)
- 5. Academic Resources Specialist (danielal@cos.edu)
- 6. SCI Representative (mattheww@cos.edu)
- 7. Distance Education Coordinator (eliseb@cos.edu)
- 8. Curriculum Coordinator (sarahha@cos.edu)
- 9. Chiara Giammanco MacPherson (chiarag@cos.edu)
- 10. Vice President of Academic Affairs (jenniferl@cos.edu)
- 11. Curriculum Coordinator CC Vote Prep (sarahha@cos.edu)
- 12. Curriculum Committee Action Item (danielal@cos.edu)
- 13. Academic Senate President (juana@cos.edu)
- 14. Board of Trustees (danielal@cos.edu)
- 15. Chancellor's Office (danielal@cos.edu)
- 16. Banner (danielal@cos.edu)

# **Approval Path**

- 1. Tue, 02 Mar 2021 23:51:05 GMT Sarah Harris (sarahha): Rollback to Initiator
- 2. Sat, 15 Jan 2022 19:22:43 GMT Ryan Froese (ryanf): Approved for SCI Chair
- 3. Wed, 02 Feb 2022 18:41:34 GMT Francisco Banuelos (franciscob): Approved for SCI Dean
- Mon, 28 Feb 2022 23:33:21 GMT Sarah Harris (sarahha): Rollback to Initiator
- 5. Wed, 15 Feb 2023 18:06:31 GMT Joshua Dillard (joshuad): Approved for SCI Chair
- 6. Sat, 11 Mar 2023 00:22:35 GMT Francisco Banuelos (franciscob): Approved for SCI Dean
- 7. Tue, 21 Mar 2023 16:50:00 GMT Sarah Harris (sarahha): Rollback to Initiator
- 8. Tue, 21 Mar 2023 21:34:06 GMT Joshua Dillard (joshuad): Approved for SCI Chair
- 9. Sat, 15 Apr 2023 02:12:03 GMT Francisco Banuelos (franciscob): Approved for SCI Dean
- 10. Fri, 21 Apr 2023 22:05:30 GMT Sarah Harris (sarahha): Approved for Curriculum Coordinator
- 11. Mon, 24 Apr 2023 15:44:04 GMT Mainou Her (mainouh): Approved for Articulation Officer
- Tue, 25 Apr 2023 17:57:03 GMT Daniel Alvarado (danielal): Approved for Academic Resources Specialist
- 13. Fri, 15 Sep 2023 17:33:45 GMT Matthew Waterhouse (mattheww): Approved for SCI Representative
- 14. Mon, 16 Oct 2023 16:18:04 GMT Elise Baker (eliseb): Approved for Distance Education Coordinator
- 15. Mon, 16 Oct 2023 17:47:45 GMT Sarah Harris (sarahha): Approved for Curriculum Coordinator
- 16. Mon, 16 Oct 2023 18:11:49 GMT Chiara Giammanco MacPherson (chiarag): Approved for chiarag
- 17. Mon, 16 Oct 2023 21:39:58 GMT Jennifer Vega La Serna (jenniferl): Approved for Vice President of Academic Affairs



18. Tue, 17 Oct 2023 16:23:02 GMT Sarah Harris (sarahha): Approved for Curriculum Coordinator CC Vote Prep

# History

- 1. Jan 17, 2019 by Daniel Alvarado (danielal)
- 2. Mar 14, 2019 by Daniel Alvarado (danielal)
- 3. Jun 26, 2019 by Daniel Alvarado (danielal)

Date Submitted: Tue, 21 Mar 2023 19:05:14 GMT

Viewing: CHEM 020 : Intro to General Chemistry Last approved: Wed, 26 Jun 2019 11:15:10 GMT Last edit: Mon, 16 Oct 2023 16:18:00 GMT Changes proposed by: chiarag

Proposer and Co-Contributor(s):

#### Proposer:

#### Name:

Chiara MacPherson

## Effective Term:

Summer 2024

# General:

Credit Status:

Credit - Degree Applicable

Subject: CHEM - Chemistry Course Number: 020

**Catalog Title** Introduction to General Chemistry

## **Catalog Description**

CHEM 020 is a one semester transferable college chemistry course designed to meet the needs of allied-health and non-science majors. The course is a study of the fundamental theories and laws of chemistry. The laboratory portion of the course involves experimentation and drawing conclusions from data.

