0 CHEM 10 • SPRING 2019 • SECTIONS 01 & 02

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OFFICE HOURS • **M:** 11:30 AM – 12:20 PM | **TWTh:** 1:30 PM – 2:20 PM | **F:** 9:30 AM – 10:20 AM

1A COURSE DESCRIPTION

CHEMISTRY • Chemistry is a cornerstone of modern science, providing both a practical and theoretical foundation that supports increasingly interwoven fields of study, such as chemical engineering, forensics, genetics, materials science, and molecular cell biology. Organic chemistry – the study of carbon and the classes of molecules that contain it – plays a pivotal role in agriculture, cooking, cosmetics, environmental reclamation, pharmaceutical design, and polymers. Having a firm, intuitive grasp of the essential concepts of chemistry is therefore crucial to unlocking the pathway to many academic endeavors.

LECTURE CONTENT • This one-quarter course presents an overview of the core concepts in general chemistry, as well as a brief introduction to organic chemistry (the chemistry of carbon-containing compounds) and biological chemistry. Major topics will include: atoms, bonding, and atomic and molecular structure; solids, liquids, gasses, and intermolecular forces; solutions; stoichiometry; acid-base reactions and reduction-oxitation (redox) reactions; nuclear chemistry; organic chemistry, including molecular structure and functional groups; and biochemistry, including carbohydrates, amino acids, proteins, and DNA.

LAB CONTENT • To compliment the lectures, a series of experiments will introduce key lab techniques used in chemistry, focusing on quantitative analysis.

1B CLASS STRUCTURE

CLASS PERIODS • This course is split into two time periods: **lecture** and **lab** (see *Table 1*). One registration code automatically enrolls you in *both* instructional periods. Since only one grade is assigned for lecture and lab combined, the lecture and lab **cannot** be taken separately *under any circumstances*, since doing so would violate articulation agreements with other institutions. This means that, even if you only need to complete the lecture to satisfy your transfer requirements, or even if you have previously taken the lab at De Anza, you are still required to complete the lab this quarter.

Table 1 COURSE SCHEDULE

	Room	Section 01 (42701)		Section 02 (42702)	
		Day	Time	Day	Time
Lecture	SC1102	TTh	10:30 AM – 12:20 PM	TTh	10:30 AM – 12:20 PM
Lab	SC2210	T	7:30 AM – 10:20 AM	Th	7:30 AM – 10:20 AM

SECTIONS • This course consists of two sections (see *Table 1*). Once you are enrolled in a particular section, you must attend *only* that section for the duration of the quarter.

1C GRADING

POINTS • The total number of points possible is 1000 (see *Table 2* for details). *Regardless of your overall point total*, you will receive an 'F' for the entire course if you do not complete all of the lab experiments (see *Section 2B* for missed labs) **or** if you do not complete the lab portion of the class with a passing grade (a grade of 'C' or better).

LAB TOTAL* • The total number of points possible in lab is 200. However, this total will be reduced due to improper handling of chemicals or waste or failure to maintain a safe and clean laboratory environment. See *Section 7A* for more information.

Table 2 GRADE DISTRIBUTION

Lecture (80%)				Lab (20%)			
Task	*Pts*	*#*	*Total*	*Task*	*Pts*	*#*	*Total*
Quiz	75	3	225	Short report	10	8	80
Exam	125	3	375	Long report	20	1	20
Final	200	1	200	Lab exam	100	1	100
Lecture total :			800			*Lab total :*	200*

Table 3 GRADING SCALE

Grade	*Percentage*	*Grade*	*Percentage*
A+	95 – 100 %	*C+*	73 – 76 %
A	90 – 94 %	*C*	70 – 72 %
A–	87 – 89 %	*D+*	66 – 69 %
B+	84 – 86 %	*D*	63 – 65 %
B	80 – 83 %	*D–*	60 – 62 %
B–	77 – 79 %	*F*	0 – 59 %

CURVES • Grades in this course are not based on any form of curve. This means that with sufficient focus and dedication, everyone in the class could receive an 'A'. By the same token, with sufficient procrastination and lack of discipline, everyone in the class could receive an 'F' instead. See *Section 1D* below for information regarding curving of the lowest exam.

GRADES • The grading scale is given in *Table 3*. *A grade of 'C' (or better) is required to pass Chem 10.*

1D FINAL CURVE

It is always possible something in your life might interfere with your studies and cause you to perform poorly on a particular exam, or even miss an exam entirely (see *Section 2B* for missed exams). To me, performing well on the final exam shows that you have overcome whatever temporary difficulty you may have encountered and is therefore reasonable justification for curving a low exam score. Thus, if your *percentage* on the final exam is higher than the *percentage* on your lowest exam, the score for that lowest exam will be replaced by the final exam score (*in terms of percentage*). Contrariwise, if you score lower on your final than any of your exams, no points will be taken off of any of your exams (you will not be penalized twice for a low score on the final).

1E REGISTRATION

REGISTRATION • The registration deadlines for this quarter are listed in ***Table 4***. Deadlines are **strictly** enforced by De Anza in accordance with state regulations. If you need to drop or withdraw from the course, you ***must*** do so by the appropriate deadline.

ENROLLMENT LIMITS • Due to safety considerations and space limitations, enrollment in each section of general chemistry is strictly limited to 30 students. ***There are absolutely no exceptions to this policy, regardless of circumstances.***

Table 4 **REGISTRATION DEADLINES**

Administrative deadline	*Date*
Add this course	4/20/19
Drop with full refund and no grade record	4/21/19
Designate this course as pass/no-pass	5/3/19
Withdraw from this course	5/31/19

WAIT LISTS • If a particular section has already been filled at the time you register for the course, you may be automatically added instead to the wait list (space permitting). Open spaces in each section will be filled in order according to the official wait list up until the add deadline (see ***Table 4***). Any open spaces remaining after all students on the wait list have been added will be filled on a **first-come, first-serve** basis. If you are added to a section from the wait list, you will not be assigned a laboratory locker until you verify that you have officially enrolled in the class. Any assessments that you may have missed while attempting to add the class will be addressed on an individual basis once you are successfully added to the course.

