

**CHEMISTRY 42: INTRODUCTORY GENERAL CHEMISTRY**      Spring 2024 Section 7948

**Lecturer:** John C. Branca, PhD

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**Lecture Room:** Lindley STEM Center room 303 TTh 12:00 - 1:30 PM

**Laboratory Room:** Lindley STEM Center room 395

Thursday 9 AM – 12 PM (Dr. Meprathu, lab instructor)

**Office hours location:** Lindley STEM Center room 316    **Office hours:** TTh 9:30 – 11:00 AM

In addition to my office hours, there is a tutorial center (Room 4251 in Doyle Library) that I recommend you utilize, if you have never had chemistry, or if it has been longer than two years.

This syllabus is intended to give the student guidance in what may be covered during the semester, and it will be followed as closely as possible. However, I reserve the right to modify, supplement, and make changes as the course needs arises.

## **OVERVIEW**

This course is a basic introductory chemistry course for students who are preparing for either one year of general chemistry (Chem 3A & Chem 3B) or for Chem 8 (one semester organic chemistry course).

## **STUDENT OBJECTIVES** (as stated in the official Course Outline of Record of SRJC.)

Upon completion of this course, the student will be able to:

1. Solve problems involving fundamental processes in chemistry, including basic atomic theory, structure and bonding, chemical reactions, equilibrium, and the various forms of matter.
2. Demonstrate a basic understanding of the above fundamental processes in chemistry and how the scientific method was used to develop the theories behind these processes.
3. Interpret and utilize the vocabulary and nomenclature that is specific to a basic level of general chemistry.
4. Follow fundamental safety procedures in a lab environment.
5. Perform simple chemical experiments and associated calculations efficiently and accurately.
6. Use fundamental processes in chemistry to investigate phenomena in the applied sciences.
7. Arrange, sort, and graphically represent chemical data.

## **STUDENT LEARNING OUTCOMES** (as stated in the official Course outline of Record of SRJC.)

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

- 1.) Analyze basic quantitative problems in chemistry and apply them to real life situations.
- 2.) Correlate macroscopic properties of matter with its structure and behavior at the atomic scale.
- 3.) Communicate effectively using common chemical conventions and notation.
- 4.) Evaluate available information to plan, perform and interpret basic laboratory experiments.

## TEACHING PHILOSOPHY

I have taught at SRJC for eight years and taught at a four-year university for five years. I have enjoyed working with students with different learning styles. I believe my college chemistry students can experience great success if they follow simple guidelines which are aimed at reaching every type of student learner. Chemistry is all around us and the relevancy of chemistry in our everyday lives is more critical now than ever before. I hope you find the sense of wonder in the world around us and that you can use this knowledge and learning to make better informed decisions in your life. Of course, you'll also need to use these credit hours toward your required graduation requirements.

## GENERAL COURSE POLICIES:

1. **Prerequisites:** Course completion of MATH 155 or two years of high school algebra or equivalent.
2. Lecture and Lab time:  
Section 7948: **Lecture:** LSC 303, Tuesday and Thursday from 12:00 – 1:30 PM  
**Laboratory:** LSC 395, Thursday from 9:00 AM to 12:00 PM (Dr. B. Meprathu is lab instructor)
3. **Required Course Materials:**

**Chemistry 42 Survivor Guide:** A comprehensive set of notes and assignment for success in an introductory chemistry course, available at the SRJC bookstore. Authors: J.P. Crowley and John C. Branca.

**Recommended Text book:** Introductory Chemistry by Russo and Silver

**Scientific or graphing calculator.** No phones or other devices are permitted for use on exams.

**Stitch-bound composition notebook for use as your Laboratory Notebook**

**Laboratory Manual CHEM 42** (available at the SRJC bookstore only). **You will need to purchase protective OSHA approved goggles and lab apron.** In lab, you must wear long pants or other clothing that covers the torso and legs completely and closed toe shoes. Recommendation: See me after class if you are not sure what additional text would be appropriate.

4. **Attendance:** Attendance is important and expected of all students. In fact, attendance is so vital for your student learning that I have incorporated points into your grade based on your daily quizzes. **Please do not miss or be consistently late to class.** The first five minutes are an incredible overview of what you will be learning including demos. **To be fair to all students, there will not be any make-ups on labs or exams for any reason other than a thoroughly explained and correctly dated document from a medical doctor for reasons you are not able to attend lab or exam.** In addition, since this is a lab-based course, missing more than three (3) labs will result in an "F" for the entire course, regardless of the student's performance in the class. This is a department policy. According to SRJC policy, a student who misses more than 10 % of class may be dropped from class at any time by the instructor.

