Chemistry 21A: Survey of General and Organic Chemistry

Instructor: Valerie Baggett

Office: Chem 132

Office Hours: Th 12:30 – 1:00 pm, or by appointment

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Class Hours:	TTh	11:00 – 12:25 pm	CHEM 133	lecture
	F	11:00 – 12:01 pm	CHEM 133	lecture
	F	12:05 – 2:15 pm	CHEM 166	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.

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

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.

Campbell, *Chemistry 21A Packet.*

Grading:

Three Exams @ 100 points each	=	300 points (50%)
Fifteen Labs @ 10 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 15 scheduled labs. If a lab is missed, it is usually not possible to reschedule. However, one extra credit assignment can be done for a missed lab.

Exams - There are four mid-term exams. The lowest of these will be dropped. If an exam is missed for a legitimate reason, please contact the instructor to arrange for an alternative testing period.

Final - The Final is cumulative and is based upon the four mid-term exams.

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 come to class on time, 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 with they come to class and lab. (This is a 4 unit class, so it must be assumed that homework will take at least 8 hours per week.)

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

5. Students will clean up their own messes.

6. Students will not cheat or plagiarize.

7. Students will ask questions in class, of other students, and of the instructor.

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

9. Students will use e-mail for questions.

10. Students will follow laboratory safety procedures, including wearing goggles, no food or drink, and wearing closed-toe shoes.

11. Students will enjoy this class, learn a lot of chemistry, and will get an amazing grade.

Proposed Lecture and Lab Schedule

Week	Date	Before Class	In Class
1	Tues 2/12		Introduction
	Thurs 2/14	Read Chapter 1 Bring calculator	Chapter 1 – Matter, Measurements and Calculations
	Fri 2/15	Exercises 1.1* – 1.3	Chapter 1
		Read Laboratory 1 - Background	*Safety Video – Laboratory 1 Pre-Lab Metric Lab*
2	Tues 2/19	Exercises 1.4 – 1.6	Chapter 1
	Thurs 2/21	Exercises 1.6 – 1.8	Chapter 1
	Fri 2/22	Exercises 1.9 – 1.11 AHEC **– Chapter 1 Read Chapter 2	Chapter 2 – Atoms and Molecules
		Metric Lab Due *Laboratory 2- Pre Lab Assignment*	*Lab check-in* *Laboratory 2 - Lab Measurements and Graphing* **Last day to add the class**
3	Tues 2/26	Exercises 2.1 – 2.4	Chapter 2
	Thurs 2/28	Exercises 2.5 – 2.7 AHEC – Chapter 2 Read Chapter 3	Chapter 3
	Fri 2/29	Exercises 3.1 – 3.3	Chapter 3 – Electronic Structure and the Periodic Law
		Laboratory 2 Due *Laboratory 3 – Pre Lab Assignment*	*Laboratory 3 – Physical Properties of Inorganic Substances*
4	Tues 3/4	Exercises 3.4 – 3.6 AHEC – Chapter 3	Chapter 3
	Thurs 3/6	Study for exam	EXAM 1 (Chapters 1, 2, 3)
	Fri 3/7	Read Chapter 4	Chapter 4 – Forces Between Particles
		Laboratory 3 Due *Laboratory 5 – Pre Lab Assignment*	*Laboratory 5- Names and Formulas of Chemical Compounds* **Last day to drop with no "W"**
5	Tues 3/11	Exercises 4.1 – 4.3	Chapter 4

	Thurs 3/13	Exercises 4.4 – 4.5	Chapter 4
	Fri 3/14	Exercises 4.6 – 4.8	Chapter 4
		Laboratory 5 Due *Laboratory 6 – Pre Lab Assignment*	*Laboratory 6 - Lewis Dot Structures and Molecular Models*
6	Tues 3/18	Exercises 4.9 – 4.11 AHEC – Chapter 4 Read Chapter 5	Chapter 5 – Chemical Reactions
	Thurs 3/20	Exercises 5.1 – 5.3	Chapter 5
	Fri 3/21	Exercises 5.4 – 5.6	Chapter 5
		Laboratory 6 Due *Laboratory 7 – Pre Lab Assignment*	*Laboratory 7- Chemicals Reactions and Their Classifications*
7	Tues 3/25	Exercises 5.7 – 5.9	Chapter 5
	Thurs 3/27	Exercises 5.10 – 5.11 AHEC – Chapter 5 Read Chapter 6	Chapter 6 – The States of Matter
	Fri 3/28	Exercises 6.1 – 6.4	Chapter 6
		Laboratory 7 Due *Laboratory 12– Pre Lab Assignment*	*Laboratory 12- Formulas of Hydrates*
8	Tues 4/1	Exercises 6.5 – 6.8	Chapter 6
	Thurs 4/3	Exercises 6.9 – 6.12	Chapter 6
	Fri 4/4	Exercises 6.13 – 6.15 AHEC – Chapter 6 Study for exam	EXAM 2 (Chapters 4, 5, 6)
		Laboratory 12 Due *Laboratory 10 – Pre Lab Assignment*	*Laboratory 10 – Collection and Measurement of Hydrogen Gas*
	4/5 – 4/11	no class	Spring Break
9	Tues 4/15	Read Chapter 7	Chapter 7 – Solutions and Colloids
	Thurs 4/17	Exercises 7.1 – 7.3	Chapter 7