REGISTRATION ERRORS • Official class rosters are generated prior to the beginning of the quarter by Admissions and Records (A & R), located in the Student and Community Services (SCS) building. Problems related to the registration system itself, your registration status, or your position on the wait list must be addressed directly to A & R, as before the quarter begins I ***do not*** have the ability to manage class registration. I am only able to add students to the course or wait list once the quarter begins.

DROPPING • If, for whatever reason, you choose to drop or withdraw from this course, it is ***your responsibility alone*** to initiate the drop or withdraw by the appropriate deadline, either online or in person. However, prior to the drop deadline, if you stop attending class, I am ***required*** to drop you from the course so as to ensure an accurate census count, which in turn determines the level of funding provided to De Anza by the State of California. Additionally, due to federal restrictions related to financial aid, after the drop deadline but before the withdrawal deadline, if you stop attending class I am also ***required*** to drop you from the course. If you stop attending class for whatever reason, especially before the drop deadline, you **must** contact me to ensure you are not removed from the course.

1F QUIZ & EXAM SCHEDULE

ASSESSMENT SCHEDULE • The assessment schedule for this class is given in ***Table 5***. It is not feasible to coordinate the assessments for this class to be accommodating to the schedules of all other classes, since every course runs at its own individual pace. Part of being an adept student is having the ability to balance the demands of several different classes simultaneously. Since you have been given this schedule at the beginning of the quarter, you have ample forewarning to properly manage your time. ***Exams will not be given on alternate days due to the workload in other classes.***

Table 5 **ASSESSMENTS**

	Quiz	*Exam*	*Lab exam (01)*	*Lab exam (02)*
#1	4/18/19	4/30/19	6/18/19	6/20/19
#2	5/9/19	5/21/19	———	———
#3	5/30/19	6/13/19	———	———

SCHEDULE CHANGES • Although every attempt will be made to adhere to the established schedule, unforeseen circumstances may arise that require a change in the day an assessment is given. Difficulties resulting from such unexpected changes will be handled on an individual basis.

FINAL • The final exam will be held on **Thursday, June 27th** at **9:15 AM – 11:15 AM** in room **SC1102**. This time is assigned by the college and cannot be changed except in cases of dire emergency (see ***Section 2B*** for details). ***Note:*** The final exam only covers material from lecture or lecture-related material presented in lab; there is no final exam for lab, only the last lab exam.

1G LECTURE ASSESSMENTS

HOMEWORK • Working problems at the end of each chapter is one absolutely assured way to increase your understanding of the course material. Recommended problems can be found in ***Table 6*** (next page). As this is a college-level course, homework will not be collected or graded; ***it is entirely up to you*** to discipline yourself to do as many problems as may be necessary for you.

QUIZZES • Quizzes are intermediate assessments that are intended to gauge your level of preparedness and direct your studying before an exam. Quizzes will normally last half the length of the class period.

EXAMS • Exams are comprehensive assessments that review in detail topics covered in lecture. Although not explicitly cumulative, each successive exam naturally builds on material found on previous exams. Exams will last the entire class period and consist of fill-in-the blank, short essay, mechanism, or synthesis questions. ***No multiple-choice tests will be given in this class***.

FINAL EXAM • The final exam is identical in format to the regular exams, except the final it is ***cumulative and comprehensive***, covering material from the entire quarter. Do not fall into the trap of cramming for each test only to forget everything before the final! Reviewing the quizzes and tests from the quarter is one of the best ways to prepare for the final. Be aware that material presented after the last exam will also be included on the final. ***Note: The final does not include any lab-related material.***

1H COURSE MATERIALS

• chemical safety goggles (see ***Section 4C*** for more information about safety goggles)

1I LECTURE TEXT

TEXTBOOK • The official lecture text for this course is ***Chemistry for Changing Times, 14th edition*** by ***John Hill*** (Pearson: 2016; ISBN 978-0-321-97202-6). ***Note:*** Due to the high cost of textbooks, if you have already purchased a previous edition of this text or a text written by another author, it is your decision whether or not to purchase the official text; however, all problems, section numbers, diagrams, or tables referred to in class will come directly from the official text. There are other excellent texts available which may be useful if you are seeking addition problems or an alternate presentation of the course material. If you wish to use an alternate text, please consult with me so that I can determine whether the text you intend to use is appropriate for the level of this course.

SUGGESTED PROBLEMS • It is recommended that you work all of the in-chapter problems from the sections listed below for fundamental skill development; the additional problems listed below are suggested for further practice. ***Note:*** Homework problems are **not** necessarily an indicator of the types of problems that will be found on quizzes or exams. In fact, you may encounter problems on quizzes or exams that have not been directly addressed either in class or in the suggested problems. I believe it is important to not simply regurgitate material, but to extend the skills you have mastered – in a reasonable way – to the unfamiliar, as you will undoubtedly encounter such challenges in your future studies or careers.

