CH 003: INTRODUCTORY GENERAL CHEMISTRY

Originator

cmelton

Justification / Rationale

To offer our students more online options for the safety of the students, faculty, and staff during the pandemic, but also to accommodate more of our students who may need access to online courses in order to attend.

Effective Term

Fall 2022

Credit Status

Credit - Degree Applicable

Subject

CH - Chemistry

Course Number

003

Full Course Title

Introductory General Chemistry

Short Title

INTRO GENERAL CHEM

Discipline

Disciplines List
Chemistry

Modality

Face-to-Face
Hybrid

Catalog Description

This course is the study of the principles of inorganic chemistry. Instruction is given in calculations, atomic theory, periodic law, compounds, bonding, nomenclature, states of matter, reaction types, composition, stoichiometry, acids, bases, pH, gas laws, and solutions. Laboratory is a hands-on experience stressing manipulation, procedure, data, and outcome calculations. Note: This course should be taken by Liberal Studies majors on the Education track to satisfy the chemistry requirement. It should also be taken as a prerequisite for CH 001A for students who have not had high school chemistry within the past 5 years.

Schedule Description

This course gives an overview of inorganic chemistry and teaches the students the proper chemical laboratory techniques. Prerequisite: MATH 054 Advisory: ENG 061 IGETC: 5A*, 5C*

Lecture Units

3

Lecture Semester Hours

54

Lab Units

1

Lab Semester Hours

54

In-class Hours

108

Out-of-class Hours
108

Total Course Units
4

Total Semester Hours
216

Prerequisite Course(s)
MATH 054
Advisory: ENG 061

Required Text and Other Instructional Materials

Resource Type
Book

Author
Zumdahl-Decoste

Title
Introductory Chemistry: A Foundation

Edition
9th

Publisher
Cengage Learning

Year
2014

College Level
Yes

Flesch-Kincaid Level
12

ISBN #
978-1337399425

Resource Type
Manual

Author
Hall, J., Little, J.

Title
Introductory Chemistry in the Laboratory

Publisher
Cengage Learning

Year
2015-01-01

For Text greater than five years old, list rationale:
This text has not been updated, better materials have not been published.

Class Size Maximum
24

Entrance Skills
Explain the real number system: integers, rational and irrational numbers.

Requisite Course Objectives
MATH 054-Identify, recognize and classify real numbers, as integers, rationals, or irrationals and locate their approximate positions on the real number line.

Entrance Skills
Understand the concept of a variable.

Requisite Course Objectives
MATH 054-Understand the concepts of variables and how variables can be used to represent an unknown quantity or a range of quantities.

Entrance Skills
Use variables to generate algebraic expressions modeling an application (word) problem.

Requisite Course Objectives
MATH 054-Use variables to create algebraic expressions that model quantities in an application problem.

Entrance Skills
Demonstrate arithmetic of algebraic expressions, including the use of the commutative, associative, distributive, identity, and inverse properties, the use of the order of operations, and the use of integer exponents and the rules of exponents.

Requisite Course Objectives
MATH 054-Use the properties of integer exponents to simplify algebraic expressions, including expressions involving scientific notation.

Entrance Skills
Create equations that model real world situations given in application (word) problems.

Requisite Course Objectives
MATH 054-Use variables to create algebraic expressions that model quantities in an application problem.

Entrance Skills
Advisory skill: Demonstrate a critical thinking skills when reading, composing and participating in class discussions.

Requisite Course Objectives
ENG 061-Demonstrate the ability to think critically and express ideas using various patterns of development.

Entrance Skills
Advisory skill: Demonstrate the ability to read and respond in writing beyond the literal interpretation of the text.

Requisite Course Objectives
ENG 061-Demonstrate the ability to read and respond in writing beyond the literal interpretation of the text.

Entrance Skills
Advisory skill: Develop, organize and express complex ideas in both expository and research papers.

Requisite Course Objectives
ENG 061-Use theses to organize paragraphs into coherent analyses.
ENG 061-Demonstrate the ability to use research skills including library resources such as books, periodicals, electronic databases and online resources such as the internet.

