Chemistry 30A
at De Anza College

Intro to General, Bio & Organic Chemistry (I)

Spring 2016
Section 01—CRN 42682
Section 02—CRN 42690

Introduction to General, Bio & Organic Chemistry I is the first part of a two term series. This 5 unit course will be taught from 03/04/2016 through 06/24/2016 with a final exam on Wednesday 06/22/2016 7:00-9:00 am. The class has two lab sections that meet for a shared lecture section. Each section will be lead by Prof. Nick DeMello (email nick@chemlectures.com).

Course Description:

This class is for students entering the allied health fields. The focus of the first part of this class is an introduction to general chemistry. This course begins with a discussion of various measurement tools. This will be followed with a discussion of energy and matter which will be followed by a discussion of the discovery of an atom. The next set of topics will cover an introduction to elements, compounds, and types of bonding in compounds followed by various types of chemical reactions and stoichiometric calculations based on chemical equations. Properties of gases and solutions will be discussed. The course concludes with a discussion of acid-base reactivity and some topics in nuclear chemistry.

Prerequisites:

- Required: Math 114 or equivalent.
- Recommended: English Writing 211 and Reading 211 (or Language Arts 211), or English as a Second Language 272 and 273

Required Materials:

- Textbook, Timberlake Chemistry: An Introduction to General, Organic and Biological Chemistry, 12th Ed., Pearson / PrenticeHall 2015 ISBN 0-321-90844-9. Other editions **may** be acceptable (ask your instructor).
- Mastering Chemistry license for online homework (available from the campus bookstore or online at www.masteringchemistry.com)
- Lab manual, Catalyst: Introduction to General, Organic and Biochemistry, custom lab manual for Chem 30A and 30B, Pearson Learning Solutions 2012 ISBN 1-256-17651-6 (available from the campus bookstore)
- A spiral bound notebook for doing problems in class, taking notes, and recording data.
- Pencils (2) with an eraser should be brought to every class.
- Internet access (answer keys, worksheets, lecture slides, and other resources will be available only online).
- Laboratory safety goggles (can be purchased at the campus bookstore) are required for all lab experiments.
- A combination pad-lock may be required (if needed, this will be announced in the first lecture).
- A simple scientific calculator. The calculator must do scientific notation, log and square root functions. Anything more than that is a not needed and will likely slow you down. Keep it simple. Cell phones, PDAs, smart phones, laptops, or other personal electronics devices are **not** an acceptable substitute.

Structure

Lecture & Discussion:

Lecture will be held from **8:30 am to 10:20 pm (1 hr 50 min) Mon & Wed, in room 102 building SC1**. Lecture attendance is required. You must sign the daily lecture attendance sheet to have your attendance recognized — not signing the sheet is the same as not attending class. Students missing more than two consecutive lectures, more than four lectures in total, or any lectures during the first two weeks of class, may be dropped from the class.

Lectures will parallel the content in the class textbook. Prior to lecture, students are required to read the assigned textbook through the section indicated on the course schedule. Students are encouraged to write down any questions that occur during reading for discussion in lecture and to make note of definitions and formulas introduced in the text. The lecture will assume students have read the assigned sections.

Laboratory:

Lab session will be held from **11:30 am to 2:20 pm (2 hr 50 min) in room 204 building SC2. Section 01 will meet for lab on Mondays; Section 02 will meet Wednesdays**. Lab attendance is required. You must sign the daily lab attendance sheet to have your attendance recognized — not signing the sheet is the same as not attending class. This is a separate sign in sheet from the lecture attendance sheet. Two or more absences from lab may result in the student being dropped. There are no make-up labs.

Lab session will offer students the opportunity to explore many of the topics presented in the course. Each session will involve a separate, predetermined experiment from the class lab manual. Experiments are listed in the lab schedule. Students must review the experiment prior to class and complete any pre-lab questions or preparations prior to lab. Many lab activities may begin with a pre-lab quiz and require a post lab report. Students unable demonstrate proper preparation may not be allowed to participate in that days lab activity.

Most experiments will be done individually. Regardless of whether the experiment is an individual or group project, each student is individually responsible for recording all experimental data, including printing out their own copy of any spectra or other results produced in the lab. Each student is responsible for submitting their own report for every experiment.

Chemistry labs are dangerous. The chemicals we employ and study are interesting because of their tendency to change one substance into another. In other words, *almost every chemical you work with is either corrosive, toxic, volatile, combustible or otherwise dangerous*. Safety policies required by the college and state will be strictly enforced.

