

## CHEMISTRY 001 SYLLABUS

### Online Course Fall 2021

Professor Jack Eichler

**DESCRIPTION** Chemistry 001 (online version of CHEM 001W) is a preparatory course for the CHEM 001A/001B/001C general chemistry series. Successful completion of this course should improve your unit conversion, dimensional analysis, and problem solving skills, which are essential for success in the general chemistry course series.

If you successfully complete the course and earn a passing grade, you will be guaranteed placement into CHEM 001A.

**TIME & PLACE** Since you will be completing the online videos and online quizzes on your own pace under weekly deadlines there is no set meeting time for this course.

**INSTRUCTOR** Prof. Jack Eichler  
Office: 220 Chemical Sciences  
Office Hours: Online virtual discussion; days/times posted in iLearn.  
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**COMMUNICATIONS** Webpage: The Chemistry 001 webpage can be accessed via UCR iLearn at "[ilearn.ucr.edu](https://ilearn.ucr.edu)". It contains materials such as syllabus, class announcements, and homework assignments.

Electronic Mail: E-mail announcements will be sent to your UCR student e-mail account (for example, [\[username@student.ucr.edu\]](mailto:[username@student.ucr.edu])) from time to time during the quarter. For questions regarding iLearn, your UCR student e-mail account, e-mail forwarding, etc, please get instructions from [ilearn.ucr.edu](https://ilearn.ucr.edu). Course announcements can also be found at the iLearn course site.

Online Discussion Forum: We will use the Piazza online discussion forum, where you can ask the instructor questions about course content or general logistical items. Details about how to access the Piazza discussion board will be posted in iLearn.

### I. COURSE MATERIALS

1. This syllabus (posted on iLearn).
2. Online/computer access to access videos, online iLearn quizzes, and online video conference office hours.
3. OpenStax text book (free download): <https://openstax.org/details/books/chemistry-2e>

**II. SCHEDULE of ACTIVITIES**

Unit	Dates	Topics	Activities
1	Weeks 1&2	Matter, Measurements, and Dimensional Analysis	1. Online lectures/iLearn quiz
2	Weeks 3&4	Atomic Structure	1. Online lectures/iLearn quiz
3	Weeks 5&6 Week 6	Electronic Structure	1. Online lectures/iLearn quiz <b>2. Online iLearn midterm exam</b>
4	Weeks 7&8	Chemical Reactions	1. Online lectures/iLearn questions
5	Weeks 9&10	Solutions and Math Topics	1. Online lectures/iLearn questions
Final Exam	Dec 10-18		<b>Online iLean Final Exam</b>

**III. PROCEDURES**

You will need access to an internet enabled computer/device in order to access iLearn, watch the online videos, and complete the online iLearn quizzes. You will also need access to a computer that has audio and a webcam, which will be required for the online final exam. The midterm exam and final exam will be administered by ProctorU, and instructions for signing up with ProctorU will be posted in iLearn.

**IV. GRADING POLICIES**

GRADING Grades will be based on the cumulative total points that result from all of the following:

	<b>Points</b>
a. Midterm Exam	300 points
b. iLearn Lecture Quizzes	300 points
d. Final Exam	400 points

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TOTAL POINTS      **1000 points**

GRADES Chem 001 is a graded S/NC for “satisfactory” or “no credit”. To pass this course (S), you must earn 650 or more points. If you earn a passing (S) grade, you will be guaranteed placement in CHEM 001A.

**CHEATING** Cheating in any part of the course will result in an “F” in the course as a whole - not just zero for that assignment - for each student involved. Also, the instructor may withhold the grade in the course and report the student’s unacceptable conduct to the campus administration for disciplinary action. (See the policy “Academic Discipline Process” passed by the faculty in 1988. It is on file in the Office of the Vice Chancellor, Student Services, and in the Academic Senate Office, University Office Building). *An F in a Chemistry class for cheating closes all doors to normal continuation of your education in science.*

Cheating means submission of work for point credit that is not your own work. Work that is not your own results from copying, plagiarizing, using unauthorized online resources, having another person complete an assignment or take an exam for you, etc.

