

Chemistry 21A: Survey of General and Organic Chemistry
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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.

Chemistry 21A 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 the sequence).

Prerequisite: Mathematics 40 (Elementary Algebra) with eligibility for Mathematics 70 or equivalent.

Materials:

1. Seager and Slabaugh, *Chemistry for Today: General, Organic, and Biochemistry*, 6th edition
2. Campbell, *Chemistry 21A Packet*
3. Peller, *Exploring Chemistry: Laboratory Experiments in General, Organic, and Biological Chemistry*, 2nd Edition.
4. Safety goggles (Instructor approved - do not purchase until "fitted" in class)
5. Scientific Calculator (able to handle exponential notation calculations and logarithms)
6. OPTIONAL: *Study Guide and Solutions Manual for Seager and Slabaugh's Chemistry for Today: General, Organic, and Biochemistry*, 5th edition

Grading: Final letter grades will be assigned according to the following percentage of total points earned:

<u>Grade</u>	<u>Percent</u>
A	90 - 100%
B	80 - 90%
C	65 - 80%
D	55 - 65%
F	below 55%

SPECIAL NOTES: 1) Because chemistry is a laboratory science, passing work (55% or more of possible points) in the laboratory portion of the course is required in order to earn an overall grade of "C" or higher, regardless of test and quiz scores. 2) A minimum of 65% in the Lecture portion of the course (quizzes, exams, assignments, final exam) is required in order to earn an overall grade of "C" or higher, regardless of lab scores. 3) The Final Exam is CUMULATIVE and comprehensive, through the last day of lecture!

Approximate distribution of points:

Tests (3 @ 100 points each)	.....	300
Daily Quizzes (5 points each)	.....	100
Laboratory (total points)	.....	200
Assignments/Other	.....	50
Final Exam	.....	<u>200</u>
Course Total	.....	850

POLICIES, PROCEDURES, AND GUIDELINES FOR SUCCESS

READ THOROUGHLY - YOU ARE RESPONSIBLE FOR AWARENESS OF ALL INFO ON THIS PAGE!

1. Unless you are anticipating a REALLY important call, PLEASE TURN YOUR CELL PHONE OFF!! Points may be deducted for such interruptions - is that incoming call worth it?

2. **GRADES** are EARNED, not appointed. It is up to YOU to learn the material thoroughly enough to do well on Quizzes, Tests, and Labs. PLAN to spend 15-20 HOURS PER WEEK on this course IN ADDITION to time in class! Study effectively: read the texts before lecture; take good lecture notes (taping of lectures is permitted); rewrite your lecture notes; study the texts and your notes; DO ALL THE SUGGESTED PROBLEMS, repeatedly. Use FLASHCARDS to help memorize terms and formulas. **STUDY PARTNERS OR GROUPS** are especially recommended!

3. **ATTENDANCE** - Be PROMPT and regular in attendance. Quizzes and Tests are “lecture-based” and may include questions on material covered only in Lecture (i.e. not discussed in the texts). Consistent late arrival may result in a lower grade; MORE THAN FOUR ABSENCES may result in being dropped from the class. If you arrive to LAB after discussion of safety procedures you may be excluded from the lab (0 pts) that day.

*** IMPORTANT NOTE: Any “excusable” absence for a lab or test MUST be substantiated by a WRITTEN note; a grade for “excused” missing work will be assigned as determined appropriate by the Instructor, on a case by case basis. Otherwise, missed work = zero points!

4. **TESTS, QUIZZES, AND THE FINAL EXAM** - It is **your** responsibility to be present and on time for all tests, quizzes, and especially the Final Exam. CHECK THE SCHEDULE! No extra time will be allotted due to late arrival. There are NO MAKE-UP tests or quizzes, so it very much benefits you to show up to each lecture and especially on time. The daily quizzes will be given in the first 5 minutes of lecture worth 5 points each. The possible points earned for daily quizzes will be 100 points. You will be able to drop 2 of your lowest quiz scores in calculating your final point total; ALL test scores will be counted in the final point tally. The Final Exam is COMPREHENSIVE, with a slight emphasis on material covered after Test 3 – including organic chemistry.

5. **ASSIGNMENTS** - Problems from the texts are an essential part of the learning process and give you practice, drill, and reinforcement of the course material. For chemistry practice problems online that can help with materials we have gone through, please visit <http://proton.csudh.edu/homeworkcs/hwintrocns7.html>. SOME end-of-Chapter problems or online website page may be assigned, collected, and graded, at the whim of the Instructor. Additional written assignments will be given and graded. Complete all assignments in a timely manner – points are lost for late submittals. Be prepared to ask questions at appropriate times during class, or Office Hours, concerning any material or problems which you don't understand.

