# Chemistry 21A: Survey of General and Organic Chemistry

**Fall 2009 – Section 1158**

**Instructor:** Valerie Baggett

**Office:** Chem 132

**Office Hours:** MW 9:30 – 10:00 am, or by appointment

**Telephone:** 310-660-3593 x 6131 (no messages); 310-990-1201 in emergency

**Email:** vbaggett@elcamino.edu

**Website:** http://www.elcamino.edu/faculty/vbaggett/chem21a.html

| | | | | |
|---|---|---|---|---|
| **Class Hours:** | MW | 8:00 – 9:25 am | CHEM 101 | lecture |
| | F | 8:00 – 9:01 am | CHEM 162 | lecture |
| | F | 9:05 – 11:15am | CHEM 162 | lab |

**Course Description:** Chemistry 21A is the first semester of a two-semester sequence designed to provide students with the skills and knowledge needed to satisfy the requirements for several allied health related majors, especially the pre-nursing major. This course presents the fundamental principles of inorganic chemistry and begins the study of organic chemistry.

This course fulfills the chemistry prerequisite for Biology 1B, Microbiology 33, and Physiology 31, and provides the foundation necessary for success in Chemistry 21B, the second course in this sequence.

**Prerequisite:** Mathematics 40 or 41B with a minimum grade of C (or by placement exam).

**Required Materials:**

Seager and Slabaugh, *Chemistry for Today: General, Organic, and Biochemistry*, 6th edition, Thompson Brooks/Cole. ISBN: 978-0495112822

Peller, *Exploring Chemistry: Laboratory Experiments in General, Organic, and Biological Chemistry*, 2nd edition, Pearson Prentice Hall. ISBN: 978-0130477149

Scientific calculator - Capable of doing exponential calculations (exp or EE key). Not a graphing calculator.

Safety goggles (Instructor approved – do not purchase until "fitted" in class.)

**Optional Materials:**

Harris, *Study Guide and Solutions Manual for Chemistry for Today: General, Organic, and Biochemistry*, 6th edition, Thompson Brooks/Cole. ISBN: 978-0495112716

Campbell, *Chemistry 21A Packet.*

**Grading:**

| | | |
|---|---|---|
| Three Exams @ 100 points each | = | 300 points (50%) |
| Twelve Labs @ 12 points each | = | 150 points (25%) |
| Final Exam | = | 150 points (25%) |
| Total Points for Course | = | 600 points (100%) |

| *%* | *Points* | *Grade* |
|---|---|---|
| 90 - 100 | 540 - 600 | A |
| 80 – 89 | 480 - 539 | B |
| 70 – 79 | 420 - 479 | C |
| 60 – 69 | 360 - 419 | D |
| 0 – 59 | 0 - 359 | F |

***Homework –*** All of the homework can be handed in before each exam for 5 extra credit points. Partial credit is not given if not all the homework has been completed.

***Labs*** – There are 13 scheduled labs. There are no make-up labs. The lowest lab will be dropped. The pre-lab assignment is to be finished before coming to lab. If it is not complete, a 2-point deduction will be taken on the lab. All labs reports are due one week after the lab is completed. There will be a 2-point deduction on all labs that are turned in late.

***Exams*** - There are four mid-term exams, each worth 100 points. Exam questions will be similar to the homework problems. On calculation problems, partial credit is given if the work is shown. The lowest exam grade will be dropped. There are no makeup exams.

***Final*** - The final is a cumulative exam.

**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.

Students will practice safe laboratory procedures by putting their goggles on at the beginning of a chemistry lab experiment involving burners or chemicals, and by keeping their goggles in place during the entire course of the experiment. Students will not remove their goggles until the students are leaving or until the instructor has said that it is safe to do so (whichever comes first).

**Course Objectives:**

By the end of this course, the student will be able to:

1. Use the language of general chemistry (vocabulary, nomenclature, formulas and equations) to describe chemical systems and changes (physical and chemical) they undergo.