#### Prerequisites

Elementary algebra or higher or eligibility for transfer-level mathematics

#### Advisory on Recommended Preparation:

CHEM 010 and MATH 044 or higher or equivalent college course with a minimum grade of C

#### Method of Instruction:

Distance Education Laboratory Lecture and/or Discussion

# **Course Units/Hours:**

**Course Units Minimum:** 

4

#### Lecture Hours Minimum (week)

Email:

chiarag@cos.edu



Lab Hours Minimum (week)

3

Activity Hours Minimum (week)

Outside Hours Minimum (week)

6

**Total Contact Hours Minimum (semester)** 105

**Total Outside Hours Minimum (semester)** 105

**Total Student Learning Minimum Hours (semester)** 210

**Do you want to override any hours fields?** No

**Repeatability:** No

**Repeat Type:** N - Non-Repeatable Credit

**Open Entry/Exit:** No

Field Trips: Not Required

Grade Mode: Standard Letter

# **State Requirements**

**TOP Code:** 190500 - Chemistry, General

SAM Code: E - Non-Occupational

**Basic Skills Status:** N - Not Applicable

**Prior Transfer Level:** Y - Not Applicable

**Cooperative Work Experience:** No

Approved Special Class: N - Not special class

**Funding Agency Category:** Not Applicable



**Program Status:** 

**Program Applicable** 

### **Course Content**

#### Methods of Assessment:

Essay quizzes or exams Problem solving assignments or activities Problem solving quizzes or exams Short answer quizzes or exams Skill demonstrations

#### **Course Topics:**

	Course Topics
1	Measurement
2	Matter - Atoms and Elements
3	Acids, Bases, and Salts
4	Energy and States of Matter
5	Nomenclature
6	Chemical Bonds
7	Chemical Reactions
8	Stoichiometry
9	Solutions
10	Aqueous Systems
11	Gas Laws
12	Redox Reactions
13	Equilibrium and Kinetics
14	Nuclear Chemistry

#### **Course Objectives:**

	Course Objectives
1	Laboratory Skills: Collect, record, organize, and analyze experimental data, and recognize the limitations of measurements.
2	Qualitative Analysis: Demonstrate critical thinking and logical reasoning skills by applying appropriate theories and techniques to solve qualitative problems. This will include nomenclature, molecular/complete/net ionic equations, and VSEPR theory.
3	Quantitative Analysis: Demonstrate critical thinking and logical reasoning skills by applying appropriate theories and techniques to solve quantitative problems. This will include dimensional analysis, stoichiometry/limiting reactants, thermodynamics, and mathematical applications of gas laws.

#### **Course Outcomes:**

	Course Outcomes
1	Laboratory Skills: Collect, record, organize, and analyze experimental data, and recognize the limitations of measurements.
2	Qualitative Analysis: Demonstrate critical thinking and logical reasoning skills by applying appropriate theories and techniques to solve qualitative problems. This will include nomenclature, molecular/complete/net ionic equations, and VSEPR theory.
3	Quantitative Analysis: Demonstrate critical thinking and logical reasoning skills by applying appropriate theories and techniques to solve quantitative problems. This will include dimensional analysis, stoichiometry/limiting reactants, thermodynamics, and mathematical applications of gas laws.



#### Assignments:

	D-4-14
Assignment Type:	Details
Reading	Students are expected to read each relevant chapter of the textbook prior to attending the lecture of the same topic. The following is an example of a typical reading assignment: Please read chapter 1 of the textbook completely. As you read the section on the scientific method (pages 4-5), pay careful attention to the difference between an observation, a hypothesis, a scientific theory and a scientific law. Take Cornell-style notes on the reading, then write a short summary applying the scientific method to a problem/observation you come across in your daily life. -Read the background and procedure for lab experiments in preparation for lab. The following is an example of a typical reading assignment:
	Please read the "Percent of Sulfate in a Salt" Lab in your lab manual, including the objective, background, and Experimental procedure sections. Write an overall one sentence summary of the aim of the lab and a bullet point list of the procedural steps in your own words
Writing	-Writing assignments are given weekly to allow students a chance to demonstrate their knowledge of a particular concept or concepts discussed during lecture. The following is an example of a typical writing assignment: In a paragraph, please describe the similarities and differences between a scientific theory and a hypothesis.
	-Write a summary aim and bullet point outline in preparation for conducting lab experiments. The following is an example of a typical writing assignment: Please read the "Percent of Sulfate in a Salt" Lab in your lab manual and write an overall one sentence summary of the aim of the lab and a bullet point list of the procedural steps in your own words
	-Writing assignments are also given weekly in the Lab session that apply the lab experiments to lecture concepts. These require students to explain how and why certain experiments have the results observed. The following is an example of a typical writing assignment: If a student is measuring the density of an object using the method that was used in this lab, but didn't have enough water to cover the object, would the density calculated be too high too low or unchanged? Please explain your answer using complete sentences and any requisite formulae.
Homework	Multiple homework assignments are given throughout the semester, typically on a weekly basis. The assignments are designed to allow students an opportunity to gain familiarity with the concepts discussed in class and a chance to practice problem solving methods. The following is an example of a typical homework assignment: Please complete the Review Questions #1-15 at the end of chapter 1, the Paired Exercises #1-6, and Challenge Exercises #3 and 4. Questions may also be created by the instructor.
	Homework may also be assigned each class to ensure that students are keeping up with the reading. Typically this involves completing an online, open book, untimed Canvas-based quiz on the reading for the day to check for comprehension. It may involve discussion posts or other responses.
	Some instructors have begun utilizing an online adaptive homework program which requires students to show mastery. This has resulted in an increase in scores on final exams, so more instructors are using it. The program is called ALEKS, and an example of a mastery topic is as follows: Students will be able to deduce the ions in a polyatomic ionic compound from its empirical formula. A student must answer at least 3 questions concerning the topic to complete it, and more if they answer incorrectly. A typical assignment would consist of ~5 ALEKS topics (15-25 problems).