Table 6 LECTURE SCHEDULE

Week	Day	Sections	Topic	Problems
1	4/9	1.1 – 1.10	***Introduction*** – Let's start at the beginning. ***Measurement and numbers*** – The nuts and bolts of science.	1: 23 – 26, 29, 31, 33 – 39, 42, 45 – 49, 53, 55, 61, 66, 67
	4/11	2.1 – 2.3 2.4 – 2.6	***Atoms*** – The building blocks of the universe. ***The mole*** – So much more than a common mammal.	2: 15 – 21, 25, 27, 31, 33, 35, 37 2: 41, 43
2	4/16	3.1 – 3.6	***Atomic structure*** – A tiny, monumental discovery.	3: 2, 5 – 8, 12 – 14, 16, 18 – 20, 22 – 26, 28
	4/18	3.6 – 3.8	***Atomic orbitals*** – They'll make your head spin.	3: 30, 31, 33 – 43, 47
3	4/23	4.1 – 4.8	***Molecules and compounds*** – Terribly tiny tinker toys.	4: 1 – 3, 5 – 9, 13, 15 – 26, 30 – 36, 38 – 40, 45, 47 – 53 , 55
	4/25	4.9 – 4.12	***Molecular shapes*** – The shape of things to come.	4: 27 – 29, 41 – 44, 56 – 61, 64 – 67, 68
4	4/30	**• Exam 1 •**		
	5/2	5.1 – 5.5	***Stoichiometry*** – Keeping everything balanced.	5: 7 – 10, 13 – 16, 19, 25, 27 – 35, 37, 39, 41, 43, 45, 47
5	5/7	6.1 – 6.4	***Solids and liquids*** – They're all stuck together.	6: 1 – 6, 8 – 15
	5/9	6.5 – 6.7	***Gasses*** – They're under a lot of pressure.	6: 7, 17 – 31 (*odd*), 35 – 45 (*odd*)
6	5/14	7.1 – 7.4	***Acids and bases*** – Not the tools of a successful rock band.	7: 1, 2, 4 – 10, 13, 15, 17, 19, 23 – 27, 29, 31 – 33, 35 – 37
	5/16	7.5 – 7.8	***Neutralization*** – Neither this nor that.	7: 39 – 45, 47, 49, 51, 53
7	5/21	**• Exam 2 •**		
	5/23	8.1 – 8.2	***Oxidation and reduction*** – When electrons come and go.	8: 16 – 18, 21, 23, 24, 31 – 47 (*odd*), 55, 57
8	5/28	8.3 – 8.7	***Batteries*** – You'll get a charge out of these.	8: 25 – 30
	5/30	9.1 – 9.3	***Organic chemistry*** – Carbon gets its day in the sun.	9: 2 – 4, 6 – 9, 11 – 15, 17 – 26, 41 – 46
9	6/4	9.4 – 9.8	***Functional groups*** – Giving organic molecules a purpose.	9: 27, 31 – 40, 47 – 50
	6/6	10.1 – 10.7	***Polymers*** – Making a mountain out of a mole hill.	10: 2 – 8, 15, 16, 18 – 20, 21 – 23, 27, 28, 34
10	6/11	11.1 – 11.7	***Nuclear chemistry*** – Why is that glowing?	11: 3 – 9, 14, 19, 21 – 23, 26 – 29, 32
	6/13	**• Exam 3 •**		
11	6/18	14.1 – 14.2 15.1 - 15.4	***Water*** – And not a drop to drink. ***Thermodynamics*** – The heat is on.	14: 1, 12 – 18 15: 13 – 15, 17, 23 – 25, 27, 29
	6/20	16.1 – 16.9	***Biochemistry*** – It takes on a life of its own.	16: 4, 6, 7, 9, 11, 17, 21 – 24, 27 – 29, 32 – 34, 39, 40, 47, 51, 53, 55, 56, 60

1J CORE TOPICS

The following is a listing of the major topics that will be covered each day in lecture. Please note that this list should not be interpreted as the exclusive set of topics to be covered on a quiz or exam; instead, it should be viewed as a set of milestones to be reached in your studying or as key concepts around which to organize your notes.

Week	Day	Topics
1	4/9	Mass versus weight; physical and chemical properties; states of matter: solid, liquid, gas; atoms, elements, molecules, substances, and compounds; homogeneous and heterogeneous mixtures; the metric system: base units and prefixes; density; intensive versus extensive properties; heat: Joules and calories; temperature scales: Fahrenheit, Celsius, and Kelvin.
	4/11	Law of conservation of mass, law of definite proportion, law of multiple propportions; atomic theory; Avogadro's number, moles, molar mass, molar ratios; the periodic table
2	4/16	Ions: cations and anions; electrons; anodes and cathodes; cathode ray tubes; oil drop experimet; radioactivity: alpha, beta, and gamma particles; gold foil experiment; atomic nucleus: protons and neutrons; isotopes; atomic symbols; atomic spectra; energy levels; ground and excited states; Bohr atomic model
	4/18	Quantum atomic model; orbitals; shells and subshells; electron configurations; groups and periods; metals and non-metals
3	4/23	Core and valence electrons; Lewis dot symbols; the octet rule; nomenclature of monatomic cations and anions; ionic and covalent bonds; bonding and lone electron pairs; single, double, and triple bonds; electronegativity and bond polarity; nomenclature of covalent compounds
	4/25	Nomenclature of polyatomic ions; Lewis structures; radicals; valence shell electron pair repulsion (VSEPR) theory; common molecular shapes: linear, trigonal planar, tetrahedral, trigonal pyramidal, and bent; dipoles; molecular polarity
4	4/30	**• Exam 1 •**
	5/2	Chemical equations, products, reactants; balancing chemical equations; molar masses; percent composition; stoichiometric factors; concentration, molarity, percent volume, percent mass
5	5/7	Phase changes: melting, freezing, vaporization, condensation, sublimation, deposition; intermolecular forces: dipole-dipole forces, dispersion forces, hydrogen bonds; solutions, solutes, solvents
	5/9	Kinetic molecular theory, gas laws: Boyle's law, Charles's law, Gay-Lussac law, Avogadro's law; molar volume; standard temperature and pressure (STP); the ideal gas law
6	5/14	Arrhenius versus Brønsted-Lowry acid and bases; acid and base anhydrides; strong versus weak acids and bases
	5/16	Neutralization; *p*H; conjugate acid-base pairs; buffer solutions
7	5/21	**• Exam 2 •**
	5/23	Oxidation and reduction; oxidation states; oxidizing agents and reducing agents
8	5/28	Electrochemical cells; batteries; electrolysis; corrosion
	5/30	Hydrocarbons, aliphatic compounds, aromatic compounds; saturated, unsaturated, and cyclic hydrocarbons; constitutional and geometric isomers; homologs; condensed and skeletal structures; alkanes, alkenes, and alkynes; substituents
9	6/4	Functional groups: alcohols, phenols, ethers, aldehydes, ketones, carboxylic acids, esters, amines, amides; heterocycles; alkaloids
	6/6	Monomers and polymers; polyethylene, polypropylene, polystyrene; thermoplastic polymers; polyvinyl chloride (PVC); polytetrafluoroethylene (PTFE); addition and condensation polymerization; elastomers; vulcanization; polyesters and polyamides; thermosetting polymers; polycarbonate; silicones; glass transition temperature; plasticizers
10	6/11	Radioisotopes; alpha, beta, and gamma decay; positrons; electron capture; half life; radioisotopic dating; binding energy; fusion and fission
	6/13	**• Exam 3 •**
11	6/18	Unusual properties of water: amphoteric, high density, high specific heat; kinetic and potential energy; system and surroundings; endothermic and exothermic; bond enthalpy; reaction rates; catalysts; first and second laws of thermodynamics; entropy
	6/20	Carbohydrates: aldoses and ketoses, mono-, di-, and polysaccharides; lipids; fatty acids; amino acids; peptides; zwitterions; proteins: primary, secondary, tertiary, and quaternary structure; enzymes; nucleic acids; DNA and RNA; transcription and translation

1K — LAB TEXT

TEXTBOOK • The official lab text for this course is ***Conceptual Chemistry: Understanding Our World of Atoms and Molecules, 5th edition*** by ***Donna Gibson*** and ***John Suchocki*** (Pearson: 2014; ISBN 978-0-321-80453-2). ***Note:*** Please be aware that the page numbers have changed from older editions, and there may be differences in the procedures as well. If you have an older edition of the lab text and you cannot or do not wish to purchase the current edition, there is a copy of the lab text on reserve at the library. However, do not wait until the last moment to prepare for lab in case someone else has checked it out!

