

CHEMISTRY 4
Beginning Chemistry
Fall 2009

INSTRUCTOR: A. Tontcheva, Ph.D.

LECTURE: M-W in Chem 101

LAB: Th in Chem 164

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OFFICE HOURS: Mon 12:20-1:30, Tue 12:30 -1:00, Wed 12:30-2:00

PREREQUISITE: Math 70 (Intermediate Algebra) with a minimum grade of C or equivalent; or qualification by testing (El Camino College Mathematics Placement Test) and assessment.

REQUIRED MATERIALS:

- Textbook: Cracolice, Peters, *Introductory Chemistry: An Active Learning-Approach* 4th ed., (ISBN-13: 978-0-495-55851-4)
- Calculator: Non-programmable scientific calculator.
- Laboratory Manual: McLeod, et. al., *Chemistry 4 Supplement and Laboratory Manual*
- Approved Safety Goggles: Required for lab work. Safety glasses are not acceptable. If you wear prescription glasses, your safety goggles must be worn over them. You should not wear contact lenses to lab. Safety goggles are available at the ECC bookstore.

COURSE DESCRIPTION

Chemistry 4 introduces principles of chemistry, modern concepts of atomic structure and periodicity as a basis for the understanding of bonding, chemical formulas, chemical equations and chemical reactions, states of matter, important elements and their compounds, solutions, acid-base theories and reactions, net ionic equations, and oxidation-reduction. It includes an introduction to kinetics and chemical equilibrium. Emphasis in lecture is on chemical nomenclature and calculations. In the laboratory, emphasis will be on observations, measurements and elementary quantitative experiments with an introduction to qualitative analysis.

COURSE POLICIES: Late work will NOT be accepted. Instructors are under no obligation to make special arrangements for students who are absent. Make up examinations will NOT be administered. Students who are disrupting the class will be asked to leave and may receive a lower grade. Use of cell phones during class is prohibited.

ATTENDANCE: Students with excessive absences or lateness may receive a lower grade. Students who drop the course before the final W drop date will receive a "W". It is your responsibility to drop the course to avoid an "F". To drop, you must check out of your lab drawer and have a card signed by the stockroom.

STUDY TIPS: All students can achieve success in this course by taking charge and challenging themselves to learn the material. The key is to keep up with the material. Arrive on time, prepared with textbooks, calculator, etc., for each scheduled class meetings. All assigned materials should be read before class. Prepare questions about topics that are not clearly understood. Be sure to ask those questions in class. Participate in all activities. Complete all assignments and turn them in on time. Students who simply occupy a seat, copying down what is written on the board and do not prepare before class will have less chance for success. In order to succeed in the class, you need to study about 20-30 hours per week.

HOMEWORK: Homework is a non-graded component of this course. The best way to understand chemistry is by doing lots of homework problems on your own! Homework problems should be completed weekly as we cover each chapter in class. You are expected to do all of the odd numbered problems for each chapter. If you can work a few each day, you'll learn more than if you cram them all in at the end of the week or, worst of all, just before an exam. If you need help working your homework problems, please see me after class and/or seek tutoring. Don't wait! If you fall behind, it is impossible to get caught up.

QUIZZES AND EXAMS: Four exams (100 pts each) and two quizzes will be administered on lecture days. Extra time will not be given to students who are late for the exam. Each exam will be cumulative with a heavy emphasis on material presented since the last midterm exam. No makeup exams will be given! If you think that there is a grading error on an exam, the exam must be submitted to me for regrading within one class period. Requests for regrades must be submitted in writing. Erased or modified answers will not be regraded. Students who submit modified exams for regrading are violating the academic honesty code and may receive a failing grade for the exam and/or the course. . If you forget your calculator, you may use another student's calculator when they have finished the exam. You may not use programmable calculators, cell-phone calculators, or translators during a quiz or test.