Safety policies include (but are not limited to):

- Safety goggles must be worn at all times in the lab, unless the instructor specifically tells you otherwise.
- Students must wear clothes that adequately cover legs, arms, and feet. No open toed shoes, no shorts, sleeveless shirts, etc.
- No draping or baggy clothing. Long hair must be tied back. Most lab fires start in loose hair or clothing.
- No food or drink is permitted in the lab or in the halls outside the lab. While there is adequate ventilation in the labs for most practices, many foods readily absorb chemical vapors and can become toxic in a lab environment.

A complete list of safety polices will be provided during the first lab period. Students must agree to abide by all safety polices and will be asked to sign a contract to that effect. Students violating that will be asked to leave the lab and may be dropped from the class. At the instructors discretion, points may be removed the from the students safety score instead, as a one time warning.

Reports and other assignments are due at the start of the next lab period following completion of the activity, unless your instructor specifies otherwise. Students may submit lab reports only for activities in which they participated. Missed labs will result in zero points for that activity.

Homework:

Homework problems will be assigned for each chapter. Homework assignments will include questions and calculations similar to those found on the midterms and final exam. Most homework assignments will use the online Mastering Chemistry system. Homework due dates are shown in Mastering Chemistry. You can acquire the required license for Mastering Chemistry when you purchase your lab textbook at the campus book store. If you are using a rented or other copy of the text which does not include a license, a license can also be purchased separate from the text at the campus book store or online at masteringchemistry.com.

Exams & Quizes:

Student understanding of course content will be evaluated with quizzes, mid-term exams (3) and a cumulative final exam. Quizzes will occur at the start of lab period. Midterm exams will be held during lecture period. A state or campus photo ID is required for exams. The Final exam will be provided according to the colleges published final exam schedule. The Final Exam will be from **7:00-9:00 am on Wed 6/22/2016 room 102 building SC1**.

Students are required to bring a scientific calculator, pencils (2), and an eraser to each class and these will be needed for all quizzes and exams. No notes, books, scantron forms, blue books, or other materials are required or will be permitted. There are no make-up exams or quizzes. Exams and quizzes cannot be taken early. A

missed exam or quiz will result in zero points for that assessment. The final exam is comprehensive and is a required assessment. Not taking the final exam will result in a failing grade for the course.

Grading

There is no curve. There is no extra credit. Final class grades are based on a percentage of total points achieved to total points possible. Points are earned for homework, exams, lab experiments (lab report plus any pre-lab quiz), the lab practical and for lab safety. The total points expected to be offered this semester is approximately 700 — broken down as follows.

180 pts	Homework (10 assignments; 17-20 pts each)	26%	
240 pts	Midterm Exams (3 exams; 80 pts each)	34%	Lecture 75%
120 pts	Final Exam (comprehensive; 120 pts)	17%	
80 pts	Lab Reports (8 scores; 10 pts each)	11%	
40 pts	Lab Quizes (8 quizes; 5 pts)	6%	Lab 25%
30 pts	Lab Practical (30 pts)	4%	
10 pts	Lab Safety	1%	
700 pts		100%	

Students who earn 90% or more of the available points will receive an A grade. Students who earn less than 90% but 80% or more of available points will receive a B grade. Students who earn less than 80% but 70% or more of available points will receive a C grade. Students who earn between 70% and 55% will receive a D grade.

Where allowed by campus policy, a "+" prefix will be attached to B and C grades when a student earns points in the top half of each respective range. Students who earn less than 55% of the total possible points or who fail to take the final exam will receive a failing grade for the course.

Resources

Chem Website 30A:

The course syllabus, schedule, topics lists, study guides, worksheets, answer keys and other class resources can be found on the chemistry website for 30A at this URL:

http://chem.ws/30a

Office Hours:

Office hours will be Mon & Wed 10:30 to 11:20 am in the STEM Student Success Center (rm S-43 of bldg S4).

Learning Objectives:

A list of the topics we intend to cover in lecture and lab is provided on the class website, organized by chapter of the class textbook. Specific learning objectives are listed under each topic. Additional topics & objectives may be added during the semester and not all will be tested for on in any given exam or assignment. Students are encouraged to use objectives listed in preparing for lecture, reviewing chapters, getting ready for exams, and determining if this class meets the student's personal goals in studying chemistry.

Student Success Center:

The Student Success Center offers workshops, tutoring, and support for most De Anza classes. This is a unique and valuable resource. The center offers a great environment for study groups to meet. Students are strongly encouraged to explore and make use of the center.