Table 8 — LAB SCHEDULE

Week	Sec 01	Sec 02	Report	Topic
1	4/9	4/11		*Introduction and Check-In*
2	4/16	4/18	———	*Lab 1 • Experiment 2* – Taking measurements
3	4/23	4/25	*Lab 1*	*Lab 2 • Experiment 4* – Percent water in popcorn
4	4/30	5/2	*Lab 2*	*Lab 3 • Experiment 9* – Electron dot structures
5	5/7	5/9	*Lab 3*	*Lab 4 • Experiment 10* – Molecular shapes
6	5/14	5/16	*Lab 4*	*Lab 5 • Experiment 11* – Solutions
7	5/21	5/23	*Lab 5*	*Lab 6 • Experiment 17* – Upset stomach
8	5/28	5/30	*Lab 6*	*Lab 7 • Experiment 13* – How much fat
9	6/4	6/6	*Lab 7*	*Lab 8 • Experiment 20* – Organic molecules
10	6/11	6/13	*Lab 8*	*Lab 9 • Experiment 21* – DNA capture
11	6/18	6/20	*Lab 9*	*Check-out and lab exam*

2A Absences

Almost everyone is absent from class occasionally due to legitimate reasons – such as sudden or unexpected work conflicts, illness of self or a close relative, accidents, births, deaths, court cases; sometimes the reasons ar not so lofty – such as sleeping through an alarm or grappling with the after-effects of a particularly enthralling party. If you have missed class, or you are aware ahead of time that you will be absent for class, please contact me by e-mail (or by phone if you do not have e-mail access) and provide a brief explanation for your absence. Without proper advance or reasonable notice, no opportunity to make up any missed work will be given (please see ***Section 2B*** below for more details). Depending on the reason for your absence, you may be required to provide verification of the circumstances surrounding your absence – for example, a doctor's note confirming your illness.

Due to the perpetually impacted wait lists for this class, if you are absent for any reason before the add deadline passes (see ***Table 4***) without justification or notification ***you may be automatically dropped from the class***. During this time period, it is especially important that you contact me regarding any absences right away to preserve your spot in the class.

2B Make-up policies

Lecture and lab lecture • If you are absent from lecture or the lecture portion of lab and if no quiz or exam was given that day, there is no work for you to make up. Audio recordings and written notes of all lectures and lab lectures can be found online at the class web site (see ***Section 0*** for the address). If you were absent from the lecture portion of lab on a day a pre-lab was due, you must show me that pre-lab on the ***very next day*** that you are in class (see ***Section 5A*** for information on pre-labs).

Lab • ***Missed labs cannot be made up.*** Our lab program operates under tight constraints on both resources and space; as such, the chemicals for any one experiment are only available for a limited number of lab periods. If the chemicals happen to be available the next lab you attend, you must be prepared to complete the missed work in parallel with whatever other experiment you are supposed to be conducting that day. If you are unable to complete an experiment due to one or more ***legitimate*** absences, the grade for the missing lab will be based on an alternate assignment related to the lab. Other than under rare circumstances, you may ***not*** attend another lab section to make up a missed lab, especially if the section already has a full compliment of students. ***Note: If you miss lab on the same day you have a lecture exam, you will not be allowed to take or receive a score for the exam.***

Quizzes and lab exams • Missed lecture quizzes and lab exams can be made up only in the event of an excused absence and must be taken by ***the very next time that you attend class***, regardless of whether it is for lecture or for lab; otherwise, you will receive a score of zero on that assessment. If you wish to make up the assessment before your next regular class session, you may make arrangements to come during office hours or some other mutually agreed-upon time. Due to problems with academic integrity, make-up quizzes and lab exams differ from the original versions given in class, although they are of comparable difficulty.

Exams • Due to problems with academic integrity, ***missed exams normally cannot be made up***. If you missed class due to a truly severe event – such as a debilitating accident or the death of a close relative – then the opportunity to make up an exam may be given, although the exam will differ from the original version. See ***Section 1D*** regarding curving of the lowest exam.

Final • The final exam time and date is scheduled by the college and cannot be changed unless every student in the class agrees and the time change is approved by the dean. Be sure to schedule any travel around your final exam time. If a true, verifiable emergency arises, contact me ***immediately*** to make alternate arrangements. When such an emergency occurs, the exam will be given at another time when possible. If no alternate time is available, a grade of 'incomplete' may be given for the quarter; the final must then be taken within a mutually established time frame. An official contract must be submitted to A & R to receive an 'incomplete'; if the incomplete is not resolved according to that contract, you will receive a grade based on the work completed.

2C Grading options

Pass/No Pass • If you are taking this class out of general scientific interest or for pleasure and would like to receive credit for the course – but do not need a letter grade – this course may be taken on a pass/no-pass basis. A grade of 'C' or higher is considered passing, while a grade of 'D+' or lower is considered failing. You must elect to take the course on a pass/no-pass basis by the official registration deadline (see ***Table 4***). ***Note:*** Once the deadline for designating the course as pass/no-pass has elapsed, you ***cannot*** convert a passing grade into a letter grade or convert a letter grade into a passing grade.

Auditing • If you have previously taken this course ***at De Anza*** and want to repeat this course for review, you may take this course on an audit basis. If you have **not** taken this course ***at De Anza*** before, you must officially register for the course. Due to liability and equanimity concerns, ***you may not attend this class if you are not officially registered***. Auditing students may not participate in lab experiments and will not receive credit for the course.