LAB REPORTS: Bring the entire lab, including blank report pages. If you forget pages, photocopy after lab lecture. You must attend the entire lab lecture to do the lab. Late students will get a penalty or be asked to leave depending on what was missed. Writing on another student's lab, bringing in graded experiments, or copying a sentence or piece of data is cheating. Do independent work. View your lab notes on safety, disposal and important info during lab. Read the experiment before the lab. Wear closed-toe shoes to labs with burners or chemicals. Don't touch the chemicals! If you miss more than 2 labs, you will not pass the course. See Quizzes and Tests for missed lab policy. Unless announced otherwise, lab reports are due before the beginning of the 2nd class after the lab. Pages must be stapled in numerical sequence. Late lab reports will be penalized 2 points per class day late. Being tardy or absent is not an excuse for late lab reports.

FINAL EXAM: The final exam is cumulative and is worth 200 points. It will not be returned to the students. If you wish to examine your graded final, you may do so by contacting me.

GRADING: Your final grade for the course will be computed as follows:

Assignment	Point Value	Grade Assignment
Exams (4 X 100 pts):	400 pts.	89 – 100% = A
Quizzes: (8 x 20 pts)	160 pts.	79 – 88 % = B
Labs (15 x 10 + 30 pts):	180 pts.	65 – 77% = C
<u>Final Exam:</u>	<u>200 pts.</u>	<u>54 – 64% = D</u>
Total:	940 pts	< 54 = F

TENTATIVE CLASS SCHEDULE:

Week	Date	
1	Mon 8/31	Chapter 2 (Matter), Chapter 3 (Measurements).
	Tue 9/1	Chapter 3. Bring your scientific calculator. Bring the math and measurements section of the supplement through week 2.
	Wed 9/2	Chapter 3 , Chapter 4 (Gases),
	Thu 9/3	Quiz 1 (Chapters 2-3) , Chapter 4, safety video (mandatory for all students)
2	Tue 9/8	Chapter 4, Chapter 5 (Atomic Theory)
	Wed 9/9	Elements Quiz , Chapter 5, Chapter 6 (Nomenclature)
	Thu 9/10	Safety; Check-In; Experiment 1A-G: Burners (L1) Don't forget your goggles, closed shoes, experiment, and Roman-numeral pages.
3	Mon 9/14	Quiz 2 (Chapters 4-5) , Chapter 6

	Tue 9/15	Chapter 6
	Wed 9/16	Chapter 6
	Thu 9/17	Experiment 2: Measurements (L2)
4	Mon 9/21	Nomenclature Exercise (L3+10)
	Tue 9/22	Chapter 7 (Formulas). Bring the reactions section of the supplement through week 5.
	Wed 9/23	Test 1 (Chapters 2-6)
	Thu 9/24	Experiment 7: Charles' Law (L4)
5	Mon 9/28	Chapter 7, Chapter 8 (Reactions)
	Tue 9/29	Chapter 8
	Wed 9/30	Chapter 8
	Thu 10/1	Chapter 8, Chapter 9 (Chemical Change) Bring the NIE section of the supplement
6	Mon 10/5	Chapter 9
	Tue 10/6	Quiz 3 (Chapters 6-8), Chapter 9
	Wed 10/7	Chapter 9
	Thu 10/8	Experiment 5: Hydrates (L5)
7	Mon 10/12	Chapter 10 (Quantity Relationships)
	Tue 10/13	Quiz 4 (Chapter 9), Chapter 10
	Wed 10/14	Chapter 10
	Thu 10/15	Experiment 11: Conductivity (L6)
8	Mon 10/19	Chapter 10, Bring Exp. 3 to lecture (Exp 3 lecture is mandatory for all students)
	Tue 10/20	Chapter 10, Chapter 11 (Atomic Theory) Bring the quantum section of the supplement
	Wed 10/21	Test 2 (Chapters 6-9)
	Thu 10/22	Experiment 3: Observations (L7+10), save this lab
9	Mon 10/26	Chapter 11, Bring Exp. 6 to lecture (Exp 6 lecture is mandatory for all students)

