

GE-001-145, CHM 101/101L , Consumer Chemistry  
(GE Sub-areas B1 and B3)  
Academic Senate Minutes 5-27-15 -- Attachment 2

**ATTACHMENT 1 – GE-001-145, CHM 101/101L, CONSUMER CHEMISTRY  
(GE SUB-AREAS B1 AND B3)**

**CALIFORNIA STATE POLYTECHNIC UNIVERSITY, POMONA  
EXPANDED COURSE OUTLINE**

Subject Area/Catalog #:	CHM 101
Course Title:	Chemistry in Our World
Units:	3
CS #:	C1
Component:	Lecture
Grading Basis:	Graded
Preparation:	11/28/11
Prepared by:	Dr. Edward Walton
Date of Last Revision:	03/10/15

**I. Catalog Description**

**CHM 101 Chemistry in Our World (3)**

Analysis of important concepts, principles and applications of chemistry for non-science-majors. Topics include atomic theory, organic and biochemistry with application to foods, drugs, medicines, fossil fuels and energy production, polymers, plastics and fibers. This course is not intended for science majors. Designed to satisfy requirements in GE Physical Science (B1). 3 lecture hours. Staff.

**II. Required Background or Experience**

Prerequisite: None. Prior experience with high school chemistry is not required. This course is not open to students who have credit in CHM 121.

**III. Expected Outcomes**

- Students shall be able to describe both qualitatively and quantitatively the basic chemistry that is needed to understand issues of science that are of public interest.
- Students will be able to use this knowledge of chemistry to describe a real world issue such as energy, foods, drugs, and pollution.
- Students shall be able to make informed decisions as they relate to public concerns about science and its applications.
- The student shall be able to explain the relationship between experiment, scientific developments and application of science in general and chemistry in particular.

GE-001-145, CHM 101/101L , Consumer Chemistry  
(GE Sub-areas B1 and B3)  
Academic Senate Minutes 5-27-15 -- Attachment 2

#### IV. Text and Readings

Recommended Text:

CHM 101 Text: *Chemistry in Context: Applying Chemistry to Society, a project of the American Chemical Society* by Catherine Middlecamp, Steve Keller, et al. (McGraw Hill, 2012).

Supplemental Reading Materials:

Additional readings include current newspaper articles, as well as online materials related to our science topics. Examples: Marc Stuckey\* and Ingo Eilks\*, “Chemistry under Your Skin? Experiments with Tattoo Inks for Secondary School Chemistry Students” *J. Chem. Educ.* **2015**, 92, 129–134; Sarah L. Garvey, Golbon Shahmohammadi, Derek R. McLain, and Mark L. Dietz\*, Determination of Calcium in Dietary Supplements: Statistical Comparison of Methods in the Analytical Laboratory, *J. Chem. Educ.* **2015**, 92, 167–169.

Lecture notes and handouts will be available on Blackboard.

#### V. Minimum Student Material

Assigned text, personal response system (e.g. i-Clicker or similar technology) and access to the Internet and websites.

#### VI. Minimum College Facilities

This course (CHM 101) may be presented as an online course, hybrid, or face-to-face course requiring either online teaching capability or an on-campus lecture room with seating capacity of up to 96 that is equipped with computer capabilities, white board or blackboard, overhead projector, wall-size periodic table, and instructor table (laboratory bench ideal, but not required).

#### VII. Course Outline

Week #	Major Topics	CHM 101
1	Introduction	The Nature of Science and Chemistry, Elements and Compounds, Atoms and Molecules
2-3	Air and gases	Classifying Matter: Mixtures, Elements, and Compounds Gas Laws

GE-001-145, CHM 101/101L , Consumer Chemistry  
(GE Sub-areas B1 and B3)  
Academic Senate Minutes 5-27-15 -- Attachment 2

		The Oxygen–Ozone Ultraviolet Screen Air Pollution and Issues
4	Water	Water as a Molecule Molecular Structure and Physical Properties of Water Water as a Solvent Names/Formulas of Ionic Compounds Water Pollution and Clean water
5	Acids and Bases	What are Acid and Bases? Neutralization: Antacids Are Bases Acid Solutions and pH Acid Rain
6	Energy from Combustion	Energy, Work, and Heat The Nature of Fossil Fuels Energy Changes at the Molecular Level New Fuels
7	Nuclear Energy	The Atomic Nucleus Isotopes Radioisotopes in Medicine Nuclear Reactions How Nuclear Reactors Produce Electricity Risks and Benefits of Nuclear Power
8	Organic Chemistry and Polymers	Carbon Chemistry Structures and Isomers Carbon Chains Plastics
9-10	Biochemistry	The structure and functions of Carbohydrates, Proteins, Lipids and Nucleic Acids (DNA and RNA) The Genetic code Genetically Engineered Agriculture Drugs and Medicines

### VIII. Instructional Methods

Instructional methods will include active and collaborative learning strategies including small group discussions, role playing advocacy, student input via personal response systems, student presentations and papers, and peer review of writing assignments.

### IX. Evaluation of Outcomes

Suggested distribution of the weighting of assignments in assigning the grade in the course:  
20% for class discussion/survey/class participation  
20% 2 Midterms

GE-001-145, CHM 101/101L , Consumer Chemistry  
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 Academic Senate Minutes 5-27-15 -- Attachment 2

- 20% Final Exam
- 20% Paper/Project (5% for revision input)
- 20% Student Presentations to Class (5% for revision input)

Students will receive feedback on their presentations and topic papers from the instructor and other students, prior to revision. Students will analyze how the course material can be useful within their major field of study. Student assignments will be designed to assess their abilities to apply this learning to public and professional issues. Use of pre-tests and a post-tests will measure student achievement of stated learning outcomes.

**X. Relationship to Program Objectives**

The CHM 101 course will allow students to meet some of the measurable goals and outcomes for the GE program at Cal Poly Pomona. Specifically, this course is designed to meet the requirements for a B1, physical science course.

B1 Courses meet GE Program Outcomes Ic, Id, and IIa	CHM 101
<ul style="list-style-type: none"> <li>• Goal I (Acquire foundational skills and capacities), item c: (Construct arguments based on sound evidence and reasoning to support an opinion or conclusion).</li> </ul>	Written topic papers prepared for instructor and peers. Student presentations for instructor and peers to review.
<ul style="list-style-type: none"> <li>• Goal I (Acquire foundational skills and capacities), item d (Apply and communicate quantitative arguments using tables, and graphs (and equations as appropriate).</li> </ul>	Use of scientific data and equations in supporting arguments of scientific opinions/trends.
<ul style="list-style-type: none"> <li>• Goal II (Develop an understanding of various branches of knowledge and their interrelationships), item a (Apply scientific methods and models to draw quantitative and</li> </ul>	Examine popular cultural ideas of scientific phenomena for validity with scientific facts (this can be from areas such as politics or business as it relates to science or even between areas of science). Articulate opinions based on

GE-001-145, CHM 101/101L , Consumer Chemistry  
 (GE Sub-areas B1 and B3)  
 Academic Senate Minutes 5-27-15 -- Attachment 2

qualitative conclusions about the physical and natural world).	scientific principles in written and visual presentations. Use of newspaper/magazine articles; journals, websites to present and analyze scientific concepts.
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Assignment Alignment with GE Student Learning Outcomes	Ic	Id	IIa	Written Communication	Oral Communication
Midterms	x	x	x		
Final	x	x	x		
Class Discussions	x	x	x		x
Role-Play Advocacy	x	x	x		x
Presentations	x	x	x	x	
Paper	x	x	x	x	
Peer Review	x		x	x	