CHEM 120 - General Chemistry 1 Course Outline

Approval Date: 10/10/2019
Effective Date: 08/13/2021

SECTION A

Unique ID Number	CCC000558182
Discipline(s)	
Division	Science and Engineering
Subject Area	Chemistry
Subject Code	CHEM
Course Number	120
Course Title	General Chemistry 1
TOP Code/SAM Code	1905.00 - Chemistry, General / E - Non-Occupational
Rationale for adding this course to the curriculum	1. Change pre-requisites in accordance with current UC standards 2.adjust pre-requisites for changing pre-reqs in Chem 110 (All related to AB705). 3. Change textbook to current one
Units	5
Cross List	*N/A*
Typical Course Weeks	18

Total Instructional Hours

	Contact Hours
Lecture	54.00
Lab	108.00
Activity	0.00
Work Experience	0.00
Outside of Class Hours	108.00

Total Contact Hours	162
Total Student Hours	270

Open Entry/Open Exit	No
Maximum Enrollment	
Grading Option	Letter Grade or P/NP
Distance Education Mode of Instruction	On-Campus

SECTION B

General Education Information:

SECTION C

Course Description

Repeatability May be repeated 0 times

Catalog Description An introduction to principles of chemistry, with an emphasis on mathematical applications. Topics include atomic structure, chemical reactions, gram-mole-atom conversions, stoichiometry, aqueous solutions, concentrations, titrations, limiting reactants, gas behavior, kinetic molecular theory, bonding, molecular structure, quantum theory, and coordination chemistry.

Schedule Description

SECTION D

Condition on Enrollment

1a. Prerequisite(s)

- Intermediate Algebra or Math 95 or appropriate placement and
- CHEM 110 with a minimum grade of C or better or
- AP Chemistry score of 3 or better or
- High School Chemistry with a C or better

1b. Corequisite(s): *None*

1c. Recommended: *None*

1d. Limitation on Enrollment: *None*

SECTION E

Course Outline Information

1. Student Learning Outcomes:

A. Communicate chemical and physical processes at the molecular level and how they relate to the macroscopic environment.
B. Solve both qualitative and quantitative chemistry problems while demonstrating the reasoning clearly and completely.
C. Implement laboratory techniques correctly using appropriate safety procedures and express them clearly in written laboratory reports.

2. Course Objectives: Upon completion of this course, the student will be able to:

A. The American Chemical Society (ACS) General Chemistry Guide and the General Chemistry examinations provide information on topics and indicate an appropriate level of this sequence of courses, including learning goals and objectives. At the conclusion of the course, each student should be able to employ standard laboratory techniques appropriate to the course content. These may include but are not limited to the following,
B. Explain how chemicals and chemical processes are investigated and concepts developed based on the experimental evidence.
C. Model the process of science in chemistry, by asking questions of chemical systems. Use these questions as the basis for designing experiments which will then be completed. Develop explanations based on the data to develop structural and behavioral models.
D. Demonstrate safe laboratory procedures when handling chemicals, chemical glassware and instruments, and the proper disposal of chemical waste.
E. Discuss and illustrate the application and role of chemical principles and processes important for society and the environment.

F. Analyze a problem and develop a plan to solve it. Produce notes about the plan that can be understood and followed by others dealing with the same problem.
G. Judge when insufficient data is provided in a problem as well as selecting appropriate data from extraneous information to solve a problem.
H. Describe and illustrate how to measure chemicals and their properties by appropriate laboratory equipment and apparatus. Isolate and identify chemicals based on their properties.
I. Manipulate chemical concepts and experimental information to predict what to expect from the action of chemical systems and processes.
J.

3. Course Content

A. Overview of Chemistry
B. Chemical nomenclature
C. Atoms, molecules and ions
D. States of matter
E. Descriptive chemistry - chemistry of the main group elements
F. Stoichiometry
G. Chemical reactions
H. Significant figures and propagation of error
I. Reaction types including but not limited to single and double replacement, neutralization, combustion, combination, decomposition and oxidation-reduction
J. Solution chemistry
K. Gases laws and kinetic molecular theory
L. Atomic structure and periodicity
M. Quantum theory
N. Molecular structure and bonding
O. Coordination chemistry

Other topics may include:

A. Kinetics
B. Nuclear chemistry
C. Organic chemistry

Laboratory Activities:

The laboratory sequence will support the above topics including both qualitative and quantitative experiments, analysis of data and error propagation.

