

**CHEM 42 Course Outline as of Fall 2010****CATALOG INFORMATION**

Dept and Nbr: CHEM 42      Title: INTRO GEN CHEM  
 Full Title: Introductory General Chemistry  
 Last Reviewed: 2/7/2022

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	4.00	Lecture Scheduled	3.00	17.5	Lecture Scheduled	52.50
Minimum	4.00	Lab Scheduled	3.00	6	Lab Scheduled	52.50
		Contact DHR	0		Contact DHR	0
		Contact Total	6.00		Contact Total	105.00
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 105.00

Total Student Learning Hours: 210.00

Title 5 Category: AA Degree Applicable

Grading: Grade or P/NP

Repeatability: 00 - Two Repeats if Grade was D, F, NC, or NP

Also Listed As:

Formerly: CHEM 55

**Catalog Description:**

A basic introduction to fundamental laws and principles of the composition of matter, physical and chemical changes, atomic and molecular structure, chemical equilibria, intermolecular forces, solutions, and qualitative and quantitative theory and techniques. This course is a pre-requisite for Chemistry 1A.

**Prerequisites/Corequisites:**

Course Completion of MATH 155 or two years of high school algebra or equivalent.

**Recommended Preparation:**

Eligibility for ENGL 100 or ESL 100

**Limits on Enrollment:****Schedule of Classes Information:**

Description: A basic introduction to fundamental laws and principles of the composition of matter, physical and chemical changes, atomic and molecular structure, chemical equilibria, intermolecular forces, solutions, and qualitative and quantitative theory and techniques. This course is a pre-requisite for Chemistry 1A. (Grade or P/NP)

Prerequisites/Corequisites: Course Completion of MATH 155 or two years of high school

algebra or equivalent.

Recommended: Eligibility for ENGL 100 or ESL 100

Limits on Enrollment:

Transfer Credit: CSU;UC.

Repeatability: Two Repeats if Grade was D, F, NC, or NP

## **ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:**

<b>AS Degree:</b>	<b>Area</b>		Effective:	Inactive:
	C	Natural Sciences	Fall 2005	
<b>CSU GE:</b>	<b>Transfer Area</b>		Effective:	Inactive:
	B1	Physical Science	Fall 2005	
	B3	Laboratory Activity		
<b>IGETC:</b>	<b>Transfer Area</b>		Effective:	Inactive:
	5A	Physical Sciences	Spring 2007	
	5C	Fulfills Lab Requirement		
<b>CSU Transfer:</b>	Transferable	Effective:	Fall 2005	Inactive:
<b>UC Transfer:</b>	Transferable	Effective:	Fall 2006	Inactive:
<b>CID:</b>				
CID Descriptor:	CHEM 101	Introduction to Chemistry		
SRJC Equivalent Course(s):		CHEM42		

### **Certificate/Major Applicable:**

Both Certificate and Major Applicable

## **COURSE CONTENT**

### **Outcomes and Objectives:**

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

1. Solve problems involving fundamental processes in chemistry , including basic atomic theory, structure and bonding, chemical reactions, equilibrium, and the various forms of matter.
2. Demonstrate a basic understanding of the above fundamental processes in chemistry and how the scientific method was used to develop the theories behind these processes.
3. Interpret and utilize the vocabulary and nomenclature that is specific to a basic level of general chemistry.
4. Follow fundamental safety procedures in a laboratory environment.
5. Perform simple chemical experiments and associated calculations efficiently and accurately.
6. Use fundamental processes in chemistry to investigate phenomena in the applied sciences.
7. Arrange, sort, and graphically represent chemical data.

