CHEM 3A -59066
Lectures M-R 2:20-3:11pm in Room 200
CHEM3A labs on F 12-3 PM in MSE 201

Instructor: Katie Ochoa ochoa-k@kcusd.com
Lab Instructor: Zak Kawagoe
Tutoring: Free in-person tutoring in the tutorial center, and free zoom tutoring available: https://www.reedleycollege.edu/academics/tutoring-services/index.html

Course Objectives: Chemistry 3A is an elementary survey course in chemistry including lab work. It will provide a chemistry background for a wide variety of careers.

Course Prerequisite: Math 3A/High School Algebra II. Students please note, chemistry is a quantitative science**.** Students need to be comfortable manipulating algebraic equations, much of the course will require completing mathematical calculations.

Course Advisories: ENGL 1A, CHEM10 or high school chemistry

Text and Materials:
1. Nivaldo J. Tro: "Introductory Chemistry" **6th** Edition. The Mastering Chemistry CD is not needed.
2. You will need a calculator with "exp" (or "EE") and "log" keys ($12 at Walmart), but not a programmable calculator, Casio, or a STATS calculator. You may borrow a calculator for the semester from me as needed. (or EOPS office).
3. A Lab Coat and safety glasses will be provided for the semester. These will stay in the lab.

Class Attendance and Participation Policy Requirements: Your attendance and participation is important for success in this class. Students need to attend and pass the Friday lab portion of the class to pass the class. If you wish to withdraw from the class, you are responsible for withdrawing before the drop date. After that date you will be given a letter grade.

Late Work Policy: Homework assignments need to be turned in at the assigned time. You will lose 10% if the homework is turned in late. If you are absent, email me your homework. If you email me the homework after the due time, but before the next class, 10% will still be deducted for it being late. Homework will no longer be accepted (even for late credit) once the assignment has been reviewed. Prelabs need to be turned in at the beginning of lab (before teaching begins), and should not have anything printed on the back. Late prelabs will also lose 10%. If you are late to the lab you will also lose points for the lab. Lab reports and Postlab questions need to be turned in before leaving the lab. If you miss a lab, email or turn in the Prelab and Postlab questions before the next lab for a small partial credit.

Quizzes and Exams Late Work Policy: A make-up quiz/exam will only be given due to extreme circumstances, with verifiable written proof, at the discretion of the instructor.

No notes, cell phones, i-pods, smart watches, programmable calculators, restroom breaks or talking will be allowed during exams.

Lecture Notes: The ability to listen carefully and to take good lecture notes is an essential college skill. (If you need an accommodation to have a note-taker or another accommodation, please contact the DSP&S office).To maximize retention of the material you should do homework as soon as possible after lecture and read the text. You should keep your notes, homework and lab assignments in a binder or notebook and review them the day before your exam, especially the homework and prelabs.

Homework and Lab Reports: Homework will be assigned weekly and a lab report for every lab. Success in this class requires that all work is complete, submitted, and mostly correct. All homework will be due as assigned in lecture and selected problems graded. Do not copy somebody else's homework or you will not be able to do the problems for yourself in the exams. If you choose to turn in identical homework/lab reports both assignments will receive a zero, the student who copied and the student who allowed the copying of their work. You can ask for help to start problems, but you need to work them out for yourself. You should do the odd number problems in your textbook for extra practice and check the answers at the back of the textbook.

Laboratory (25%):	**Lab Reports 12.5%, Lab quizzes 12.5%**
Lecture Material (75%):	**Exams 60%**
	Homework 15%

The grading scale to be used is **A** 90-100%, **B** 80-89%, **C** 70-79%, **D** 60-69%, **F** 0-59%

CHEM 3A Spring 2024

Week	Dates	Lectures	Friday Lab
1	Jan 15-19	Periodic Table 2.3 Significant Figures and Density	Safety and Lab equipment
2	Jan 22-26	2.2 Scientific Notation and Temperature 2.6 Dimensional Analysis and Measurements	Exp 3. Density of liquids and solids
3	Jan 29-Feb 2	3. Matter, Physical and Chemical Changes 4 Atoms, Elements and Ions	Exp 1: Properties and changes of matter
4	Feb 5-9	5. Chemical Nomenclature: Ionic Compounds and Molecules 5.11-6.1 The Mole	**Exam 1 and Lab Quiz 1 during Lab**
5	Feb 12-16	6.7 Percent Composition and 6.8 Empirical Formulas	Nomenclature Worksheet (with Ochoa)
6	Feb 19-23	5. Polyatomic Ions and Hydrates Percent water in Hydrates	Exp 4: The Mole
7	Feb 26-Mar 1	7.1-7.4 Balancing Chemical Reactions and 7.9-7.10 Types of Reactions	Exp 5: Empirical Formulas of a Compound and Exp 13: Percent Water in Hydrates
8	Mar 4-8	8. Stoichiometry 8.6 Limiting Reactants and Percent yield	**Exam 2 and Lab Quiz 2 during lab**
9	Mar 11-15	8. Thermochemistry 8. Calorimetry	Exp 7: Reaction Types Copper Chemistry
10	Mar 18-22	11. Gases and the Combined Gas law	Exp 2: Calorimetry experiment