## V. SUGGESTIONS FOR SUCCESS

The instructor will do everything within reason to help, but YOU have to do the online work. BUDGET your time. Learn by practicing the material (DO EXERCISES). **Familiarize, do not memorize.**

1. Do suggested exercises/online assignments EVERY day. That is how you familiarize yourself with the ideas, procedures, and the ways of thinking about chemistry. Those exercises should be the minimum number attempted.
2. Read in the suggested textbook readings about the daily topics for each unit. These readings can help supplement/clarify the online videos and/or the online assignments.
3. Take notes, as best you can, during the online video lectures. Taking notes while watching the video tutorials will help you retain the new knowledge covered in the tutorials, and will also then provide for you a set of notes to review for the exams.
4. Attend the virtual office hours and ask questions if you do not understand the direction or main points in the video lectures. It is quite likely that many others will not understand either; they will appreciate your asking questions.
5. SUMMARY AND ESSENTIALS: Make a weekly schedule for watching the video lectures and completing the online assignments and stick to that routine. If you wait until the day the assignments are due, you will likely not do well as the course progresses.

## VI. LEARNING OBJECTIVES FOR EACH UNIT

### **Learning Goals & Outline – Introduction to Matter, Making Measurements, and the Scientific Method**

#### Learning Goals

Students will:

- 1) be able to identify different classifications of matter and explain the difference between a chemical and physical change.
- 2) be able to describe how taking measurements are a requirement for carrying out a scientific experiment, and be able to recognize how the measuring device determines the number of significant digits in a measurement.
- 3) be able to assess the accuracy and precision of measurements, both qualitatively and quantitatively.
- 4) recognize the various SI units that are important in chemistry, and be able to use the metric prefixes with the various SI units.
- 5) be able to convert between metric-based units, and between metric-based and English units (using proportions and/or dimensional analysis).

### **Learning Goals & Outline – Atomic Structure and Atomic Mass**

#### Learning Goals

Students will:

- 1) be able to describe the basic structure of the atom, based on the nuclear model of the atom.
- 2) be able to distinguish the difference between different isotopes of atoms based on mass symbols of elements; students will be able to calculate the number of protons, electrons, and neutrons in an atom based on mass symbols.
- 3) be able to describe the difference between the mass of an individual isotope and the average atomic mass, and be able to calculate the average atomic mass of an element.
- 4) be able to calculate the percent composition of a compound.

### **Learning Goals & Outline – Electronic Structure and Electron Configurations**

#### Learning Goals

Students will:

- 1) be able to describe the relationship between light and energy, and be able to calculate the energy of electromagnetic radiation given its wavelength, and vice versa.
- 2) be able to describe the relationship between atomic line spectra and assigned energies of electrons in the atom.
- 3) be able to build up atomic orbitals for different elements/atoms, and be able to use these atomic orbital combinations to assign electron configurations for different elements/atoms/ions.
- 4) be able to describe the relationship between the periodic nature of the period table and the building up of atomic orbitals/electron configurations.

## **Learning Goals and Outline - Compounds and Chemical Composition**

### Learning Goals

Students will:

- 1) be able to identify and differentiate compounds and elements.
- 2) be able to calculate the percent composition of a compound.
- 3) be able to describe the concept of the mole.
- 4) be able to calculate the molar mass of elements and compounds.

## **Learning Goals & Outline - Chemical Reactions/Stoichiometry and Solutions**

### Learning Goals

Students will:

- 1) be able to balance chemical reactions.
- 2) be able to describe the concept of the mole, explain why the mass unit mole is used in chemistry, and describe the importance of the mole in chemical reaction equations.
- 3) be able to use moles and molecular masses of elements/compounds in order to quantify the masses of compounds used and produced in chemical reactions (stoichiometry).
- 4) be able to determine the limiting reactant and calculate the %yield in chemical reactions.
- 5) be able to calculate the %composition of elements in compounds, and be able to determine the empirical formula of a compound using elemental analysis data.
- 6) be able to describe the components of a solution, and the different types of solutions.
- 7) be able to calculate the molar concentration
- 8) be able to use concentration units in chemical reactions