Course Content

1. Chemistry: An Introduction
2. Measurements and Calculations
3. Matter
4. Chemical Foundations: Elements, Atoms and Ions
5. Nomenclature
6. Chemical Reactions: An Introduction
7. Reactions in Aqueous Solutions
8. Chemical Composition
9. Chemical Quantities
10. Energy
11. Modern Atomic Theory
12. Chemical Bonding
13. Gases
14. Liquids and Solids
15. Solutions
16. Acids and Bases
17. Equilibrium
18. Oxidation-Reduction Reactions and Electrochemistry

Lab Content

1. Safety Rules & Laboratory measurements: Balances
2. Use of Volumetric Glassware
3. Density determination of a solid, liquid and of a solution
4. Calorimetry: Calculation of the specific heat of a metal
5. Metathesis (double displacement) reactions (precipitation)
6. Oxidation-reduction reactions
7. Graphing the data
8. Determine the % composition of MgO by reacting Mg with O2. Calculate the empirical formula
9. Stoichiometry and Limiting reactant
10. Line Spectra
11. Lewis Structures and Molecular Shapes
12. Molar mass of a volatile liquid
13. Properties and Reactions of acids and bases; measurement of pH
14. Acid-Base Titrations
15. Scientific Abstract

Course Objectives

	Objectives
Objective 1	Explain the fundamental concepts of chemistry with their applications to human affairs.
Objective 2	Discuss major historical chemistry discoveries which have been a part of human social and technological development.
Objective 3	Demonstrate use of tools and instruments involved in making findings in chemical behavior.
Objective 4	Solve chemistry problems with the coupled recognition that calculation methods in chemistry are shared in other domains such as business, economics, and technology.
Objective 5	Demonstrate the ability to raise questions and how to formulate them clearly
Objective 6	Demonstrate the ability to collect and interpret the data
Objective 7	Demonstrate the ability to work in teams and to respect other people’s opinions

Student Learning Outcomes

	Upon satisfactory completion of this course, students will be able to:
Outcome 1	Analyze quantitative data to draw plausible conclusions.
Outcome 2	Relate the macroscale phenomena of daily life to microscale atomic concepts.
Outcome 3	Apply scientific literacy to vet sources and summarize observed chemical phenomena.
Outcome 4	Perform basic general chemistry laboratory experiments safely and accurately.

Methods of Instruction

Method	Please provide a description or examples of how each instructional method will be used in this course.
Journal	Supplemental readings focusing on historical events in chemistry and the every-day applications of chemistry develops an awareness and understanding of chemistry beyond the concise principles offered in the assigned text
Experiential	Hands-on labs help students understand how to run experiments and observation of experiments in real time.
Discussion	Lecture and lab discussions offer students an opportunity to critically think about concepts.
Participation	Student have the opportunity to participate in lecture via discussion and example problems, and in lab via lab experiments.
Observation	Observing students perform labs with opportunities to correct methods along the way.
Lecture	Course concepts will be presented to students in a lecture format.
Laboratory	Students will be able to perform laboratory experiments weekly.

Methods of Evaluation

Method	Please provide a description or examples of how each evaluation method will be used in this course.	Type of Assignment
Guided/unguided journals	A typed scientific abstract based on an assigned reading of a chemical article.	Out of Class Only
Written homework	Homework sets with approximately 30 problems per week will be assigned in each chapter with answers in the back of the text for self check.	Out of Class Only
Mid-term and final evaluations	A comprehensive final examination will be administered covering all previously completed topics for the semester. Questions will require problem solving, short answer and matching.	In Class Only
Tests/Quizzes/Examinations	An examination will be given covering each topic area in that section. The in class examinations will consist of statement answers, multiple choice, fill in the blank, and problem solving. There will be 4-8 exams, 15-17 quizzes.	In and Out of Class
Group activity participation/observation	In the laboratory students will have the opportunity to work in groups and observe chemical demonstrations.	In Class Only
Laboratory projects	In the lab, students will perform chemical experiments for data collection and analysis.	In Class Only

Assignments

Other In-class Assignments

Quizzes and exams

Lab experiments

Other Out-of-class Assignments

1. Textbook reading, approximately 25 pages per week.
2. Textbook homework, approximately 25-30 problems per week.
3. Complete and receive certification of completion for all pre-laboratory assignment sheets. Approximately 15 assignments.
4. Complete and receive certification of completion for all pre-laboratory procedure write-ups. Approximately 15 assignments.
5. Submit laboratory work for evaluation and completeness and correctness of data and calculations. Approximately 15 lab experiments (listed under course content)

Grade Methods

Letter Grade Only

Distance Education Checklist

Include the percentage of online and on-campus instruction you anticipate.

Online %

50

On-campus %

50

Lab Courses

How will the lab component of your course be differentiated from the lecture component of the course?

Labs will be face-to-face and focused on performing experiments. Lectures will be focused on the theory and problem-solving aspects of chemistry.

From the COR list, what activities are specified as lab, and how will those be monitored by the instructor?

Face-to-face delivery of chemical laboratory experiments.