Plus/Minus Grades • Grades in this course are constituted according to a plus/minus grading scale. According to the California state education code, the maximum grade point possible for a course is 4.0, meaning that a grade of 'A+' is equivalent to a grade of 'A' for the purposes of calculating grade point average. Additionally, since a grade of 'C' is considered the minimum grade for passing a course within the California community college system, there is no such grade as 'C–' at De Anza.

2D Electronic resources

Cell phones, tablets, computers, and similar devices may be used in class during lecture, so long as no form of assessment is being given, and so long as their use does not cause any disruption to any students or to me – specifically, while lecture is in progress, you may **not** carry on any conversations out-loud on such devices, and they must be in silent mode. No form of electronic devices may be used on assessments except for approved, dedicated calculators (see ***Section 2E*** for academic accommodations).

2E ACADEMIC ACCOMMODATIONS

If you have some form of disability, many accommodations and services are available through Disability Support Programs & Services (DSPS), located in the Advanced Technology Center (ATC 209). If you require some form of academic accommodation on assessments – such as additional time, a reduced-distraction environment, or the use of alternative media or assistive technology – you must be evaluated by the Educational Diagnostic Center (EDC), located in Learning Center West (LCW 110), and receive a Test Accommodation Verification (TAV) form. ***Absolutely no accommodations can be given without a completed TAV form.***

2F EXPECTATIONS

SELF-RELIANCE • It is only through **your own effort** and dedication that you will ever truly master the material presented in this course. I can teach in every way imaginable, but I can do nothing to make you then take over the burden to learn – I can only act as a guide. **You** have to dedicate yourself to your own future.

TIME • To excel in this course, you will have to commit a substantial amount of time. Although the quantity of time needed to master the material varies widely from person to person, a standard guideline is to expect that – between reading, reviewing notes, and working problems – you will need to set aside ***at least two hours*** for studying for ***every hour*** of lecture or lab lecture.

READING • It is impossible to conduct a lively class discussion if only I am prepared; as such, I expect that you will read all assigned passages ***before*** coming to class. I ***do not*** expect you will understand everything that you read – otherwise there would be no need for you to take this class – but you will be far more able to participate in and benefit from class discussions by reading ahead of time. If English is not your primary language, reading in advance is even more crucial, since it provides you the opportunity to familiarize yourself with new vocabulary or terminology first and thereby enable you to far more easily understand a lecture. Even common English words can have completely different meanings in a chemistry-related context; for example, a hood is normally something worn over the head, but in the lab it is a safety system for mitigating the release of hazardous gases.

PARTICIPATION • I am not a video to be viewed passively at your discretion; I am a living, breathing, feeling creature that will reach out and interact with you in class. As will become evident, I am able to talk indefinitely in lecture, so when I do ask a question or request some other form of participation from class, I become irritated when I receive no form of response. I do not expect that you, individually, will always have the right answers, but I do expect that you, as a class, will be engaged.

PROBLEMS • Working problems is often an effective means of mastering a concept. I only have a limited quantity of time in lecture to present a broad range of material, thus I frequently will be unable to cover every single conceptual or mathematical detail. You must therefore take it upon yourself to work as many problems as you deem necessary in order to master the material. I will cover the essential framework; you have to fill in the details yourself. ***Note:*** Resist the urge to refer to a solution manual or answer key until you are completely stuck on a problem. It is (comparatively) easy to work backwards from the correct answer; it is far more beneficial (but, of course, more difficult) to run into the proverbial brick wall first and learn from your mistakes.

PROFICIENCY • Assessments for this course are designed presuming you reach a level of proficiency in a skill or concept that enables you to then use it to efficiently solve a problem. If you take too long to solve a particular problem due to lack of practice, you will be unable to complete the assessments. Likewise, you are also expected to be able to address the core of a problem with concise yet complete answers. If you answer in several paragraphs what requires just a few sentences, you will never finish an assessment; likewise, if you answer in just a few words what requires a few sentences, you are unlikely to receive full credit.

PROMPTNESS • ***All assessments will begin promptly at the beginning of lecture or lab.*** No extra time will be given if you are late, so plan to arrive early if you are regularly stuck in traffic or if you have a habit of tardiness.

2G CODE OF CONDUCT

All De Anza students and staff are expected to abide by the Code of Conduct, which is based on the following four principles: 1) mutual respect between students, faculty, and staff; 2) pursuit of studies with honesty and integrity; 3) respect for College and personal property; and, 4) compliance with all rules and regulations. It is fortunate that only occasionally am I prompted to take action against violations of the Code, as the majority of students are respectful of each other and of course policies. However, be aware that disruptive or abusive behavior towards myself or any student in the class will not be tolerated. Depending on the seriousness of the incident, violations of the Code may be reported to the dean of Student Development for potential disciplinary action. Additionally, I am authorized to dismiss a student from class, without prior authorization, for disruptive behavior for two class periods. ***Note:*** Cheating and other lapses of academic integrity constitute violations of the Code (see ***Section 2H*** below).

2H ACADEMIC INTEGRITY

Academic integrity is one of the most important qualities a student, instructor, or researcher can possess. Once that integrity is lost, it is virtually impossible to recover, and its loss represents a severe lapse in ethics. Cheating and plagiarism are two of the most serious violations of academic integrity in an educational environment. Having been a student, I fully understand the pressure to succeed. However, **I do not consider cheating to be excusable in any form or under any circumstances**, as I personally believe that a lack of ethics in this phase of your academic career is indicative of how you will behave in your future occupation. **ANY STUDENT CAUGHT CHEATING OR PLAGIARIZING ON ANY ASSIGNMENT WILL AUTOMATICALLY RECEIVE ZERO CREDIT FOR THAT ASSIGNMENT**. If collusion between multiple students can be unequivocally demonstrated, each student will receive this same penalty. All instances of cheating and plagiarism will be reported to both the dean of Physical Sciences, Math, and Engineering (PSME) and the dean Student Development for possible further disciplinary action.

3A Teaching philosophy

Knowledge • Knowledge is the ultimate weapon, ignorance the ultimate weakness. We are all born into a world filled with knowledge for us to grow from, and we perish by those who embrace ignorance instead. There are those who seek knowledge to entertain, to heal, to build, to understand the divine, and there are those who seek to control knowledge to deceive, to subjugate, and to destroy. I view creating, maintaining, and transmitting knowledge for the greater good of all a noble pursuit in life.