6. **LABORATORY** - Read laboratory experiments BEFORE coming to class, as this will allow you to ask appropriate questions and take full advantage of further instructions provided by the Instructor so that you will be able to complete the laboratory work in the allotted time. Specified “Pre-lab” assignments will be part of the overall lab points total. “Background” material from the labs may be tested on! Lab reports submitted late will earn only partial, or NO, credit. Missed labs earn zero points. Remember - you **must** pass the lab (minimum of 55% of lab points) to pass the course!

***NOTE: There is NO time allotted for “make-up” labs! If necessary you MAY be able to complete a lab during the time when another Section is doing the SAME experiment - ask the Instructor. (See above for what to do if you miss a lab for a legitimate reason.) Although many laboratory exercises will be completed with partners, all REPORTS must be completed individually!

7. Success is a matter of preparation and repetition. The material presented is perhaps new to you, but is not difficult IF YOU SPEND THE TIME TO LEARN IT. Make use of all possible learning resources - your texts, the Instructor (in class and during Office Hours), tutors if necessary, and especially your fellow students. Always remember that everything BUILDS on what comes before, so don't let any gaps develop!

*KEEP UP - THERE IS TOO MUCH MATERIAL, AND NOT ENOUGH TIME, TO PLAY CATCH UP *

Chemistry 21A - Course Objectives

By the end of the course you should 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 structures 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, including buffer systems.
10. describe the bonding and geometry of carbon compounds in terms of hybridization and type of bonding orbital overlap (pi or sigma).
11. use 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, thiols, and ethers.
13. state the names of common aromatic compounds and describe the structures of these compounds.
14. recognize a chiral center in an organic compound.
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.

Lectures: Mon & Wed, 12:30 - 1:55 pm (CHEM 101),
and Thurs, 9:30 - 10:31 am (CHEM 166)

Laboratory: Thursday, 10:35 am - 12:45 pm (CHEM 166)

TENTATIVE LECTURE & TEST SCHEDULES AND ASSIGNMENTS

<u>Day/Date</u>		<u>CHAPTER/TOPIC</u>
M 02/11		Course Overview; Chapt 1: Matter, Measurements, and Calculations;
W 02/13		Chapt 1 , cont'd: Properties and Changes;
Th 02/14		Chapt 1 , cont'd: Classification of Matter;
M 02/18		Chapt 1 , cont'd: Measurements;
W 02/20		Chapt 1 , cont'd: the Metric System;
Th 02/21		Chapt 1 , cont'd: Density and Specific Gravity
M 02/25		Chapt 2: Atoms and Molecules; Important Elements and Their Symbols;
W 02/27		Chapt 2 , cont'd: the Mole
Th 02/28		Chapt 3: Electronic Structure and the Periodic Law
M 03/03		Chapt 3 , cont'd: Electron Configurations;
W 03/05		Chapt 3 , cont'd: Property Trends; Formula Writing Practice
Th 03/06		Chapt 4: Forces Between Particles; Charges of Simple Ions;
M 03/10		Chapt 4 , cont'd: Covalent Bonding;
W 03/12		Chapt 4 , cont'd: Lewis Electron Dot Diagrams; Polyatomic ions;
Th 03/13		Chapt 4 , cont'd: Polarity of Covalent Molecules
M 03/17	T 1	TEST I
W 03/19		Chapt 5: Chemical Reactions; Equation Writing;
Th 03/20		Chapt 5 , cont'd: Types of Reactions; Redox Rxns;
M 03/24		Chapt 5 , cont'd: the Mole and Chemical Equations (omit Sec 5.10);
W 03/26		Chapt 5 , cont'd; Stoichiometry Worksheet
Th 03/27		Chapt 6: The States of Matter;
M 03/31		Chapt 6 , cont'd: the Gas Laws (omit Sec 6.10);
W 04/02		Chapt 6 , cont'd; Gas Law Worksheet;
Th 04/03		Chapt 6 , cont'd: Changes in State
M 04/07		Spring Break (no class)
W 04/09		Spring Break (no class)
Th 04/10		Spring Break (no class)
M 04/14		Chapt 7: Solutions (and Colloids – but omit Sec 7.6, 7.8, 7.9);
W 04/16		Chapt 7 , cont'd; Solutions Worksheet;
Th 04/17		Chapt 7 , cont'd: Solution Properties
M 04/21	T 2	TEST II
W 04/23		Chapt 8: Reaction Rates and Equilibrium;
Th 04/24		Chapt 8 , cont'd: Chemical Equilibrium;

