Chemistry 1A: General Chemistry Spring 2020

Dr. Brophy

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*Please note that **Canvas Messages** are the most reliable way to get in touch with me.*

Course Webpage: Canvas. *Turn on Canvas notifications to receive class announcements.*

For Spring 2020, All lectures and laboratory content and materials will be posted online in Canvas. My intention is to record all my lectures so you can watch them on your own schedule. Class times are reserved for Zoom conferences which will include additional practice problems and discussions. Your attendance is strongly encouraged.

Class Conferences **MWF 11:30 am – 12:20 pm (lecture)**
MW 9:30 am – 10:20 am (section 1 lab)
MW 2:30 pm – 3:20 pm (section 2 lab)

Virtual Office Hours: Friday 12:30 pm – 3:50 pm. ***during my virtual office hours, I will be available for scheduled Zoom meetings and by email***

Zoom Meeting Room: https://cccconfer.zoom.us/my/drbrophy
Password to be sent separately

Important Dates

Add Day	April 25, 2020	Last day to *add*.
Drop Day	April 26, 2020	Last day to *drop* the course without a withdraw being recorded.
Withdraw	June 5, 2020	Last day to *withdraw* from the course.

Exam Dates

There will be two midterm exams and one cumulative final exam. All exams will be open-book take-home exams. You may use your notes and any other course materials that are available to you. Exams will be distributed on Friday afternoons and they will be due the following Monday by 11:30 am.

	Content (Silberberg Chapters)	Due Date
Midterm Exam 1	1–4, 6	May 11, 2020
Midterm Exam 2	7 – 10.1	June 8, 2020
Final Exam	1–4, 6–11	June 22, 2020

Required Materials

- **Textbook** *Chemistry: The Molecular Nature of Matter and Change*, 8th edition by Silberberg and Amateis. For this quarter, McGraw-Hill has generously provided us with ***free ebook access*** through the Aleks homework system. If you wish to purchase a physical copy, I encourage you to buy a used copy of an older edition.
- **Calculator** A scientific calculator with natural log functionality is necessary and sufficient for this class. If you have already purchased a graphing calculator for another class, you may use it on exams and quizzes; however, *we will not use the graphing functionality.* Recommended models:
  https://www.amazon.com/Texas-Instruments-MultiView-Scientific-Calculator/dp/B000PDFQ6K
  https://www.amazon.com/dp/B005QXO8J0/ref=dp_cerb_3

- **Computer and printer access.** All Spring 2020 classes at De Anza College are being conducted online due to the COVID-19 crisis. You will require a computer with internet access and a printer throughout this course.
- **A PDF App** Throughout the quarter, you will turn in handwritten assignments (including exams) by creating a PDF filed and uploading this file to Canvas. Recommended apps include GeniusScan and CamScanner.

Recommended Materials

- *Calculations in Chemistry an Introduction*, 2nd edition by Dahm and Nelson. Available at many online retailers (https://www.amazon.com/Calculations-Chemistry-Introduction-Donald-Dahm/dp/0393614360/ref=dp_ob_title_bk)
- *OpenStax Chemistry*, 2nd edition. Available *free* online at https://cnx.org/contents/f8zJz5tx@9.18:DY-noYmh@9/Introduction or on the OpenStax app (iPhone/iPod).

I expect you to use the resources available to you, share resources with your classmates, and ask for help when needed.

Syllabus Statement
This course syllabus is a contract. Please read it carefully and completely in its entirety before asking me any questions regarding the course schedule, content, requirements, grading, etc. You are expected to adhere to the De Anza College Student Code of Conduct Administrative Policy 5510 at all times. This syllabus is a living document. ***All corrections and changes to this syllabus will be announced through Canvas.***

This class is divided into two separate instructional periods: a lecture period devoted to the primary course material and a lab period for conducting lab experiments. Everyone will have the same lecture period, but a different lab period depending on which section you are enrolled in. At De Anza College, the lab and lecture may not be taken as separate courses under any circumstances.

Course Description
An introduction to the structure and reactivity of matter at the molecular level. Application of critical reasoning to modern chemical theory and structured numerical problem solving. Development of molecular structure from rudimentary quantum mechanics, including an introduction to ionic and covalent bonding. Chemical problem solving involving both formula and reaction stoichiometry employing the unit analysis method. An introduction to thermochemistry and a discussion of the first law of thermodynamics.

Prerequisites
Chemistry 25 or 30A or satisfactory score on the Chemistry Placement Test; MATH 114 or equivalent.
EWRT 211 and READ 211 (or LART 211), or ESL 272 and 273.

Hours
The study of chemistry combines both macroscopic and microscopic views of the natural world with mathematical models to explain and predict phenomena. This is a 5-unit class, and you should expect to spend ***18 hours per week*** on class assignments. Divide this work throughout the week so that you don't overwhelmed. Set aside a time and place that you can work on class materials every day.