Globalization • Knowledge does not exist in a vacuum; it reflects and serves the society from which it came. Each society has it own set of customs, mores, and beliefs. These beliefs provide a framework within which a society can function. Thanks to technology, the ease with which we now exchange knowledge has brought the ideas of countless cultures together. It is a new form of globalization – a globalization of knowledge. For those who appreciate the creativity that differences in culture can bring, our close contact with one another has prompted unprecedented achievement; for those who fear and exploit the differences in our cultures and misrepresent the ideas that lie within them, our technological prowess has also produced unprecedented destruction. Now more than ever, it is imperative that education be conducted in the context of a constructive cultural awareness.

Collaboration • Chemistry itself is a distinct form of intellectual pursuit, with its own traditions, its own conventions, its own method of viewing and explaining the various phenomena of life. A good many other academic traditions – archaeology, geology, history, philosophy, theology – have also tried to explain the world around us, merely beginning from different points of view. To shun the humanities altogether as "unscientific" is to ignore that science itself is founded on unique philosophical and historical precepts, while to eschew the sciences as "culturally insensitive" is to ignore the objectivity and uniformity it intrinsically seeks. The ability to blend different traditions of thought to solve a problem is an important outcome of a complete education.

Teaching philosophy • My role as an instructor is threefold:

• 1) To be prepared in all ways to effectively pass on the knowledge I have gathered. This includes maintaining myself physically and mentally fit to execute the task of teaching, keeping fluent in the course material, constantly refining my methods of classroom instruction and assessment, and staying current with innovations within the field of chemistry.

• 2) To create a class environment based on respect for the many types of people that we are, so that I can encourage my students to flourish in our increasingly diverse, global society. No student in class should ever feel uncomfortable being around his or her peers, nor should any student ever be afraid of expressing ideas which may differ from those of a neighbor (or myself).

• 3) To place the content and skills learned in this course within a broader context – historical, social, political, economic, or practical – whenever possible. Aside from making the class more interesting by reaching out to the surrounding world, command of a well-rounded academic background is invaluable in securing a more stable, fulfilling job.

3B Learning philosophy

Self-reliance • All of us have been students in life, and many of us at some point will teach someone in some capacity as well. Certainly, good teachers help in learning, but the bulk of the burden falls on the student. For example, a dance instructor can show a student a particular move every day for a year, but unless the student practices that move over and over and over again, there is nothing that the instructor can do to make the student improve.

Self-discipline • I myself am nothing more than an older student. What I know I only know because of the time and the dedication I have put into bettering myself. I am still a student, I still learn from each successive class that I teach – new ways to present a problem, new realizations of how concepts fit together. The knowledge that I pass on is not my own, I am just acting as a caretaker. To truly succeed, you have to have you own inner thirst for knowledge, a drive to better yourself, to open up more possibilities in you future life. We are usually our own worst enemies – doubting that we can succeed; giving in to procrastination; failing to discipline ourselves. I realize that few people take chemistry for their enjoyment, but since you are taking this course, you should dedicate yourself to your studies, learn what you can, and apply that knowledge to thrive to the best of your abilities.

3C Collegial philosophy

Unity • Each of us is born into different cultures, raised speaking different languages, driven to follow different beliefs, compelled to preserve different traditions. But we breathe the same air, we drink the same water, we are warmed by the same sun, we are made of the same atoms. Beneath our skin there is less than a 1% variation in our genetic composition. To discriminate on the basis of race, color, national or ethnic origin, age, gender, religion, marital status, sexual orientation, physical ability, economic disposition, or appearance is to focus on these insignificant differences between us and ignore the fact we are all human.

Tolerance • I firmly believe that it is the intersection of the many cultures represented on out campus that ignites academic discourse and philosophical innovation. Academia thrives on respectful disagreement, but withers in the face of ignorance or intolerance. Should there be a problem with intolerance in the class, it will be swiftly and sternly dealt with.

3D Campus resources

De Anza has a number of services available to help you in your studies – and to help you as an individual – including:

- ***Math & Science Student Success Center*** (S43) – Both individual and group tutoring services are available
- ***Counseling and Advising*** (SCS) – Provides academic counseling, transfer planning, and psychological services
- ***Health Services*** (Hinson Campus Center) – Includes services such as minor first aid, medical exams, and immunizations
- ***Inter Club Council*** (Hinson Campus Center) – Dozens of student-run clubs available to engage the De Anza community

3E Surviving college

De Anza, being a community college, is an institution in which a class may contain students from all age and academic levels. For those of you coming directly out of high school, developing rock-solid study habits right away is crucial. For some students returning from the workforce to further their education, coming back to college can be both an exciting and unsettling experience. Quite unfortunately, many students pass through high school without feeling particularly motivated or challenged, and thus wind up in college unprepared for the dramatically heavier burden of study they will have to carry. If you are a new college student, the following suggestions may be helpful.

Making studying a habit • Make studying a habit, not just a chore. Clear out the same amount of time each day, even if you cannot schedule it at the same time each day. In the first week, study whichever subjects you feel like. Don't be concerned at first how much or how little you have accomplished as long as you remain focused and have a positive outlook. Over time, you can condition yourself to automatically put this time aside and think twice about procrastinating.

Study environment • Make a space devoted to studying, whether it is at your own home, in a public setting, or somewhere outdoors. Some people need a quiet room with soft lighting, a comfy sofa, and a steaming cup of herbal tea in order to find their groove, while other people are more serene in a noisy coffee house sipping on extra super triple roasted organic low-fat double raspberry mocha lattés. Whatever your ideal studying space may be, make it yours.

Set attainable goals • Give yourself reasonable goals. Unless you are superhuman, you are not going to make that web site to help you study and start a chat group and rewrite all of your notes and highlight all of your books and index your references and organize your backpack and read those two novels by tomorrow at seven in the morning. Break down "studying" (which is a large and nebulous task) into the most essential objectives that you need to meet (smaller, more digestible tasks). Then, once you accomplish your primary mission, you can work on that homework color-coding project.

Schedule, schedule, schedule! • Know when your next assessment is coming in all of your classes. Plan ahead so that when your work schedule is heavy you do not have as much homework. Read your notes during that ride on the bus instead of a blog. Play your lecture recordings in the car while you're stuck in traffic. Squeeze every little bit of time out of life that you can.