	Fri 4/18	Exercises 7.4 – 7.6	Chapter 7
		Laboratory 10 Due *Laboratory 6-2 Pre Lab Assignment*	*Laboratory 6-2 (Handout) – Solution Chemistry*
10	Tues 4/22	Exercises 7.7 – 7.9 AHEC – Chapter 7 Read Chapter 8	Chapter 8 – Reaction Rates and Equilibrium
	Thurs 4/24	Exercises 8.1 – 8.3	Chapter 8
	Fri 4/25	Exercises 8.4 – 8.6	Chapter 8
		Laboratory 6-2 Due *Laboratory 9 – Pre Lab Assignment*	*Laboratory 9 – Equilibrium Systems*
11	Tues 4/29	Exercises 8.7 – 9.8 AHEC – Chapter 8 Read Chapter 9	Chapter 9 – Acids, Bases, and Salts
	Thurs 5/1	Exercises 9.1 – 9.4	Chapter 9
	Fri 5/2	Exercises 9.5 – 9.8	Chapter 9
		Laboratory 9 Due *Laboratory 13 – Pre Lab Assignment*	*Laboratory 13- Acids, Bases, pH, and Indicators*
12	Tues 5/6	Exercises 9.9 – 9.13 AHEC – Chapter 9 Study for exam	EXAM 3 (Chapters 7, 8, 9)
	Thurs 5/8	Read Chapter 11	Chapter 11 – Organic Compounds: Alkanes
	Fri 5/9	Exercises 11.1 – 11.3	Chapter 11
		Laboratory 13 Due *Laboratory 18 – Pre Lab Assignment*	*Laboratory 18 – Hydrocarbons* **Last day to drop with a "W"**
13	Tues 5/13	Exercises 11.4 – 11.5	Chapter 11
	Thurs 5/15	Exercises 11.6 – 11.7	Chapter 11
	Fri 5/16	Exercises 11.8 – 11.9	Chapter 11
		Laboratory 18 Due *Laboratory 19 – Pre Lab Assignment*	*Laboratory 19 – Reactivity of Hydrocarbons*

14	Tues 5/20	Exercises 11.10 – 11.11 AHEC – Chapter 11 Read Chapter 12	Chapter 12 – Unsaturated Hydrocarbons
	Thurs 5/22	Exercises 12.1 – 12.2	Chapter 12
	Fri 5/23	Exercises 12.3 – 12.4	Chapter 12
		Laboratory 19 Due *Laboratory 22 – Pre Lab Assignment*	*Laboratory 22 – Classification and Recycling of Plastics*
15	Tues 5/27	Exercises 12.5 – 12.6	Chapter 12
	Thurs 5/29	Exercises 12.7 – 12.8 AHEC – Chapter 12 Read Chapter 13	Chapter 13
	Fri 5/30	Exercises 13.1 – 13.4	Chapter 13
		Laboratory 22 Due *Laboratory 23 – Pre Lab Assignment*	*Laboratory 23 – Alcohols and Phenols* *Lab Checkout*
16	Tues 6/3	Exercises 13.5 – 13.8	Chapter 13
	Thurs 6/5	Exercises 13.9 – 13.11 AHEC – Chapter 13 Study for exam	EXAM 4 (Chapters 11, 12, 13)
	Fri 6/6	*Laboratory 23 Due* Study for final	FINAL EXAM

*Exercises – the decimal number after "Exercises" indicates the section number, not the problem number. All exercises are assigned. Answers for even-numbered problems are in Appendix B of the book. Answers for odd-numbered problems will be posted.

**AHEC – Allied Health Exam Connection

Acknowledgement of Syllabus:

By signing and returning this sheet, I acknowledge that I have read the El Camino College Chemistry 21A Syllabus for Spring 2008 and that I have understood all of its contents.

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Signature Printed full name