

# CHEM 100

## Chemistry and Society

**Instructor:** Oscar Navarro, Ph.D.

**Contact:** office: Bilger 304  
email: oscaranf@hawaii.edu

**Office hours:** Students are strongly encouraged to meet with the instructor for questions, additional information or any other related matter. Office hours are MWF 13:20-14:30, no appointment required. Any other time can be scheduled by appointment (request by email or in class).

**Classroom:** Bilger 152

**Hours:** 3 1-hour lectures MWF 12:30-13:20

**Textbook:** "Chemistry for Changing Times." J. W. Hill and Doris K. Kolb, 11<sup>th</sup> Ed. Pearson: New Jersey, USA. ISBN: 0321576683  
Study Guide (optional): ISBN 0132271133

**Number of credit hours:** 3

**Prerequisites:** none

**Course description:** This is an introductory course that focuses on the fundamental principles of chemistry and the impact of chemistry in society. It is intended for non-science majors that might not have a background in chemistry. There are three units in this course:

1. Fundamental Principles of Chemistry: introduces students to the building blocks of matter, chemical bonding, principles of reactivity, intermolecular forces, solutions, thermodynamics and kinetics, as well as the basics of nuclear, organic and biochemistry
2. Health Applications of Chemistry: explains, in a general manner, the input of chemistry in the health sciences, ranging from the process to develop a new drug and the mechanisms of action in the body, to chemistry in the food industry and the molecular basis of exercise
3. Societal Applications of Chemistry: the relation between chemistry and other sciences or areas of society will also be discussed, like energy production, the impact of human activity on the environment, forensic science to study a crime scene or the chemistry behind painting a work of art

### Course objectives:

- To introduce students to the fundamental principles of chemistry
- To establish relations between learned concepts and a series of topics on health and society
- To promote an understanding of the importance of chemistry in many aspects of every day life and the implications in other fields and sciences, from the arts to environmental science
- To provide the student a scientific basis to help him/her developing a critical, educated analysis of major societal matters.

**Student learning outcomes:** Students who complete this course will be able to:

- Know and define the basic principles of chemistry
- Formulate basic chemical equations and perform calculations with quantitative material

- Relate those concepts to other sciences and aspects of everyday life
- Recognize and value the impact of chemistry in our society
- Distinguish between the different areas of chemistry and their applications
- Describe the chemical basis of energy production, including some renewable sources
- Analyze the impact of human activity on the environment and discuss some possible ways of remediation
- Summarize the processes for drug discovery and development in pharmaceutical companies
- Explain the mechanisms of action of medicinal compounds that have a profound impact on society, from medicinal drugs to “recreational” drugs
- Explain the basis of cutting-age biochemical topics (cloning, genetic engineering, etc) and discuss their social and political implications

**Student Responsibility:** It is the student's responsibility to put forth the effort required to learn the material and to become competent with it. The best way of learning is to self-test what you don't know and correct that: this means working on the course, reviewing in a daily basis and using good study habits. Ignoring the subject until three days before the test usually guarantees a failure. If you find yourself having troubles catching up with the subject, the instructor will be happy to help you. Consult him as soon as possible. Reading the corresponding chapter and trying to understand the concepts before going to the classroom is highly encouraged. Lectures will be presented in PowerPoint, unless otherwise noted. The PowerPoint files will be uploaded at the MyUH webpage of the course or emailed in order to make them available for the students, so they can be printed out and brought to class to take notes. The handout for the following chapter should be brought in case we advance to it earlier than expected.

#### **Course Policies:**

- 1- There will be no makeup exams. If you miss an exam and have a valid excuse, the weighing of the other assignments will be adjusted accordingly.
- 2- Regular attendance in lecture is highly recommended. The aim of the lecture session is to guide you in your studies and to clarify, emphasize and illustrate the important (and sometimes subtle) concepts. Topics not included in the text will be covered in class and will appear in the tests. You are responsible for all information relayed in class whether you attend or not.
- 3- Academic dishonesty will not be tolerated. Cheating in the form of copying, plagiarism, altering information or using cribs on exams will result in judicial proceedings in accordance with the University of Hawaii's policy on academic dishonesty.