- Math, Science & Technology Resource Center: S43 / 408.864.8683
- Academic Skills Center: ATC 302 / 408.864.8253
- General Subject Tutoring: ATC 304 / 408.864.8682
- Listening and Speaking Center: ATC 313 / 408.864.5385
- Writing and Reading Center: ATC 309 / 408.864.5840

Hours vary by program. See http://www.deanza.edu/studentsuccess for details.

Notices

About transitioning into a collegiate environment.

"We teach rose bushes and ivy where to grow. Infants, toddlers, and children are taught right from wrong and other essential lessons. Useful skills, necessary limits, and entertaining tricks are taught to service animals and pets. Teaching is acting upon another to cause them to know something. Out of necessity teaching is generally done without a subjects knowledge, regardless of their consent, and often against their will.

As children become adults, the educational process for them changes. We teach less and ask students to learn more. Required lessons are slowly replaced with opportunities to explore and seek out whatever knowledge a student may choose to make their own. Eventually teaching ends and young adults graduate from even our highest schools, but opportunities to learn may continue. The collegiate environment is not a school. There are no teachers here and enrollment is not required.

If you take this class, you are doing so of your own free will. You are choosing to attempt to master an extremely challenging subject. The faculty and staff of this college will do our best to assist you in your challenge. But passive attendance and simply doing as you are told will not be sufficient. The knowledge proffered here must be taken up, considered, and made your own. You face a difficult challenge. Success is not guaranteed, regardless of effort or intent.

This college also offers you the benefit of having your knowledge tested, graded and certified if you meet a level of mastery determined by the state and college. This certification is not a reward or payment for effort. It is recognition of learning, of what knowledge you succeed in making your own. It is a worthy achievement that few will accomplish. It is something to be proud of."

Academic Integrity Policy (from the De Anza College Catalog)

"De Anza College is committed to excellence in the pursuit of learning and academic achievement by its students. To further this goal, the college is committed to providing academic standards that are fair and equitable to all students in an atmosphere that fosters integrity on the part of student, staff and faculty alike. The student's responsibility is to perform to the best of his/her potential in all academic endeavors. This responsibility also includes abiding by the rules and regulations set forth by individual faculty members related to preparation and completion of assignments and examinations.

The submission of work that is not the product of a student's personal effort, or work which in some way circumvents the given rules and regulations, will not be tolerated.

The following types of misconduct for which students are subject to disciplinary sanction apply at all times on campus as well as to any off-campus functions sponsored or supervised by the college: cheating, plagiarism or knowingly furnishing false information in the classroom or to a college officer."

The policy in this course is that any student found cheating, plagiarizing, or pursuing any form of academic dishonesty on any assignment will automatically receive zero credit for that assignment. If collusion between students to cheat can be demonstrated, each student will receive this same penalty.

All instances of cheating, plagiarizing, or pursuing any form of academic dishonesty – no matter how small – will be reported to all academic authorities and disciplinary action (including expulsion from the academic program and college) will be fully pursued.

Student Learning Outcomes

Upon successful completion of this course, a student should be able to:

1. Solve stoichiometric problems by applying appropriate molar relationships.
2. Predict the behavior of ideal gasses using Kinetic Molecular Theory.
3. Apply acid-base chemical principles to biological processes.

Course Outline

Ch 1 & 2: Science & Measurement
Solve chemistry problems using significant figures, dimensional analysis, and scientific notation.

- Units of measurement
- Measured numbers and significant figures
- Significant figures in calculations.
- Scientific notation
- Prefixes and equalities
- Writing conversion factors
- Density calculations

Ch 03: Matter & Energy
Examine the relationships between energy and matter.

- Classification of matter
- Energy and nutrition
- Temperature conversions
- Specific heat
- States of matter
- Changes of state

Ch 04: Elements & Atoms
Compare atoms and elements and summarize major properties of elements based on a discussion of the periodic table of elements.

- Elements and symbols
- The periodic table
- Atomic number and mass number
- Isotopes and atomic mass
- Electron energy levels
- Periodic trends

(Select Ch05 topics may be explored after Ch10)

Ch 06: Compounds
Categorize compounds based on their chemical bonding and predict the names of chemical compounds from their formulas and vice versa.

- Octet rule and ions
- Ionic compounds
- Naming and writing ionic formulas
- Polyatomic ions
- Covalent compounds
- Electronegativity and bond polarity
- Shapes and polarity of molecules
- Attractive forces in compounds

Ch 07: Reaction & Stoichiometry
Calculate amounts of reactants and products based on stoichiometric relationships in chemical equations.