		11. Ideal Gas Law	
11	Mar 25-29	**Spring Break**	
	April 2-5	11. Gas Stoichiometry and Partial Pressure 9. Orbital Diagrams	Exp 14: Molar mass of a volatile gas
12	Apr 8-12	9. Electronic configuration 9.7, 9.9 and 10.2 Periodic Table Trends	**Exam 3 and Lab Quiz 3**
13	Apr 15-19	10. Lewis Diagrams of Molecules 10.7 Geometry	Exp 9: Production of Hydrogen Gas
14	Apr 22-26	13. Solutions, Dilutions 14. Acids and Bases and Titrations	Lewis Diagrams and Molecular Models
15	Apr 29-May 3	10.8 Electronegativity, Polar Covalent Bonds and Polar molecules 12. Liquids, Solids and Intermolecular Forces	Exp 11: Acid Base Titration Lab and pH worksheet
16	May 6-10	15. Chemical Equilibrium 17. Radioactivity and Nuclear Chemistry	Exp 8: Alum production from scrap aluminum
17	**May 6-10**	14: pH and pOH	**Lab Practical - Titration**
18	**May 13-17**	**Finals Week**	**Final**

<u>Student Learning Outcomes</u>:

Upon completion of this course, students will be able to:

A. Use dimensional analysis to solve for an unknown parameter of density, volume, mass, pressure, temperature, molar mass, concentration, or an empirical formula.
B. Construct and balance a chemical reaction and use the reaction to predict stoichiometric quantities.
C. Explain concepts from the periodic table and the use the periodic table to solve chemical problems.
D. Describe acid-base reactions and how to calculate pH.
E. Name and draw Lewis diagrams of inorganic and molecular compounds from the formula and vice versa.
F. Safely conduct laboratory experiments implementing concepts and principles learned in lecture.

<u>Course Objectives</u>:

Upon completion of this course, students will be able to:

A. demonstrate an appreciation for the impact of chemistry on modern society and the relationship between chemistry and other disciplines including agriculture, the medical field, and industry;
B. classify types of matter, recognize physical properties and chemical properties, and a general understanding of the Law of Conservation of Mass and the Law of Conservation of Energy;
C. perform unit conversions using the correct significant figures; between the English and metric systems, temperatures in different units, density, energy, and with SI units;

D. use the periodic table to predict physical and chemical properties of elements and calculate molar masses of compounds and molecules;
E. recognize the electromagnetic spectrum and have a basic understanding of the quantum mechanical model of the atom;
F. demonstrate the ability to name inorganic compounds given their formulas, and write formulas given names;
G. distinguish and identify metals, non-metals, metalloids, and the elements of alkali metals, alkaline earth metals, halogens, noble gasses, transition metals, and elements of the lanthanide and actinide;
H. distinguish and identify between different types of intramolecular and intermolecular forces of attraction present in various substances based on chemical formulas and structures;
I. write Lewis Electron-Dot Formulas and identify the shape using VSEPR method;
J. write and balance chemical equations, and use these equations along with stoichiometry and the mole concept to convert quantities (e.g. grams or moles) of a given substance into quantities of an unknown substance;
K. calculate, empirical formulas, and percentage composition given the appropriate data;
L. distinguish and balance chemical equations of different types of reactions;
M. perform calculations involving a limiting reagent and determining the percent yield;
N. predict the physical behavior of gasses to pressure, temperature, and volume changes;
O. solve simple mathematical problems involving formula calculations related to gas laws;
P. use gas laws and stoichiometry to calculate quantities (e.g. moles, volume, grams) of gas produced or consumed during a reaction;
Q. calculate various parameters of solutions including molarity, dilution techniques, percentage concentration, and density.
R. construct heating and cooling curves;
S. describe state and energy changes accompanying heating and cooling curves;
T. apply the principles of equilibrium in reversible reactions, saturated solutions, solutions of weak electrolytes and solutions of gasses in solving related problems;
U. use solution properties and stoichiometry to calculate quantities (e.g. moles, volume, grams) produced or consumed during a reaction;
V. describe colligative properties of solutions (e.g. boiling point elevation, freezing point depression, and osmotic pressure);
W. define and identify acids and bases and be able to perform math calculations involving the pH;
X. determine the nature and applications for electron exchange reactions;
Y. understand the structure of the atomic nucleus;
Z. understand the fundamental types of nuclear radiation and the effects they have on biological systems
AA. and demonstrate laboratory skills which include operating an analytical balance; calibrating and/or use fundamental lab equipment such as a thermometer, barometer, buret, pipette; recognizing use and limitations of laboratory glassware; recording and reporting observations; using error analysis techniques to evaluate certainty of data; use safety precautions and general laboratory procedures.

Please be aware of the following rules:

- Tardiness, cell-phone use, leaving early, and sleeping during lecture is considered disruptive behavior.
- Fraudulent behavior during exams is graded with a (0) zero.

- Copying of homework, experimental data, and lab reports is considered fraudulent behavior for both the copier and the originator and points (10-100%) may be deducted from both the copier and the originator. **DO NOT HAND IN IDENTICAL HOMEWORK.**
- No homework may be handed in after I have returned it or gone over it in class. No alternative homework will be given.
- No extra credit will be given. You need to work consistently from the beginning.
- Please silence your cell phones during lectures so as not to disturb the class. No cell phones, i-phones or i-pods will be allowed during exams.

If you have a verified need for an academic accommodation or materials in alternate media (i.e., Braille, large print, electronic text, etc.) per the Americans with Disabilities Act (ADA) or Section 504 of the Rehabilitation Act, please contact the Disabled Student Services as soon as possible.

With this statement on my course syllabus, I am **referring** each of my enrolled students in need of academic support to **tutorial services**. Referral reason: Mastering the content, study skills, and basic skills of this course is aided by the use of trained peer tutors