Breathe! • Pay attention to your physical and mental well-being. The human mind and body can handle excessive stress only so long before it breaks down, leading to insomnia, exhaustion, depression, and a whole host of psychosomatic illnesses. Make yourself some hot chocolate, listen to some soothing music, take a walk, exercise, meditate, do something positive to release the pressure periodically. It is easy to become lost in a job, in hobbies, in relationships, but without balance and our health (both mental and physical), we are useless.

3F Surviving chemistry

Chemistry – particularly organic chemistry – is infamous for being a difficult subject – but it is not, in fact, evil. Yes, there are difficult concepts in chemistry, and in advanced courses there is a lot of difficult math. However, I believe that it is not the individual concepts themselves that make chemistry hard, but the sheer volume of material that must be assimilated in such a short time frame. To more easily survive chemistry, avoid the four common mistakes below that I see students make year after year.

Do not only memorize • Memorization is unavoidable sometimes for facts and figures, but my intent is to help you develop an intuitive understanding of the underlying concepts. So much of the information in this course is interrelated that, once your intuitive grasp has developed, you will often be able to answer questions based solely on fundamental precepts. Memorization alone – without any kind of framework for assembling that stored knowledge – often leads to confusion and frustration. When mathematical formulas are involved, try to relate those formulas back to the concepts they describe.

Don't cram! • We have all crammed for an exam, but consistently relying on late nights and massive doses of caffeine (or other substances) can only take you so far. Coasting then cramming generally produces only a fleeting grasp of a concept. Chemistry should be treated as a foreign language: persistent, consistent exposure and practice is the only true way to master it. Unless you are one of the lucky few, you are guaranteed to fail eventually if you always wait until the night before an exam to study.

Study together • Don't suffer alone. Take advantage of the academic environment around you. Form study groups, chat rooms, mailing lists, instant message groups, blogs, tweets, circles – whatever it takes. Most of all, go to office hours. Even at my best, my lectures cannot always be revelations for every student. The individual aid available in office hours is an unparalleled supplement to studying. Seeking out help should never be seen as a weakness or as a last resort, but as a study aid.

Teach • I can honestly say that I have learned more about chemistry in the years I have been teaching at De Anza than I ever did in graduate school. You can think that you have mastered a topic, but as soon as you have to turn around and explain it to someone else, you may quickly find out you do not know as much as you thought you did. Take turns asking each other questions in a group; try to give a mock lecture at a chalk board or white board or by instant message. You may be surprised at the results.

3G Learning modes

We each absorb and interpret information in our own individual ways. There are **visual** learners – those who best absorb material in the form of diagrams or figures; **aural** learners – those who best assimilate material by listening or speaking; and **mechanical** learners – those who best retain knowledge by repetition, such as rewriting notes or working problems. Knowing which blend of these or other learning formats best suits your abilities can greatly enhance your learning experience. For aural and visual learners, audio recordings of all lectures and digital scans of the accompanying written notes are available for download on the course web site (see ***Section 0*** for the address). For mechanical learners, several example problems are listed in ***Table 6***.

4A LAB SAFETY

GENERAL SAFETY RULES • The chemistry department has adopted the following safety rules from the American Chemical Society Safety In Academic Laboratories Guidelines, 7th Ed. for all chemistry lab classes:

1 • Department-approved safety goggles must be worn at all times once laboratory work begins, including when obtaining equipment from the stockroom or removing equipment from locker drawers, and may not be removed until all laboratory work has ended and all glassware has been stored.

2 • Shoes that completely enclose the foot are to be worn at all times; NO sandals, open-toed, or open-topped shoes, or slippers, even with socks on, are to be worn in the lab.

3 • Shorts, cut-offs, skirts, or pants exposing skin above the ankle, and sleeveless tops may not be worn in the lab.

4 • Hair reaching the top of the shoulders must be tied back securely.

5 • Loose clothing must be constrained

6 • Wearing jewelry (rings, bracelets, watches, etc.) is discouraged due to chemical seepage between jewelry and skin.

7 • Eating, drinking, or applying cosmetics in the laboratory is forbidden at ALL times, including during lab lecture.

8 • Use of electronic devices requiring headphones in the laboratory is prohibited at ALL times, including during lab lecture.

9 • Students are required to know the locations of the eyewash stations, emergency shower, and all exit.

10 • You may not be in the laboratory unless an instructor is present to supervise.

11 • Students not enrolled in the laboratory class may not be in the lab at any time after the first lab period of each quarter.

12 • If for any reason you feel faint during lab, notify an instructor before stepping out for air so you can be supervised.

13 • Never point a heated system towards any person, including yourself (or me).

14 • Glass and needles must only be disposed of in the appropriate containers, ***never*** in the regular trash.

15 • Never use chemical refrigerators to store food or any other personal items.

4B EYE SAFETY

RULES NUMBERS ONE, TWO, AND THREE • ***Safety goggles must be worn in the lab at all times!***

EYE HAZARDS • Many students incorrectly assume that chemicals are the prime eye hazard in the laboratory, when in fact it is often glassware that is more hazardous. If a test tube is dropped unexpectedly, regardless of whether the compound inside that tube is hazardous or not, the flying pieces of glass certainly have the potential to cause injury. In fact, it is often bystanders that are injured in such accidents, since they may not be immediately aware of what the person next to them is doing. As such, you must wear your goggles the entire time you are in the lab or in front of the stockroom window – even if you are finished with your experiment and you are "just" chatting with your friends, even if you are "just" in the balance room, even if other students are (foolishly) not wearing theirs. ***Refusal to always wear safety goggles when required will result in expulsion from the course.***

TYPES OF GOGGLES • Your safety goggles must make a seal around your eyes to prevent objects or chemicals striking from the sides as well as directly towards your eyes. If you wear prescription glasses, you must still wear safety goggles over your regular glasses, as most regular glasses are not shatter-proof and do not have appropriate side shielding. If you are certain that you will be taking many laboratory classes and you wear prescription glasses, you may want to purchase a pair of prescription safety glasses. My current favorite type of safety goggles is the Uvex Stealth, since it has a comfortable cushioning pad around the goggles.