4. Methods of Instruction:

Lecture:
Other: Lectures. Chemical demonstrations. Video presentations. Individual and group problem solving in the classroom. Individual and group laboratory experiments. Peer oriented guided instruction where the students help one another under the guidance of an instructor.

5. Methods of Evaluation: Describe the general types of evaluations for this course and provide at least two, specific examples.

Typical classroom assessment techniques

Exams/Tests -- Four exams will be given, including the final exam. Exams will be fill in, multiple choice, true/false, and short answer, and will be graded on a point scale. A sample question may be, How many grams of sulfur are there in 10 grams of FeSO4? or What is pressure of 0.4 mole of gas at STP? or perhaps, Please write down four possible quantum numbers for Sulfur.

Quizzes -- Weekly quizzes will be given. Quizzes will be fill in, multiple choice, true/false, and short answer, and will be graded on a point scale. A sample question may be, What is the empirical formula of a compound that is 75% carbon and 25% hydrogen? or What is the velocity of hydrogen at STP? or perhaps, Please write down the complete orbital configuration for bromine.

Group Projects -- At the end of each semester, groups of students are assigned a mini-research project that must be solved experimentally. The students develop the methods and procedures used in lab, do the experiment and then write a lab report explaining the experiment and the results achieved. Typical projects include Calculation of the Solubility Product of Lead Iodide and A Determination of the Composition of an Unknown Compound.

Home Work -- Students will have assigned reading and homework will be assigned. Typical assignment may be, Read Chapter 11 and do homework problems 11.1 through 11.20. Reading and homework is evaluated with quizzes, exams, and class discussion.

Lab Activities -- Students are required to attend a weekly lab. Students will work individually and in groups. All labs will be checked off by the instructor prior to the student leaving the lab. Labs are graded and returned to the student upon completion. A typical lab will include the collection of experimental data, data analysis, graphical representations of the data, a report on the results and error analysis as well as a section on objectives, procedure, and conclusions. A sample lab might be, The Titration of an Unknown Acid, or Calculation of the Gas Constant, R.

Final Exam -- A comprehensive final exam will be given. This exam will be fill in, multiple choice, true/false, short answer, and multistep chemical processes where work must be shown. The exam will be graded on a point scale. A sample question may be, How many grams for sulfur are there in 10 grams of FeSO4? or What is pressure of 0.4 mole of gas at STP? or perhaps, Please write down four possible quantum numbers for Sulfur.

Additional assessment information:

Regular attendance in the laboratory is required. All labs will be checked off by the instructor prior to the student leaving the lab.

Letter Grade or P/NP

6. Assignments: State the general types of assignments for this course under the following categories and provide at least two specific examples for each section.

A. Reading Assignments
   Daily reading of text; weekly reading of lab manual (ex: Read Chapter 2,"The Periodic Table," Sections 2.1 through 2.4 in your text and read the first lab, "Basic Laboratory Techniques.")
B. Writing Assignments
   Problem sets are provided for homework.
   Laboratory write-ups are assigned weekly.
   Sample tests/study sheets are provided for each of the four exams.
C. Other Assignments
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7. Required Materials

A. EXAMPLES of typical college-level textbooks (for degree-applicable courses) or other print materials.

Book #1:

Author:	Tro
Title:	Principles of Chemistry: A Molecular Approach
Publisher:	Prentice Hall
Date of Publication:	2012
Edition:	2nd

Book #2:

Author:	Fawl, S
Title:	Insights into Chemistry
Publisher:	Fountainhead Press
Date of Publication:	2018
Edition:	2nd

Manual #1:

Author:	Fawl
Title:	Laboratory Manual, General Chemistry
Publisher:	NVC Reproduction Services
Date of Publication:	08-22-2012

B. Other required materials/supplies.