2. Describe the structure of the atom in terms of the arrangement of subatomic particles and electronic configuration.

3. Extract information from the periodic table and predict periodic trends.

4. Distinguish between ionic and covalent bonding and write Lewis structure for molecules and polyatomic ions.

5. Predict molecular geometry, bond angles and polarity.

6. Solve introductory level quantitative problems applied to chemical systems by using dimensional analysis and algebra. These problems include unit conversions, stoichiometry, gas laws, solution concentrations and pH.

7. Describe the properties of solids, liquids, gases and solutions and relate them to bonding and intermolecular forces.

8. Discuss the factors which affect the rate of reactions and apply Le Chatelier's Principle to equilibria.

9. State the properties and definitions of acids and bases and interpret elementary acid-base equilibria.

10. Describe the bonding and geometry of carbon compounds in terms of hybridization and type of bonding orbital overlap (pi or sigma).

11. Use free radical, ionic and concerted mechanisms to show how selected organic reactions take place.

12. Determine the nomenclature and write equations for the preparation and important reactions of alkanes, alkenes, alkynes, alcohols and ethers.

13. State the names of common aromatic compounds and describe the structure and resonance of these compounds.

14. Recognize a chiral center in an organic compound, recognize the difference between enantiomers and diastereomers and draw the R or S configuration of an enantiomer using a Fisher projection.

15. Use common laboratory glassware and equipment.

16. State and apply the rules and procedures for laboratory safety.

17. Demonstrate the ability to use basic laboratory skills such as taking and recording observations of chemical systems and interpreting qualitative and quantitative experimental data.

**Expectations of Students:**

1. Students will be in class at the start of class every day, will stay for the whole class, and will attend every class and laboratory.

2. Student will notify the instructor if they are going to miss class. This can be done in person, by e-mail, or by a phone call in an emergency situation.

3. Students will be prepared when they come to class and lab. Students are expected to read the chapter before coming to lecture, and read the experiment and complete the pre-lab exercises before coming to lab.

4. Students will do the assigned homework. It is best to do the homework the same day as the lecture. (This is a 4 unit class, so it must be assumed that homework will take at least 8 hours per week.)

5. Students will not disrupt the class with cell phones, late arrivals, excessive noise, eating and drinking, etc.

6. Students will not cheat or plagiarize. This includes copying someone else's lab report or lab data. Refer to page 6 of the El Camino Fall Course Schedule under the heading "Cheating and Plagiarism."

7. Students will ask questions in class, of other students, and of the instructor. Questions are encouraged as long as they relate to the lecture subject. Sincere questions are never stupid and you will not be ridiculed or degraded for asking them.

8. Students will form study groups and help each other learn.

9. Students will notify the instructor of a medical condition or disability which may prevent the student from compliance with the course syllabus. Students with disabilities who believe they may need accommodations in this class are encouraged to contact the Special Resource Center on campus as soon as possible to better ensure such accommodations are implemented in a timely fashion and to please contact me privately to discuss your specific needs.

10. Students will follow laboratory safety procedures, including wearing goggles, no food or drink, and wearing closed-toe shoes. Students will clean up their own messes. Students must clean up their work area with a wet towel before leaving the lab. Sinks must be kept free of matches, paper towels and broken glass.

# Proposed Lecture and Lab Schedule

| Week | Day | Date | Lecture/Lab |
|---|---|---|---|
| 1 | Mon | 8/31 | Introduction |
| | Wed | 9/2 | Chapter 1 – Matter, Measurements and Calculations |
| | Fri | 9/4 | Chapter 1 |
| | | | *Safety Video – Laboratory 1 Pre-Lab*<br>*Metric Lab* |
| 2 | *Mon* | *9/7* | *Labor Day – No school* |
| | Wed | 9/9 | Chapter 1 |
| | Fri | 9/11 | Chapter 1 |
| | | | *Lab check-in*<br>*Laboratory 2 - Lab Measurements and Graphing*<br>**Last day to add the class** |
| 3 | Mon | 9/14 | Chapter 2 - Atoms and Molecules |
| | Wed | 9/16 | Chapter 2 |
| | Fri | 9/18 | Chapter 3 – Electronic Structure and the Periodic Law |
| | | | *Laboratory 3, Part 3 – Physical Properties of Inorganic Substances: Density* |
| 4 | Mon | 9/21 | Chapter 3 |
| | Wed | 9/23 | Chapter 3 |
| | Fri | 9/25 | Review for Test |
| | | | *Laboratory 5- Names and Formulas of Chemical Compounds*<br>**Last day to drop with no "W"** |
| 5 | Mon | 9/28 | EXAM 1 (Chapters 1, 2, 3) |
| | Wed | 9/30 | Chapter 4 - Forces Between Particles |
| | Fri | 10/2 | Chapter 4 |
| | | | *Laboratory 6 - Lewis Dot Structures and Molecular Models* |