Grade Scale
To succeed in this course, you will need to exhibit consistent and sustained effort throughout the quarter. Your final grade will be based on your final percentage out of the total points available.

Final %	Grade[1–3]
>99.0	A+
90.0 – 98.9	A
88.0 – 89.9	A–
85.0 – 88.9	B+
80.0 – 84.9	B
78.0 – 79.9	B–
75.0 – 77.9	C+
68.0 – 74.9	C
63.0 – 67.9	D+
55.0 – 62.9	D
<55%	F

[1]This grade scale is approximate and may be adjusted at the end of the quarter to the benefit of the student.
[2]If your average in the lab portion of the course is less than 60%, you will receive an F as a final grade.
[3]A+ grades will be given to students who demonstrate excellence in the following three areas: lecture, lab *and* class participation.

Study Tips
1. Complete the assigned reading before coming to class. Review 1A and 1B topics that are unfamiliar. Write down any vocabulary words that you do not understand as well as their definitions.

2. Take *handwritten* notes during class and review your notes regularly. Write down any questions you have and bring them to office hours or e-mail your instructor.
3. *Do a little bit every day*. After every lecture, review the reading assignment and complete in-chapter and end-of-chapter exercises.
4. Join a study group. Work on problem sets together. The best way to learn the material is to teach it to somebody else.
5. If you feel that you are a poor test-taken, *complete and turn in all assignments on time* in order to pass the class.
6. Take care of yourself! Stay well-rested and drink water.

Academic Integrity

Students are expected to adhere to the policy on academic integrity that is outlined in the De Anza College manual (https://www.deanza.edu/studenthandbook/academic-integrity.html). ***I expect all submitted work to represent your own understanding of the material and to be written in your own words.*** Cheating, copying, plagiarizing, etc. will not be tolerated, and the minimum consequence will be receiving a zero on that assignment and the incident will be reported to the Dean of Student Services. All laboratory data used in calculations and reported in lab reports must be collected by each student. Multiple instances of academic dishonesty may result in failing the course.

Lecture Tickets
Lecture tickets will be submitted through Canvas assignments. There will be a lecture ticket for every lecture (3 per week), and they will be due at 11:59 pm the day after the lecture is posted. By having multiple lecture tickets due through the week, I hope to help you pace your progress through the course. Lecture tickets will be graded for completion and not accuracy. They will help me gauge the effectiveness of your progress in the course. Each lecture ticket will be worth 3 points.

Aleks Objectives
We will use Aleks as an online homework platform through the course. McGraw-Hill is providing us with free access to Aleks and the ebook for the course in exchange for piloting Aleks. There will be 11 Aleks assignments through the quarter: a preliminary knowledge check and one assignment for each week's content. Aleks objectives will be due on Sundays at 11:59 pm. Each week of objectives will be worth 10 points.

Graded Discussion Posts
To encourage interaction and class discussion, graded discussion posts will be opened on Canvas for every lecture topic.

Recommended practice problems
Consistent practice is an essential component of learning, and homework questions will often be similar to exam questions. Recommended practice problems from the textbook will be posted for each chapter; however, homework will *not* be graded. In general, the answers to these questions may be found in the back of the textbook and solutions are readily available online. *Collaboration with classmates is expected and encouraged.*

Exams
There will be two midterm exams and one cumulative final exam. Exams will be take-home and open-book and each exam will be worth 100 points. Exams will consist of short answer questions with the opportunity for partial credit. You must show your work in order to receive credit for any answer. I am more interested in how you think about a problem than your final answer. You will be asked to demonstrate your conceptual understanding of the material and apply those concepts in an algebraic context and solve quantitative problems. Exams will be released on Friday at 12:30 pm and due the following Monday by 11:30 am. Late exams will not be accepted unless you have made prior arrangements with me.

Virtual Laboratory Experiments
Virtual laboratory experiments and simulations will be performed through three platforms: Labster (integrated into Canvas), ChemCollective, and PhET. Associated assignments may include, but are not limited to, worksheets, calculations, and screen shots of virtual lab benches. The number of points available for each experiment and due date will vary throughout the quarter.

Lab Surveys
Pre-lab surveys will be posted on Canvas. You should complete the survey after watching the lab lecture and before starting the lab activity.

Lab Quizzes
There will be a lab quiz administered through Canvas each week. Lab quizzes will cover concepts and techniques related to each week's lab. Lab quizzes must be completed each Sunday by 11:59 pm.

Lecture Schedule
Chemistry 1A will cover material presented in chapters 1, 2, 3, 4, 6, 7, 8, 9, 10, and 11 of Silberberg.