### **Topics and Scope:**

- I. Atomic theory
  - A. Physical and chemical properties of matter

- B. The scientific method and development of atomic theory
- C. Structure of the atom
- D. Nucleons
- E. Nuclear chemistry
- F. The periodic table
- II. Laboratory measurements
  - A. SI/metric system units
  - B. Significant figures
  - C. Unit conversions
- III. Chemical bonding and molecular structure
  - A. Ions and ionic compounds
  - B. Covalent bonding
  - C. Lewis dot structures
  - D. Molecular geometry and hybridization
  - E. Molecular polarity
- IV. Stoichiometry
  - A. Moles and molar mass
  - B. Balancing chemical equations
  - C. Stoichiometric and limiting reactant calculations
- V. Chemical reactions
  - A. Precipitation reactions
  - B. Oxidation-reduction reactions
  - C. Assigning oxidation numbers
- VI. Intermolecular forces
  - A. Liquids
  - B. Solids
- VII. Gases
  - A. Gas laws
  - B. Kinetic-molecular theory
  - C. Gas stoichiometry
- VIII. Solutions
  - A. Concentration
  - B. Solution stoichiometry
- IX. Chemical equilibrium
  - A. Rates of chemical reactions
  - B. Equilibrium
  - C. Le Chatelier's principle
- X. Acids and bases
  - A. Definitions
  - B. The pH scale
  - C. Hydroxide and hydronium ion concentrations

Whenever possible, laboratory experiments that reflect real-life applications of chemistry will be chosen.

#### Laboratory material

1. Laboratory safety
2. Laboratory techniques
3. Maintaining a laboratory notebook
4. Measurement and significant figures
5. Graphing data obtained in the laboratory
6. Limiting reactants and percent yield

7. Qualitative analysis/identification of an unknown
8. Application of chemistry to various career fields (e.g. Environmental science, agricultural chemistry, enology)
9. Writing laboratory reports

**Assignment:**

1. Reading (averaging 1 chapter/30-50 pages per week)
2. Reading and pre-lab questions for laboratory exercises (10-15)
3. Laboratory reports (10-15)
4. Homework assignments/study problems (0-15)
5. Quizzes (0-4)
6. Exams (3-5)
7. Final exam

**Methods of Evaluation/Basis of Grade:**

**Writing:** Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

Lab reports	Writing 20 - 35%
<b>Problem Solving:</b> Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.	
Homework assignments, lab reports	Problem solving 5 - 20%
<b>Skill Demonstrations:</b> All skill-based and physical demonstrations used for assessment purposes including skill performance exams.	
Laboratory techniques	Skill Demonstrations 0 - 10%
<b>Exams:</b> All forms of formal testing, other than skill performance exams.	
Quizzes, Exams and Final Exam: multiple choice, completion, calculations, short essay, problem solving	Exams 50 - 75%
<b>Other:</b> Includes any assessment tools that do not logically fit into the above categories.	
Class and laboratory participation	Other Category 0 - 5%

**Representative Textbooks and Materials:**

Introductory Chemistry, 3rd Ed., Russo, Steve and Silver, Mike; Pearson Prentice Hall, 2006.

Chemistry for Changing Times, 12th Ed., Hill, John, McReary, Terry and Kolb, Doris; Pearson Prentice Hall, 2010.

Introductory Chemistry, 3rd Ed.; Tro, Nivaldo; Pearson Prentice Hall, 2009.

Introductory Chemistry: A Foundation, 6th Ed., Zumdahl, Steven and DeCoste, Donald; Houghton-Mifflin, 2008.

Introductory Chemistry: An Active Learning Approach, 4th Ed., Cracolice, Mark and Peters, Edward; Brooks/Cole Cengage, 2007.

Laboratory Manuals:

Chemistry 42 Laboratory Manual, Fall 2009 Edition, Santa Rosa Junior College Chemistry Department.

Laboratory Manual for Introductory Chemistry, 3rd Ed., Gloffke, Wendy and Kimbrough, Doris; Pearson Prentice Hall, 2006.

Chemical Investigations for Changing Times, Hassell, Alton and Marshall, Paula; Pearson Prentice Hall, 2010.

Foundations of Chemistry in the Laboratory, 12th Ed., Hein, Morris et al.; Wiley, 2006.

Introduction to Chemical Principles: A Laboratory Approach, 7th Ed., Weiner, Susan; Brooks Cole, 2009.