

**CHEM 4A Course Outline as of Spring 2008****CATALOG INFORMATION**

Dept and Nbr: CHEM 4A      Title: GEN CHEM WITH QUANT  
 Full Title: General Chemistry with Quantitative Analysis  
 Last Reviewed: 10/14/2013

Units	Course Hours per Week		Nbr of Weeks		Course Hours Total	
Maximum	5.00	Lecture Scheduled	3.00	17.5	Lecture Scheduled	52.50
Minimum	5.00	Lab Scheduled	6.00	17.5	Lab Scheduled	105.00
		Contact DHR	0		Contact DHR	0
		Contact Total	9.00		Contact Total	157.50
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 105.00

Total Student Learning Hours: 262.50

Title 5 Category: AA Degree Applicable

Grading: Grade Only

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

Also Listed As:

Formerly:

**Catalog Description:**

First half of intensive one-year program covering physical inorganic and analytical chemistry; laboratory includes quantitative and instrumental analysis. Subject matter of Chemistry 5 (Quantitative Analysis) is included in this sequence. Recommended for Chemistry, Chemical Engineering, preprofessional, and physical or life science majors.

**Prerequisites/Corequisites:**

Chemistry 51 or Chemistry 42 (formerly Chemistry 55) or placement on the Chemistry Diagnostic Test AND completion of Math 155.

**Recommended Preparation:**

Eligibility for ENGL 100 or ESL 100

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

Description: First semester of intensive one year program of general chemistry with quantitative and instrumental analysis. (Grade Only)

Prerequisites/Corequisites: Chemistry 51 or Chemistry 42 (formerly Chemistry 55) or placement on the Chemistry Diagnostic Test AND completion of Math 155.

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>		<b>Effective:</b>	<b>Inactive:</b>	
	C	Natural Sciences	Fall 1981	Fall 2018	
<b>CSU GE:</b>	<b>Transfer Area</b>		<b>Effective:</b>	<b>Inactive:</b>	
	B1	Physical Science	Fall 1981	Fall 2018	
	B3	Laboratory Activity			
<b>IGETC:</b>	<b>Transfer Area</b>		<b>Effective:</b>	<b>Inactive:</b>	
	5A	Physical Sciences	Fall 1981	Fall 2018	
	5C	Fulfills Lab Requirement			
<b>CSU Transfer:</b>	Transferable	<b>Effective:</b>	Fall 1981	<b>Inactive:</b>	Fall 2018
<b>UC Transfer:</b>	Transferable	<b>Effective:</b>	Fall 1981	<b>Inactive:</b>	Fall 2018

<b>CID:</b>				
CID Descriptor:CHEM 110	General Chemistry for Science Majors I, with Lab			
SRJC Equivalent Course(s):	CHEM1A OR CHEM4A OR CHEM3A AND CHEM3AL			
CID Descriptor:CHEM 120S	General Chemistry for Science Majors Sequence A			
SRJC Equivalent Course(s):	CHEM1A AND CHEM1B OR CHEM4A AND CHEM4B OR CHEM3A AND CHEM3AL AND CHEM3B			

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

Major Applicable Course

## **COURSE CONTENT**

### **Outcomes and Objectives:**

After successful completion of this course, a student will be able to:

1. Perform calculations and solve word problems related to chemistry-specific topics.
2. Describe matter and its transformations according to the atomic theory, and the theories of chemical bonding; and write and classify balanced chemical equations.
3. Relate chemical reactions to associated changes in energy.
4. Correctly identify, name, and write the formula for inorganic compounds.
5. Recognize trends in chemical properties as related to the periodic table of the elements, and use data on the periodic table of elements to perform calculations.
6. Collect and analyze scientific data in the laboratory using a computer interface and several common laboratory instruments.
7. Apply the principles of quantitative analysis in a laboratory setting.

### **Topics and Scope:**

## Lecture Material

1. Matter
2. Scientific Measurement/Uncertainty
3. Atomic Theory
4. Bonding and Molecular Shape
5. Inorganic Nomenclature
6. The Mole
7. Calculations and chemical reactions
8. Types of Chemical Reactions
9. Microscopic Picture of the States of Matter
10. Gas Laws
11. Thermodynamics
12. Periodic Trends
13. Intermolecular Forces
14. Properties of Mixtures

## Laboratory Material

1. Laboratory Safety
2. Laboratory techniques
  - a. the measure and transfer of liquids
  - b. determining mass using a balance
  - c. creating solutions of known concentration
3. Maintaining a Laboratory Data Notebook
4. Graphing data obtained in the laboratory
5. Analysis of yields and experimental errors obtained in the laboratory
6. Writing laboratory reports
7. Using a computer interface to collect data
8. Calibrating laboratory glassware
9. Gravimetric and titrimetric analysis

## Assignment:

1. Specific reading and study assignments from the lecture textbook (averaging 25-30 pages per week).
2. Completion of recommended end-of-chapter problems (averaging 15-20 per week).
3. Laboratory experiments and accompanying reports
4. Midterm Exams, Quizzes, 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.

Written homework, Lab reports

Writing  
10 - 30%

**Problem Solving:** Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Homework problems, Lab reports, Exams

Problem solving  
40 - 70%

**Skill Demonstrations:** All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

Class performances, Lab skill tech/accur lab rslts

Skill Demonstrations  
5 - 20%

**Exams:** All forms of formal testing, other than skill performance exams.

Multiple choice, Completion, Prob solving & short essay

Exams  
15 - 25%

**Other:** Includes any assessment tools that do not logically fit into the above categories.

Attendance, assignments submitted on time, improvement demonstrated on final exam

Other Category  
0 - 5%

### **Representative Textbooks and Materials:**

Chemistry: The Central Science by Brown, LeMay, Bursten; Prentice Hall 2006

Chemistry: The Molecular Nature of Matter and Change by Silberberg, McGraw Hill, 2006

Principles of Modern Chemistry by Oxtoby, Gillis, Nachtrieb, Brooks/Cole, 2002

Chemistry by Zumdahl, Houghton Mifflin, 2004

Chemical Principles by Zumdahl, Houghton Mifflin, 2005

Chemistry and Chemical Reactivity by Kotz, Treichel, Weaver, Brooks/Cole 2006

Lab Manuals

Laboratory Experiments for Chemistry: The Central Science, by Nelson and Kemp, Prentice Hall

Experiments in General Chemistry by Greco, Rickard, Weiss, Prentice Hall

Quantitative Chemical Analysis by Daniel Harris, WH Freeman Publishing

Fundamentals of Analytical Chemistry by Skoog, West and Holler, Saunders