M	04/28		Chapt 8 , cont'd: Factors that Influence Equilibrium Position
W	04/30		Chapt 9 : Acids, Bases, and Salts;
Th	05/01		Chapt 9 , cont'd;
M	05/05		Chapt 9 , cont'd; Buffer Problems
W	05/07		Chapt 11 : Organic Chemistry: Alkanes ; Functional groups;
Th	05/08		Chapt 11 , cont'd: Structure/Isomerism; Organic Nomenclature;
M	05/12		Chapt 11 , cont'd: Organic Nomenclature;
W	05/14		Chapt 11 , cont'd: Cycloalkanes;
Th	05/15		Chapt 11 , cont'd: Alkane Reactions
M	05/19	T 3	TEST III
W	05/21		Chapt 12 : Unsaturated Hydrocarbons;
Th	05/22		Chapt 12 , cont'd: Properties of Alkenes and Alkynes
M	05/26		Chapt 12 , cont'd: Properties of Alkenes and Alkynes
W	05/28		Chapt 13 , Alcohols, Phenols, and Ethers;
Th	05/29		Chapt 13 , cont'd: Reactions of Alcohols and Phenols;
M	06/02		Chapt 12 : Aromatic Cmpds; Stereochemistry
W	06/04	FE	FINAL EXAM ; Chapt 12 : Aromatic Cmpds; Stereochemistry
Th	06/05	FE	FINAL EXAM ; Chapt 12 : Aromatic Cmpds; Stereochemistry

FINAL EXAM:

WEDNESDAY, JUNE 4th (PART 1 – multiple choice/written – all material through 5/29)

AND

THURSDAY, JUNE 5th (PART 2 – multiple choice: ALL COURSE MATERIAL)

LABORATORY SCHEDULE

<u>DATE</u>	<u>EXPERIMENT or TOPIC/WORKSHEETS</u>
Th 02/14	Continues Lecture: Measurement / Sig Figs / Exponential Notation
Th 02/21	Check-in; Expt 2: Lab Measurements and Graphing
Th 02/28	Expt 3, part 3: Physical Properties of Inorganic Substances: Density
Th 03/06	Expt 5: Names and Formulas of Chemical Compounds
Th 03/13	Lab Safety; Read Expt 1 BACKGROUND; Expt 6: Lewis Dot Structures and Molecular Models
Th 03/20	Expt 7: Chemical Reactions and Their Classification
Th 03/27	Expt 8: Electrolytic Solution and Net Ionic Equations
Th 04/03	Expt 12: Formulas of Hydrates
Th 04/10	SPRING BREAK (No lab experiment scheduled)
Th 04/17	Expt 10: Collection and Measurement of Hydrogen Gas
Th 04/24	Expt 6-2 (Hand-out): Solution Chemistry
Th 05/01	Expt 9: Equilibrium Systems
Th 05/08	Expt 13: Acids, Bases, pH, and Indicators
Th 05/15	Expt 18: Hydrocarbons (Models)
Th 05/22	Expt 19: Reactivity of Hydrocarbons
Th 05/29	LAB FINAL EXAM; Check-out

ECC Resources to Help You Succeed in Chemistry 21A (and Other Courses)

El Camino College provides many resources and programs outside of this classroom that can help you to succeed in this class, and in other classes. Below are some of the resources that you might find especially helpful.

1. Counseling: Counselors provide students with academic, vocational, career, and personal support counseling. Academic, vocational, and career counseling through Counseling Services will help you identify and focus on goals and objectives - a significant factor in academic success is having a clearly identified goal and knowledge of what it takes to achieve that goal. Personal support counseling is provided on a short-term basis in Counseling Services, but in greater depth at the Health Center.
2. Learning Resources Center: TUTORING, and basic skills and other assistance.
3. Academic Strategies Course: 1abcd, 20ab, 22ab, 23ab, 25ab, 30ab, 31ab, 33ab, 35ab, 36ab, 40ab, 100. These courses focus on specific skills areas, such as test taking, study techniques, math anxiety, listening and note-taking, problem solving, writing, thinking skills, vocabulary, spelling, memory techniques, sentence punctuation, and learning resources skills development. Mid-term classes are available.
4. Special Resources Center: For physically-, visually-, or hearing-impaired, and learning disability students (including dyslexia, ADD and related). Special tutorials, adapted testing assistance, and other services are available to provide academic and related support to students with disabilities. They provide testing to discover possible learning disabilities, and also for determining your study/learning method strengths and weaknesses.
5. EOP&S Supervised Study: Tutoring and other assistance; only for EOP&S students.
6. Career Services and Transfer Services - Counseling Services: The Career and Transfer Center offers a wide array of services which help to motivate students and give them a clear idea of what they need to achieve goals. Services include a number of workshops on career areas and issues, transfer options, and information about specific universities.
7. Student Enhancement Program (SEP) Workshops in Counseling Services: The SEP workshops are actually a three workshop series, two hours each in duration, and are offered throughout the year. Activities in the workshops help students develop a proactive sense of responsibility for their academic performance and generate solutions to problems affecting their academic performance. Students are referred to on- and off-campus services. Workshop participants are encouraged to form “study partnerships” and study groups. Student feedback has been that workshops do make a difference in their classroom attitudes, motivation, personal confidence, and study behavior. Students discuss problems, formulate action plans, engage in exploration of resources, and report back to their group their findings and actions taken.