Every effort will be made to keep to the lecture schedule below. If we fall significantly behind this schedule, the content of the exams will be adjusted to reflect the material that we covered in class. Exam dates will not be modified except in cases of *force majeure*.

Week	Date	Day	Lecture Topic and Assigned Reading
1	4/13	M	Math Methods and Review Essential Skills for General Chemistry *Silberberg Chapter 1*
	4/15	W	The Nuclear Atomic Model •Potential energy •Discovery of subatomic particles *Silberberg Chapter 2 sections 1 – 4*
	4/17	F	The Nuclear Atomic Model •Isotopes and ions •Atomic mass units and elemental mass *Silberberg Chapter 2 sections 5 – 6*
2	4/20	M	Molecules, Compounds, and Mixtures •Physical changes and chemical changes •Phases of matter •The mole and molar mass *Silberberg Chapter 2 sections 7 – 9* *Silberberg Chapter 3 sections 1 –2*
	4/22	W	Chemical Reactions •Balancing chemical equations •Limiting regents *Silberberg Chapter 3 sections 3 – 4*
	4/24	F	Chemical Reactions, continued •Combustion analysis *Silberberg Chapter 3 sections 3 – 4*
3	4/27	M	Solutions •Concentration units •Dilution calculations *Silberberg Chapter 4 sections 1–2*
	4/29	W	Solutions, continued •Limiting reagents in solution *Silberberg Chapter 4, sections 1 – 2*
	5/1	F	Classifying Chemical Reactions •Precipitation, acid-base, and reduction-oxidation •Solubility “rules” (more like guidelines) *Silberberg Chapter 4, sections 3 – 6*
4	5/4	M	Thermochemistry •Heat transfer and energy transformations *Silberberg Chapter 6 section 1*
	5/6	W	Thermochemistry •Reaction enthalpy •Calculating reaction enthalpy •Heats of formation *Silberberg Chapter 6, sections 2 – 4*
	5/8	F	Thermochemistry Continued •Hess’s Lab *Silberberg Chapter 6 sections 5 – 6*
5	5/11	M	Electromagnetic Radiation •Wave-particle duality •Blackbody radiation

			Silberberg Chapter 7 section 1
	5/13	W	Electromagnetic Radiation •Interactions of light with matter •Bohr model of the atoms *Silberberg Chapter 7 section 2*
	5/15	F	The Quantum Atomic Model •de Broglie's theorem •Traveling waves and standing waves •Electron waves *Silberberg Chapter 7 section 3*
6	5/18	M	The Quantum Atomic Model •Quantum numbers and hydrogenic orbitals *Silberberg Chapter 7 section 4*
	5/20	W	Moving Beyond Hydrogen: Many-electron atoms •The spin quantum number •The Pauli exclusion principle •Effective nuclear charge *Silberberg Chapter 8 sections 1 – 2*
	5/22	F	Building the Periodic Table •Periodic trends in effective nuclear charge, atomic size, ionization energy, and electron affinity *Silberberg Chapter 8 sections 3 – 4*
7	5/25	M	*Memorial Day*
	5/27	W	Chemical Bonds •Ionic bonds, covalent bonds, and metallic bonds *Silberberg Chapter 9, sections 1 – 3*
	5/29	F	Thermochemistry and Chemical Bonds •Calculating reaction enthalpy from bond strengths •The Born-Haber cycle *Silberberg Chapter 9 sections 4 – 6*
8	6/1	M	Lewis Dot Structures *Silberberg Chapter 10 section 1*
	6/3	W	Lewis Dot Structures *Silberberg Chapter 10 section 1*
	6/5	F	Lewis Dot Structures, continued *Silberberg Chapter 10 section 1*
9	6/8	M	Molecular Geometry •Valence-shell electron-pair repulsion (VSEPR) theory •Two–four electron groups *Silberberg Chapter 10 section 2*
	6/10	W	Molecular Geometry •Five and six electron groups •Molecules with more than one central atom *Silberberg Chapter 10 section 2*
	6/12	F	Molecular Polarity •Dipole moments *Silberberg Chapter 10 section 3*
10	6/15	M	Valence Bond Theory •Linear combinations of atomic orbitals •Hybrid orbitals *Silberberg Chapter 11 sections 1 – 2*
	6/17	W	"MO" Theory, Mo' Problems •Molecular orbital theory •Bonding orbitals and antibonding orbitals *Silberberg Chapter 11 section 3*
	6/19	F	"MO" Theory, Mo' Problems •MO diagrams for diatomic molecules *Silberberg Chapter 11 section 3*
11	6/22	M	**Final Exam 11:30 AM – 1:30 PM**

Student Learning Outcome(s):

*Identify and explain trends in the periodic table.
*Construct balanced reaction equations and illustrate principles of stoichiometry.
*Apply the first law of thermodynamics to chemical reactions.