- Definition of a mole
- Molar mass
- Chemical and physical changes
- Chemical equations
- Types of reactions
- Oxidation-reduction reactions
- Mole relationships in chemical equations
- Mass calculations for chemical reactions
- Energy in chemical reactions

Ch 08: Gas State
Examine the properties of gases and laws pertaining to gases.

- Gas pressure
- Boyle's law
- Charles's law
- Gay-Lussac's law
- Combined gas law
- Avogadro's law
- Dalton's law

Ch 09: Solutions
Examine the properties of homogenous mixtures and the concept of concentration.

- Electrolytes and non-electrolytes.
- Solubility
- Percent concentration
- Molarity and dilution
- Solutions in chemical reactions
- Colloids and suspensions
- Osmosis and osmotic pressure
- Isotonic, hypertonic, and hypotonic solutions

Ch 10: Acids & Bases
Compare the properties of acids and bases and employ these concepts in biochemical systems.

- Definitions of acids and bases
- Strengths of acids and bases
- Ionization of water
- The pH scale
- Reactions of acids and bases
- Buffers

Ch 05: Radioactivity
Inspect the concepts of nuclear radiation as in pertains to biological systems.

- Natural radioactivity
- Nuclear reactions
- Radiation measurements
- Half-life of a radioisotope
- Medical applications of radioactivity
- Nuclear fission and fusion

DeAnza College

CHEM 30 A • Intro to General, Bio & Organic Chemistry I • FALL 2015 • Prof. DeMello

			Lecture Section **8:30-10:20 AM** **1 hr 50 min**	**Textbook Chapter**	**Lab Section** **11:30-2:20 PM** **2 hr 50 min**
Week 1	Mon	4/4/16	Class Intro / Science of Matter	Ch 01	Lab Section 01 - Check-in / Orientation
	Wed	4/6/16	Measurement	Ch 02	Lab Section 02 - Check-in / Orientation
Week 2	Mon	4/11/16	Properties of Matter	Ch 03	Exp 01: Measurement & Significance
	Wed	4/13/16	Energy	Ch 03	
APR 16 — LAST DAY TO ADD A CLASS					
APR 17 — LAST DAY TO DROP CLASS (WITH REFUND AND NO W)					
Week 3	Mon	4/18/16	Atomic Theory	Ch 04	Exp 02: Conversion Factors
	Wed	4/20/16	**EXAM #1 — Ch 1-3**	Ch 04	
Week 4	Mon	4/25/16	Flavors of the Atom	Ch 04	Exp 03: Density
	Wed	4/27/16	Compounds	Ch 06	
APR 27 — LAST DAY TO REQUEST P/NP					
Week 5	Mon	5/2/16	Molecules	Ch 06	Exp 04: Energy & States of Matter
	Wed	5/4/16	Molar Mass	Ch 07	
Week 6	Mon	5/9/16	Stoichiometry	Ch 07	Exp 05: Compounds & Formulas
	Wed	5/11/16	**EXAM #2 — Ch 4 & 6**	Ch 08	
Week 7	Mon	5/16/16	Pressure	Ch 08	Exp 06: Gas Laws
	Wed	5/18/16	Gas Laws	Ch 08	
Week 8	Mon	5/23/16	Electrolytes	Ch 09	Exp 07: Solution & Electrolytes
	Wed	5/25/16	Concentration	Ch 09	
MAY 27 — LAST DAY TO WITHDRAW FROM CLASS (DROP CLASS WITH "W")					
Week 9	Mon	5/30/16	Memorial Day Holiday — No Clases		
	Wed	6/1/16	**EXAM #3 — 7 & 8**	Ch 10	Review Session — Open to Both Sections
Week 10	Mon	6/6/16	Acids & Bases	Ch 10	Exp 08: Acids & pH
	Wed	6/8/16	Equilibrium	Ch 10	
Week 11	Mon	6/13/16	Radioactivity	Ch 05	Lab Section 01 - Check-out
	Wed	6/15/16	Half-Life	Ch 05	Lab Section 02 - Check-out
FINALS	Wed	6/22/16	Final EXAM (cumulative) Wednesday: 7:00-9:00 a.m.		

Midterm Exams are in first hour of lecture. **There are no make-up Exams, Quizes, or Labs**. **Schedule is subject to change**. (rev 20160302 NCD)