Lab	A variety of laboratory exercises have been used successfully in this course. To best meet the needs of the students and coordinate laboratory exercises with lecture material, the instructor may substitute, add, or omit from the following example list. A typical set of experiments would be: A. Chemical Laboratory Safety B. Measurements C. Density of Substance D. Separation of Mixtures E. Thin Layer Chromatography F. Physical & Chemical Properties G. Empirical Formula H. Chemical Reactions I. Percentage of Sulfate in a Salt J. Molecular Models K. Periodic Table L. Properties of Gases M. Quantitative Preparation of a Gas N. Solutions and Solubility O. PH and Buffers P. Acid-Base Titration Q. Chemical Equilibrium Students should turn in data collected from the lab, relevant calculations, and answer critical thinking questions as part of their lab writeup.

#### Textbooks or other support materials

Resource Type:	Details
Books	Foundations of College Chemistry; Hein, Arena, Willard; 16th edition Wiley 2021 978-1-119-76811-1
Books	Introductory Chemistry; Nivaldo Tro; Pearson; 7th edition 2023; 978-0-137-90133-3
Zero Textbook Cost	https://chem.libretexts.org/Courses/Fresno_City_College/Introductory_Chemistry %2C_Atoms_First_for_FCC
Manuals	Chemistry 20 Course Packet COS Chemistry Department College of the Sequoias 2009-08-01
Web/Other	wwww.ALEKS.com (Adaptive Learning System)
Web/Other	Instructor designed laboratory experiments

#### Library Materials:

No

#### **Equity Review:**

No

# Transferable to CSU

Yes - Approved

#### **CSU General Education**

CSU GE B1: Physical Science Transferable to CSU CSU GE B3: Laboratory Activity

#### **Transferable to UC**

Yes - Approved

#### **UC/IGETC General Education**

IGETC 5A: Physical Sciences IGETC 5C: Science Lab Transferable to UC

#### COS General Education COS GE B: Natural Sciences



Other Degree Attributes Degree Applicable

Not a Basic Skills Course

# Attachments:

**Distance Learning Addendum** DLA Chem 20.pdf

## Database:

Banner Title: Intro to General Chemistry

**Proposal Type** Substantial

Course Control Number: CCC000317401

CIP Code: 400501 - Chemistry, General.

C-ID: CHEM101

#### **Enforced Prerequisites**

And/Or

Course/Test Code Min Grade/Score Academic Level )

Concurrency

#### Method of Instruction (Banner):

(

All Classes except labs Hybrid Laboratory/Studio Lecture and/or Discussion Lecture/Lab Combination Online Online with Orientation Online/Hybrid-Delayed Interact

#### Justification / Rationale:

5 year review. Updated course content, prerequisite statement, advisory statement, and textbook. Edited to reflect current practices. Added OER textbook currently in use.

#### **Reviewer Comments**

Sarah Harris (sarahha) (Tue, 02 Mar 2021 23:51:05 GMT): Rollback: Please update justification for prerequisite - should not be "required by regulation." If this is required for transfer/ C-ID please use that option and list the transfer course. Please select only one scheduling option on the DLA form and in methods of instruction - either emergency-only or ongoing DE, not both.

Sarah Harris (sarahha) (Mon, 28 Feb 2022 23:33:21 GMT): Rollback: Update the DLA form to list only ongoing online - if you later want to change it the course will have to come through and be updated again. Add example assignments (reading, writing, homework, lab). Check C-ID for appropriate lab assignment.

Sarah Harris (sarahha) (Tue, 21 Mar 2023 16:49:25 GMT): Removed emergency DLA checkboxes - emergency DE approval is incorporated in standard, ongoing DE. Only one should be selected.

Sarah Harris (sarahha) (Tue, 21 Mar 2023 16:50:00 GMT): Rollback: Add asignments - reading, writing, homework and lab.

Elise Baker (eliseb) (Mon, 16 Oct 2023 16:18:00 GMT): Updated DLA