| | | | |
|---|---|---|---|
| 6 | Mon | 10/5 | Chapter 4 |
| | Wed | 10/7 | Chapter 4 |
| | Fri | 10/9 | Chapter 5– Chemical Reactions (omit section 5.10) |
| | | | *Laboratory 7- Chemicals Reactions and Their Classifications* |
| 7 | Mon | 10/12 | Chapter 5 |
| | Wed | 10/14 | Chapter 5 |
| | Fri | 10/16 | Chapter 6 – The States of Matter |
| | | | *Laboratory 4 – Specific Heat* |
| 8 | Mon | 10/19 | Chapter 6 |
| | Wed | 10/21 | Chapter 6 |
| | Fri | 10/23 | Review for Test |
| | | | *Laboratory 10 – Collection and Measurement of Hydrogen Gas* |
| 9 | Mon | 10/26 | EXAM 2 (Chapters 4, 5, 6) |
| | Wed | 10/28 | Chapter 7 – Solutions and Colloids (omit section 7.6) |
| | Fri | 10/30 | Chapter 7 |
| | | | *Laboratory 6-2 (Handout) – Solution Chemistry* |
| 10 | Mon | 11/2 | Chapter 7 |
| | Wed | 11/4 | Chapter 8 – Reaction Rates and Equilibrium |
| | Fri | 11/6 | Chapter 8 |
| | | | *Laboratory 9 – Equilibrium Systems* |
| 11 | Mon | 11/9 | Chapter 8 |
| | Wed | 11/11 | Chapter 9 – Acids Bases and Salts |

| | | | |
|---|---|---|---|
| | *Fri* | *11/13* | *Veteran's Day – No school* |
| 12 | Mon | 11/16 | Chapter 9 |
| | Wed | 11/18 | EXAM 3 (Chapters 7, 8, 9) |
| | Fri | 11/20 | Chapter 11 - Alkanes |
| | | | *Laboratory 13- Acids, Bases, pH, and Indicators*<br>**Last day to drop with a "W"** |
| 13 | Mon | 11/23 | Chapter 11 |
| | Wed | 11/25 | Chapter 11 |
| | *Fri* | *11/27* | *Thanksgiving – No school* |
| 14 | Mon | 11/30 | Chapter 11 |
| | Wed | 12/2 | Chapter 11 |
| | Fri | 12/4 | Chapter 12 – Unsaturated Hydrocarbons |
| | | | *Laboratory 18 – Hydrocarbons* |
| 15 | Mon | 12/7 | Chapter 12 |
| | Wed | 12/9 | Chapter 13 |
| | Fri | 12/11 | Chapter 13 |
| | | | *Laboratory 19 – Reactivity of Hydrocarbons*<br>*Lab Checkout* |
| 16 | Mon | 12/14 | EXAM 4 (Chapters 11, 12, 13) |
| | Wed | 12/16 | Review for final |
| | Fri | 12/18 | FINAL EXAM |

