

**College of San Mateo**  
**Official Course Outline**

1. **COURSE ID:** CHEM 100    **TITLE:** Survey of Chemistry  
**Units:** 3.0 units    **Hours/Semester:** 48.0-54.0 Lecture hours  
**Method of Grading:** Letter Grade Only

2. **COURSE DESIGNATION:**

**Degree Credit**

**Transfer credit:** CSU

**AA/AS Degree Requirements:**

CSM - GENERAL EDUCATION REQUIREMENTS: E5a. Natural Science

3. **COURSE DESCRIPTIONS:**

**Catalog Description:**

An introductory course in Chemistry for non-science majors. Students are introduced to basic concepts of chemistry and requires analyses of the socio-cultural contexts within which chemistry plays a central role. Key concepts include classification of matter; atomic structure; chemical bonding and their properties; chemical formulas, equations and stoichiometry; classification of chemical reactions; electronic structure and periodic trends; gases; solutions. Recommended for non-science majors or as an exploratory course for further studies in chemistry.

4. **STUDENT LEARNING OUTCOME(S) (SLO'S):**

Upon successful completion of this course, a student will meet the following outcomes:

1. Use units of measurements and dimension analysis in chemistry problems. (topics 1, 5 and 8)
2. Explain atomic and electronic structure of atoms. (Topic 2, 3)
3. Understand ionic and covalent bonding and the relationship between bonding types and properties. (topic 3 and 6)
4. Represent chemical elements and simple chemical compounds in balanced equations. (Topics 6 & 8)
5. Understand classification of matter including solids, liquids, gases, solutions, acids and bases. (topics 6, 7 and 8)
6. Explain chemical processes which impact daily activities, society and the environment. (topics 4, 5, 7 and 8)
7. Explore independently contemporary topics in which chemistry has a significant role. (Independent study topic)

5. **SPECIFIC INSTRUCTIONAL OBJECTIVES:**

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

1. Use units of measurements and dimension analysis in chemistry problems (topics 1, 5 and 8)
2. Explain atomic and electronic structure of atoms. (Topics 2 and 3)
3. Understand ionic and covalent bonding and the relationship between bonding types and properties (topic 3 and 6)
4. Represent chemical elements and simple chemical compounds in balanced equations. (topics 6 and 8)
5. Understand classification of matter including solids, liquids, gases, solutions, acids and bases. (topics 6, 7 and 8)
6. Explain chemical processes which impact daily activities, society and the environment. (topics 4, 5, 7 and 8)
7. Explore independently contemporary topics in which chemistry has a significant role. (Independent study topic)

6. **COURSE CONTENT:**

**Lecture Content:**

Topic 1: Introduction to Chemistry in our everyday; working with scientific units.

Topic 2: Atoms and elements: atomic structure, isotopes, atomic masses, introduction to the periodic table.

Topic 3: Chemical bonding: ionic and covalent bonds, properties of ionic and covalent compounds, nomenclature of simple compounds.

Topic 4: Chemicals and Energy: fossil fuels, petroleum refining and gasoline, the carbon cycle, greenhouse gases and climate changes; renewable energy sources.

Topic 5: Energy of Food: metabolism, calorimetry, classification of fats, oils, carbohydrates and proteins.

Topic 6: States of Matter - classification by state or by composition; properties of gases and liquids.  
Topic 7: Solution chemistry: uniqueness of water, solutions, solution concentration. Water cycle and water treatment.  
Topic 8: Acids and Bases - Bronsted-Lowry Acids and Bases; Strengths of acids and bases; pH scale; Acid-base reactions; acid-base reactions in everyday processes.  
Independent study topic: Examples include Lighting and human environment; transportation; nutrition; drug-design, pollution and climate issues.

**Lab Content:**

None

**TBA Hours Content:**

None

**7. REPRESENTATIVE METHODS OF INSTRUCTION:**

Typical methods of instruction may include:

- A. Lecture
- B. Directed Study
- C. Activity
- D. Discussion
- E. Guest Speakers
- F. Other (Specify): Online instructional videos and forum discussions

**8. REPRESENTATIVE ASSIGNMENTS**

Representative assignments in this course may include, but are not limited to the following:

**Writing Assignments:**

Homework questions and tutorial assignments to assess students' understanding and application of key chemistry concepts.

End-of-topic quizzes and group-discussion questions posted on online forums. These provide progress reports on students' learning on key chemical concepts.

**Reading Assignments:**

Reading posted lecture notes and relevant articles from textbook or other sources.

Reading assignments accompanied by self-test questions.

The reading assignments, lecture notes, instructional videos and audio podcasts presents concepts students need to understand to do the self-tests and assessments.

**9. REPRESENTATIVE METHODS OF EVALUATION**

Representative methods of evaluation may include:

- A. Class Participation
- B. Exams/Tests
- C. Homework
- D. Papers
- E. Quizzes
- F. Written examination

**10. REPRESENTATIVE TEXT(S):**

Possible textbooks include:

- A. Timberlake, K. *Basic Chemistry*, 4th ed. Pearson, 2013
- B. Tro, N. *Introductory Chemistry Essentials*, 4th ed. Pearson, 2011
- C. Heller, D. & Snyder, C.. *Visualizing Everyday Chemistry*, 1st ed. Wiley, 2015

**Origination Date:** October 2014

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**Effective Term:** Fall 2015

**Course Originator:** Yin Mei Lawrence