#### **Grading and Student Evaluation**

Four tests: 20% of the final grade each

Questions (weekly assigned): 20% of the total grade (average of all)

Everything will be graded from 0 to 100. **No curves will be applied.** Final grades will be:

0-24: F; 25-49: D; 50-55: C-; 56-61: C; 62-66: C+; 67-72: B-; 73-78: B; 79-84: B+; 85-89: A-; 90-95: A; 96-100: A+

#### **Student Disabilities**

The University of Hawaii is an equal opportunity/affirmative action institution, dedicated to teaching all students and reaching all learners. It is our commitment to make our lectures and classrooms accessible to all students. If you have a disability and have not voluntarily disclosed its nature and the support you need, or you think you might have one, you are invited to contact the KOKUA Program of UH (<http://www.hawaii.edu/kokua/>, phone (808) 956-7511), or talk with the instructor in order to get any accommodation you might need to take the course. This information will be kept confidential. Please do this as early in the course as possible.

## TENTATIVE LECTURE SCHEDULE

<b>Week 1</b>	
<b>M 25A</b>	Introduction
<b>W 27A</b>	Chapter 1: Chemistry in the Sciences
<b>F 29A</b>	Chapter 1: Chemistry in the Sciences
<b>Week 2</b>	
<b>M</b>	NO CLASS
<b>W 3S</b>	Chapter 2: Historic Perspective
<b>F 5S</b>	Chapter 2: Historic Perspective
<b>Week 3</b>	
<b>M 8S</b>	Chapter 3: Atomic Structure
<b>W 10S</b>	Chapter 3: Atomic Structure
<b>F 12S</b>	Chapter 4: Nuclear Chemistry
<b>Week 4</b>	
<b>M 15S</b>	Chapter 4: Nuclear Chemistry
<b>W 17S</b>	Chapter 5: Chemical Bonds
<b>F 19S</b>	Chapter 5: Chemical Bonds
<b>Week 5</b>	
<b>M 22S</b>	Chapter 6: Mass and volume Relationships
<b>W 24S</b>	Chapter 6: Mass and Volume Relationships
<b>F 26S</b>	<b>Test 1 (Chapters 1-6)</b>
<b>Week 6</b>	
<b>M 29S</b>	Chapter 7: Acids and Bases
<b>W 10</b>	Chapter 7: Acids and Bases
<b>F 30</b>	Chapter 8: Oxidation and Reduction
<b>Week 7</b>	
<b>M 60</b>	Chapter 8: Oxidation and Reduction
<b>W 80</b>	Chapter 9: Introduction to Organic Chemistry
<b>F 100</b>	Chapter 9: Introduction to Organic Chemistry
<b>Week 8</b>	
<b>M 130</b>	Chapter 10: Polymers
<b>W 150</b>	Chapter 10: Polymers
<b>F 170</b>	Chapter 11: Metals and Minerals
<b>Week 9</b>	
<b>M 200</b>	Chapter 11: Metals and Minerals
<b>W 220</b>	<b>Test 2 (Chapters 7-11)</b>
<b>F 240</b>	Topic 1: Biochemistry
<b>Week 10</b>	
<b>M 270</b>	Topic 1: Biochemistry
<b>W 290</b>	Chapter 16: Chemistry and Food
<b>F 310</b>	Chapter 16: Chemistry and Food
<b>Week 11</b>	
<b>M 3N</b>	Topic 2: Chemistry, Drugs and the Pharmaceutical Industry
<b>W 5N</b>	Topic 2: Chemistry, Drugs and the Pharmaceutical Industry
<b>F 7N</b>	Topic 2: Chemistry, Drugs and the Pharmaceutical Industry
<b>Week 12</b>	
<b>M 10N</b>	Chapter 20: Chemistry and Toxicology
<b>W 12N</b>	Chapter 20: Chemistry and Toxicology
<b>F 14N</b>	<b>Test 3 (Topics 1, 2 and Chapters 16, 20)</b>

<b>Week 13</b>	
<b>M 17</b>	Topic 3: Chemistry and Art
<b>W 19</b>	Topic 3: Chemistry and Art
<b>F 21</b>	Topic 4: Chemistry and Forensic Science
<b>Week 14</b>	
<b>M 24N</b>	Topic 4: Chemistry and Forensic Science
<b>W 26N</b>	Topic 5: Chemistry and the Environment
<b>F 28N</b>	NO CLASS
<b>Week 15</b>	
<b>M 1D</b>	Topic 5: Chemistry and the Environment
<b>W 3D</b>	Topic 5: Chemistry and the Environment
<b>F 5D</b>	Topic 6: Chemistry and Energy
<b>Week 16</b>	
<b>M 8D</b>	Topic 6: Chemistry and Energy
<b>W 10D</b>	Topic 6: Chemistry and Energy
<b>Week 17</b>	<b>FINAL TEST (Topics 3, 4, 5, 6) December 19<sup>th</sup> Friday, 12:00-14:00</b>