# Homework

| **Chapter** | **Exercises** (found at the end of the chapter in the text book) |
|---|---|
| 1 | 8, 10; 12, 14, 16; 20, 22; 28; 30, 32, 34, 36, 38, 40, 42; 46, 48, 50, 52, 54, 56, 58, 60; 62, 64, 66, 68, 70, 72, 76; 80, 82, 84, 86; 90,92; 94, 96, 98; 100, 102, 104; AHEC 106 – 112; CFT 113, 115, 119 |
| 2 | 4, 6; 10, 12; 14, 16, 18, 20, 22; 24, 28, 30, 32, 34; 42, 44, 46; 48, 50, 52, 54, 56, 58, 60; 62; AHEC 67 – 72; CFT 73 |
| 3 | 2, 4; 10, 12, 14, 16; 18, 20; 24, 26, 28; 34, 36, 38; 42, 44; 46, 50; AHEC 51 – 56; CFT 57, 60 |
| 4 | 2, 6, 8; 10, 12, 14, 16, 18; 20, 22, 24; 26, 28, 30, 32, 34, 36, 38, 40, 42; 48; 50; 52, 54; 56, 58, 60, 62, 64; 66, 68, 70, 72, 74, 76, 78; 82, 84, 86; AHEC 87 – 92; CFT 97, 98, 99 |
| 5 | 2, 4, 6, 8; 10, 12, 14, 16, 18; 20, 24, 26; 28, 30, 32; 34; 38, 40, 42, 44, 46, 48, 50; 56, 58, 60; 62; AHEC 66 – 70; CFT 71, 75, 77 |
| 6 | 2, 6, 16, 18ab, 20, 22; 24, 26, 28, 32, 34, 36, 38, 40, 44; 46, 48, 52, 58, 64, 72, 82, 84; AHEC 87 – 92; CFT 94 |
| 7 | 2; 6, 12; 14, 16; 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40; 42, 44, 46, 48, 50, 62, 68, 70, 72, 74, 78, 80, 82, 84; AHEC 90 – 94; CFT 95, 96, 98 |
| 8 | 2, 6, 8; 12; 20, 22; 24, 26; 30; 36; 38, 40, 42, 44, 46, 48; 50, 52, 54, 56, 58; AHEC 63 – 67; CFT 74, 76 |
| 9 | 2, 4; 6, 8, 10, 12, 14, 16, 18; 20, 22; 28, 30, 32; 34, 36, 38; 40, 42, 44, 46; 48, 50; 60; 62, 64, 68, 70; 80, 84, 86; 92; 94, 96; 106, 108; 112, 114; AHEC 126 – 131; CFT 133 |
| 11 | 4; 6, 8; 12, 14, 18, 20, 22; 24; 28; 30; 32, 34, 36, 38, 40, 42; 44, 46, 48; 50, 54; 56, 58; 60, 62; 66; AHEC69, 70; CFT 71, 72, 73, 74, 79, 80 |
| 12 | 2, 4, 6, 8, 10, 12; 14, 16, 18, 20; 22, 24, 26, 28, 30; 34; 38, 40, 42, 44; 46, 48, 50; 52, 56, 58, 60; 64; 70; AHEC 72, 73; CFT 74, 75, 78, 82, 83 |
| 13 | 2, 4, 6, 8, 10, 12; 14, 16; 18, 20; 22, 24, 26, 28, 30, 32; 36; 40, 44; 46, 48, 50; 56, 58; AHEC 62, 63; CFT 65, 70, 71 |

NOTES:

- Answers for even-numbered problems are in Appendix B of the book.
- AHEC = “Allied Health Exam Connection” problems.
- CFT = “Chemistry for Thought” problems.

## Student Information

Name: _____

Phone Number: _____

E-mail address: _____

Most recent chemistry course taken:

Course name _____ When taken _____

Most recent math course taken:

Course name _____ When taken _____

What is your degree/career objective?

Describe previous college experience. (Where, number of units, major, etc.)

Disabilities or limitations that might affect your lecture or laboratory work.

Something interesting that you would like to tell me about yourself.

***Acknowledgement of Syllabus:***

By signing and returning this sheet, I acknowledge that I have read the El Camino College Chemistry 21A Syllabus for Fall 2009 and that I have understood all of its contents.

_____ _____

Signature Printed full name