CONTACTS • If you wear contacts, be aware there is some concern that certain types of contact lenses (particularly soft lenses) may be potentially hazardous to wear in the presence of some chemicals. Although at De Anza there is no prohibition against wearing contact lenses (as long as safety goggles are also worn), you may want to make your own informed decision.

4C ACCIDENTS

Accidents in the laboratory can and inevitably do occur, regardless of the level of training a person has or the extent of precautions taken. I will not be mad if an accident occurs, since you are students learning how to operate in the laboratory and not trained chemists; in particular, I fully expect glassware to be broken in the lab (by accident, of course). However, since chemicals are present as well, you must inform me ***immediately*** if an accident does occur so that I can ensure your safety, the safety of the laboratory environment, and the safety of your fellow students.

4D EMERGENCY PROCEDURES

- Always report any chemical spills to me. Do not attempt to clean any chemical spills yourself unguided.
- If a chemical splashes in your eye, alert me immediately then flush your eyes at an eyewash station as directed.
- If you are splashed with a chemical, alert me immediately then, unless otherwise directed, rinse the affected skin or clothing with large quantities of water.
- If you are splashed with large quantities of a hazardous chemical, alert me immediately then, if advised, use the emergency chemical shower. You may wish to keep an extra change of clothes in your car for this very rare but possible emergency, since in such cases you may be forced to remove chemically contaminated clothing.
- In case of a fire, alert me before attempting to put out the fire, as water cannot be used to put out all kinds of fires, particularly electrical fires or fires involving metals. Please note that fire alarms are located in all lab classrooms.
- In case of an earthquake, step away from all lab equipment, duck under a lab bench or door frame, and cover your head. Do not exit the building during an earthquake as exit doors may contain glass or be near windows, and tiles or debris may fall from the roof. Once the quake passes, gather only vital personal possessions and evacuate the building.

4F Handling chemicals

Chemical safety • Most chemicals inherently have some form of health risk associated with them; sometimes the risk is quite minor, sometimes it is extreme. A chemical might be a skin irritant, a **lachrymator** (causes tearing or choking), a **carcinogen** (causes cancer), a **mutagen** (causes genetic mutations), a **teratogen** (causes fetal deformations), or a **pyrophor** (spontaneous ignites upon contact with air). Although in **relative** terms many of the chemicals used in this course are not overly hazardous, others can be quite harmful, so you should always take appropriate precautions to protect yourself. Aside from always wearing safety goggles and appropriate clothing, you may want to consider purchasing a lab coat to further protect yourself (and your clothes). You may also want to consider buying disposable lab gloves. ***Note:*** Some people have allergies to specific materials, particularly latex, so you may want to make sure you know the type of glove you purchase in case you need to switch to a glove of a different kind of material. Finally, regardless of whether you wear gloves, you should always wash your hands immediate after lab.

Chemical storage and segregation • All liquids must be stored in an appropriate container that will prevent a liquid from spreading if the bottle containing it were to somehow break. This additional precaution is known as ***secondary containment*** and is intended to prevent an unintended reaction in the event of a catastrophe like an earthquake. To further reduce the chances of an adverse reaction, only chemically compatible chemicals may be stored together in the same secondary containment – for example, acids may only be stored with other acids. Solids do not need to be kept in secondary containment, however they must still be segregated by type – particularly if they are flammable solids such as sodium metal.

4G Chemical safety rules

- All stored samples must be labeled with the names (not formulas) of the chemicals and the date the sample was created.
- Never leave any chemical uncapped after use, as it may decompose or evaporate/sublimate, causing a greater hazard.
- Please return any reagent bottles neatly to the appropriate storage bin after you are finished with them.
- Always double-check reagent labels; it is easy to misread “sodium nitrite” for “sodium nitrate” when in a hurry.
- Never return unused chemicals to their original containers (make sure to only take the quantity you need to avoid waste).
- Never re-use the same pipette to transfer a chemical once it has made contact with another container.

4H Chemical disposal

All chemicals or chemically-contaminated waste must be disposed of in an appropriately labeled waste container. ***No chemicals may ever be poured down the sink unless specifically directed.*** Besides the legal ramifications of contaminating the environment by improperly disposing of chemicals, we as humans have already caused enough damage to the planet without our class contributing to the problem. Accidents do happen, so if you do accidentally pour a chemical down the sink, please notify me immediately so that I can quarantine the sink and initiate the appropriate protocol for mitigating the spill.

Types of waste • Three types of waste containers will be available in the lab: **acidic aqueous** waste; **basic aqueous** waste; and **organic** waste. Just as chemicals must be segregated when in storage, chemicals must also always be disposed of in the appropriate, segregated container to avoid unintended reactions.

Rinses • When cleaning glassware, the first rinse with water or another substance should be treated as hazardous waste and disposed of appropriately. Subsequent rinses with water can be disposed down the drain if there is no obvious contamination.

Labels • All waste bottles are labeled with the type of waste they contain and the instructor who prepared the waste bottle. Always make sure to check that you are disposing of waste only in a bottle that I generated and that corresponds to the appropriate waste type. Waste is also labeled according to whether it only contains solids or whether it also contains liquids. Solids may be disposed of in containers labeled as liquid waste, but liquids may not be disposed of in containers labeled as solid waste.

Fill level • Waste bottles should never be filled completely; instead, a small amount of space called “head space” must be kept, so that the contents of the container have less chance of accidentally escaping if the container were to somehow be dropped or hit. If you need to dispose of waste and the appropriate bottle is full, let me know so that I can quickly create a new waste bottle.

4I Medical considerations

Although your health and your medical history is entirely confidential and you are in no way obligated to divulge any such private information to me, if you are aware that you have an allergy to a specific compound being used in an experiment, for your own safety you should inform me prior to that experiment so that alternate arrangements can be made. Also, if you are a woman and you are pregnant or feel that you may be, I strongly recommend that you consult with your doctor about being in this course. Many doctors recommend that pregnant women avoid this course due to some of the organic compounds used in lab. A list of chemicals used during the quarter is available upon request so that your doctor can best advise you.

Student Learning Outcome(s):

*Develop problem solving techniques by applying the \Scientific Method\" to chemical data."
*Analyze and solve chemical questions utilizing information presented in the periodic table of the elements.
*Evaluate current scientific theories and observations utilizing a scientific mindset and an understanding of matter and the changes it undergoes.