	Tue 10/27	Chapter 11
	Wed 10/28	Chapter 12 (Bonding)
	Thu 10/29	Experiment 6: Chemical Reactions (L8+10), save this lab
10	Mon 11/2	Quiz 5 (Chapters 10-11), Lecture: Chapter 12
	Tue 11/3	Chapter 13(Drawing Structures)
	Wed 11/4	Chapter 13, Chapter 14 (Ideal Gas Law), Exercise B: Models (found in the back of your supplement, L9)
	Thu 11/5	Experiment 9: Ideal Gas Law (L10)
11	Mon 11/10	Chapter 14
	Tue 11/11	Quiz 6 (Chapters 12-13), Chapter 15 (Gases, Liquids, Solids)
	Wed 11/12	Chapter 15
12	Mon 11/16	Chapter 15
	Tue 11/17	Chapter 16 (Solutions)
	Wed 11/18	Test 3 (Chapters 10-15)
	Thu 11/19	Experiment 14: Solutions (L11) “W” drop date is 11/20.
13	Mon 11/23	Chapter 16
	Tue 11/24	Chapter 16, Chapter 17 (Acids and Bases)
	Wed 11/25	Chapter 17
14	Mon 11/30	Chapter 18 (Equilibrium)
	Tue 12/1	Quiz 7 (Chapters 16-17), Chapter 19 (Redox) Bring page redox-5 through week 15.
	Wed 12/2	Chapter 19
	Thu 12/3	Experiment 10: Titrations (L12) Note—You must work alone on this lab.
15	Mon 12/7	Chapter 19, Bring Experiment 12 to lecture today (Exp. 12 lecture is mandatory for all students).
	Tue 12/8	Chapter 19
	Wed 12/9	Test 4 (Chapters 16-19)

	Thu 12/10	Experiment 12: Qualitative Analysis (L13). Note—You must work alone on this lab
16	Mon 12/14	Exercise C: Equations (L14), Open book and notes. Bring your copies of Exps 3 & 6 if you have them. Note—You must work alone on this lab.
	Tue 12/15	Review
	Wed 12/16	Final
	Thu 12/17	Experiment 12: Qual. Analysis (L15). Note—You must work alone on this lab. Check-out.

Course Objectives

1. Utilize the language of chemistry including vocabulary, symbols, formulas, and equations.
2. Compare and contrast physical properties, physical changes, chemical properties, and chemical changes.
3. Analyze and solve quantitative problems including stoichiometry, percent yield, energy and change of temperature, gas laws, the ideal gas equation, Dalton's law of partial pressures, percent abundance of isotopes, density, solution concentration, and colligative properties.
4. Compare and contrast ionic and covalent compounds. Evaluate bonding based on the chemical formula, and then correlate compound properties with the structure and types of bonding present.
5. Given one or the other, generate names or formulas for elements, ions, and compounds.
6. Differentiate between five reaction types: combination, decomposition, single replacement, double replacement, and complete oxidation. Given a set of reactants, diagnose the reaction type and predict the products.
7. Solve problems and express answers in scientific and decimal notation with correct units and significant figures. Use logarithms to convert a Tueg pH, pOH, $[H^+]$, and $[OH^-]$.
8. Correlate spontaneity of oxidation-reduction reactions with standard reduction potentials of reactants.
9. Predict the direction of equilibrium shift in equilibrium processes given a change in concentration, temperature, or volume of substances involved.
10. Create graphs from raw data and evaluate the graphs.
11. Demonstrate basic laboratory skills, including making, recording, and evaluating observations of chemical systems.
12. Evaluate volumetric laboratory glassware for the correct significant place to be read and record volumes correctly. Evaluate quantitative experimental data, and infer the presence or absence of specific ions in an unknown mixture.

DISCLAIMER STATEMENT:

Students will be notified ahead of time when and if any changes are made to course requirements or policies.

DISABILITY STATEMENT: If you have a documented disability and wish to discuss academic accommodations, please contact me as soon as possible.

STUDENT LEARNING OUTCOMES: On a written exercise, given the names of chemical compounds, students will be able to write the correct reactant formulas, states of matter (when required), identify reaction type, predict the formulas of products, and balance the chemical equation.

ADDITIONAL INFO:

Please refer to the course website (www.elcamino.edu/faculty/agrant) for the following information: Assessment Activities, ECC Policy on Attendance, ECC Statement of Student Conduct.