How will you assess the online delivery of lab activities?

n/a

Instructional Materials and Resources

If you use any other technologies in addition to the college LMS, what other technologies will you use and how are you ensuring student data security?

Zoom to host synchronous meetings and office hours. Security will be ensured by the use of a course pass-code.

If used, explain how specific materials and resources outside the LMS will be used to enhance student learning.

Email, zoom, and phone will allow students more options for contact with faculty as well as live help or Q&A.

Effective Student/Faculty Contact

Which of the following methods of regular, timely, and effective student/faculty contact will be used in this course?

Within Course Management System:

Chat room/instant messaging
Discussion forums with substantive instructor participation
Online quizzes and examinations
Private messages
Regular virtual office hours
Timely feedback and return of student work as specified in the syllabus
Video or audio feedback
Weekly announcements

External to Course Management System:

Direct e-mail
Posted audio/video (including YouTube, 3cmediasolutions, etc.)
Synchronous audio/video
Teleconferencing
Telephone contact/voicemail

For hybrid courses:
Orientation, study, and/or review sessions

Briefly discuss how the selected strategies above will be used to maintain Regular Effective Contact in the course.
Synchronous Zoom time for class and office hours will allow direct conversation with students. On top of that, regular weekly announcements will update students about course happenings, such as upcoming due dates or recently graded assignments. Email, chat, discussion boards, zoom office hours, and phone calls/voicemail will enable students to keep in regular touch if they have questions and for the professor to check in with them regularly as needed. Posted audio/video can be used to deliver lectures or course messages. Last, assignment feedback and rubrics will give students a good idea of how to do assignments and what mistakes might be occurring, so they can make corrections.

If interacting with students outside the LMS, explain how additional interactions with students outside the LMS will enhance student learning.
Email, zoom, and phone will allow students more options for contact with faculty as well as live help or Q&A.

Other Information

Provide any other relevant information that will help the Curriculum Committee assess the viability of offering this course in an online or hybrid modality.
All posted videos have been closed captioned through 3CMedia.

COD GE
C1 - Natural Sciences

CSU GE
B1 - Physical Science
B3 - Laboratory Activity

IGETC GE
5A - Physical Science
5C - Science Laboratory

MIS Course Data

CIP Code
40.0501 - Chemistry, General.

TOP Code
190500 - Chemistry, General

SAM Code
E - Non-Occupational

Basic Skills Status
Not Basic Skills

Prior College Level
Not applicable

Cooperative Work Experience
Not a Coop Course

Course Classification Status
Credit Course

Approved Special Class
Not special class

Noncredit Category
Not Applicable, Credit Course

Funding Agency Category
Not Applicable

Program Status
Program Applicable

Transfer Status
Transfer CSU, limited UC

General Education Status
Y = Not applicable

Support Course Status
N = Course is not a support course

C-ID
CHEM 101

Allow Audit
No

Repeatability
No

Materials Fee
No

Additional Fees?
No

Approvals

Curriculum Committee Approval Date
11/02/2021

Academic Senate Approval Date
11/11/2021

Board of Trustees Approval Date
12/17/2021

Chancellor's Office Approval Date
02/03/2022

Course Control Number
CCC000333773

Programs referencing this course
Liberal Arts: Math and Science AA Degree (http://catalog.collegeofthedesert.eduundefined/?key=29)
Agri-Business AS Degree (http://catalog.collegeofthedesert.eduundefined/?key=46)
General Agriculture AS Degree (http://catalog.collegeofthedesert.eduundefined/?key=49)
Elementary Teacher Education AA-T Degree (http://catalog.collegeofthedesert.eduundefined/?key=5)
Nutrition and Dietetics AS-T Degree (http://catalog.collegeofthedesert.eduundefined/?key=7)
Agriculture Food Safety Certificate of Achievement (http://catalog.collegeofthedesert.eduundefined/?key=83)
Agriculture Office Assistant Certificate of Achievement (http://catalog.collegeofthedesert.eduundefined/?key=84)
Agriculture Office Professional Certificate of Achievement (http://catalog.collegeofthedesert.eduundefined/?key=85)
Agriculture Pest Management Certificate of Achievement (http://catalog.collegeofthedesert.eduundefined/?key=86)
Agriculture Technician Certificate of Achievement (http://catalog.collegeofthedesert.eduundefined/?key=87)
Agriculture Plant Science AS-T Degree (http://catalog.collegeofthedesert.eduundefined/?key=89)
Agriculture Irrigation Technician Certificate of Achievement (http://catalog.collegeofthedesert.eduundefined/?key=91)