5. **Standards of Conduct:** All students are expected to do their own work. I applaud collaboration, but at the end of the group study, it is the responsibility of the individual to turn in their own work that is not a copy in any sense of other students' work. Cheating, or anything that can be construed as cheating, will result in no credit given, and possibly additional actions. **No inter-student communication is allowed during exams.** Any comments or questions you may have, must be directed toward the instructor by raising your hand and the instructor acknowledging you. You may have drinks, but no food in the classroom. Laboratory experiments will often be done in pairs, but each student is expected to record his or her own data. For example, it is not acceptable for one partner to take notes and the other partner to copy their results at the end of the lab. **Use of cell phones in class and in lab is prohibited.** Refrain from talking while lecturing is taking place because it is a distraction from learning. Laptops are not necessary for this course lectures and should not be used in lecture. **Do not ask me for extra credit.** Instead, perform the appropriate recommended study methods I have stated in class, and which are listed in this syllabus. **Violation of appropriate student behavior may result in my giving the student two class days dismissal with zero credit for what is covered during the dismissal days.** That includes, quizzes, tests, lab reports...
6. **Reading Assignments, Pencast Assignments, and Animation Assignments:** Any additional assignment albeit homework, pencast viewing or animation viewing are an important part of learning in this course. To attain the greatest success in this course, you should always do these recommended assignments **the same day** they are assigned after you have actively reworked your notes.
7. **Homework Assignments:** Chemistry is a vertical subject that is best learned in appropriate chunks. As an instructor, I have gone to great lengths to not overburden you with an inordinate amount of information per lecture. Therefore, it is imperative that you complete the recommended homework assignments **before the next class period** to avoid gaps in understanding. Studying daily interrupts forgetting and increases your ability to retain long-term information and perform more successfully on comprehensive final exams. I will be providing answers to almost all your written assignments, so you can double check your work immediately and know whether you are studying and learning what you need to know for proper preparation for the daily quizzes and the exams. Please note that I use Bloom's Taxonomy for questions on the exam which means I will ask recall questions, application questions, and higher order critical thinking questions. **Cramming will not enable you to perform at a higher level.**
8. **Laboratory:** Laboratory work is designed to give you a hands-on experience with the chemical concepts. Before lab, read the experiment and do a pre-lab write up (use blue or black ink) which includes writing a short 1 -2 sentence purpose of the lab, a brief but lucid write up of the procedures. It also includes answering any pre-lab questions. This is due BOL (at the beginning of the lab). Be sure to arrive on time in appropriate safety-approved dress. No food or drink in the lab. Follow all lab safety rules. Late labs are marked down by 20 % of the value of the lab report. Please do not miss labs because a zero has at a minimum of a 10 % effect on your overall lab grade. Zeroes are given, there are no incomplete (I) grades given for missing labs.

IN OTHER WORDS, TO RECEIVE A PASSING GRADE IN THE COURSE, PASSING WORK MUST BE DONE IN BOTH THE LAB AND LECTURE PORTIONS. IF YOU MISS MORE THAN THREE (3) LABS, YOU WILL NOT PASS THE COURSE.

Be sure to record all your lab work in your lab notebook in pen. It is an important part of the lab experience and is the permanent record of what you have observed and done in the lab. Thus, you may be graded on the quality of maintenance of your lab notebook.

9. **Exams:** There will be four (4) exams and a final comprehensive exam in the course. **No make-up exams will be given. An excused absence from an exam will be granted only if proper documentation is presented upon return to class. This means a thoroughly explained and correctly dated document from a medical doctor for reasons for you not being able to attend lab or exam.** I will discuss make-up only after having received proper documentation from the individual during my office hours. Routine office visits to the doctor do not count as excused. Any exam or quiz assessment taken at different times than stated on the syllabus will be in an alternate version and format.
10. **Accommodations for students with learning disabilities. If you provide the appropriate authorization letter from the Disability Resources Department (DRD) to me during my office hours a week before any exam, you will be given appropriate accommodation as per our discussion.** Accommodations are not automatic. You must first have a meeting with me during office hours to discuss each item (as stated in emails from DRD).
11. **Re-evaluation of Graded Work:** Graded work may be submitted for re-evaluation within one class period from when it was received. In comparing ones graded materials with that of fellow students, any difference must be confirmed by submission of both students' work for consideration. The document in question must be submitted with written detailed rationale for any changes requested. **Based on this rationale, the entire assignment will be thoroughly evaluated. This re-evaluation can result in positive, negative, or no change to the original grade.**
12. **Grading:** Grades will be broken down as follows:  
Factors:

Lab Grade:	25% of total	Can't miss more than 3 lab days or F for class
4 Exams:	50 % of total	
Participation, Assignments & Quizzes:	12.5% of total	
Final Cumulative Exam:	12.5 % of total	

Final course letter grade will correspond to the following percentages: Total points =1,000  
A = 90 % or higher  
B = 78 % - 89 %  
C = 66 % - 77 %  
D = 54 % - 65 %  
F = below 54 %

**Tentative Lab Schedule:**

Week	Date	Lab Title/Topic
1	1/18	Lab Intro/Safety
2	1/25	Calculations and Dimensional Analysis and Locker Check In
3	2/1	Measurements and Density
4	2/8	Separation of a Ternary Mixture
5	2/15	<i>No lab this week</i>
6	2/22	TBD
7	2/29	Ionic and Molecular Compounds
8	3/7	Observing Chemical Reactions
9	3/14	Lab Notebook Reflection (handout – not in lab manual)
10	3/28	Synthesis of Indigo Dye
11	4/4	Atomic Spectra
12	4/11	TBD
13	4/18	Lewis Structures and Molecular Geometry
14	4/25	Ideal Gas Law
15	5/2	Acetic Acid Titration
16	5/9	Electrochemistry and Activity Series
17	5/16	Locker Check/Clean up

**Medical condition regarding missing an exam.**

In general, if you miss an exam, you will receive zero points and no make - up. However, if you have a medical condition that requires you to miss an exam, you need to present written documentation from the doctor on their letterhead that explains the illness that prevented you from coming to class to take the exam and has the date and time you were being treated. If I do not receive the medical note from the physician within two weeks of the absence, it will then be considered an unexcused absence and no make-up points. Routine medical checkups do not count for a reason to miss class.

**TOPICS AND SCOPE:**

- 1) Fundamental principles of the composition of matter (atoms, matter and the mole)
- 2) Physical and chemical changes, measurement and significant figures, unit conversions
- 3) Atomic and molecular structure, nuclear chemistry
- 4) Bonding, naming and oxidation numbers
- 5) formulas, formula writing, molar mass
- 6) Chemical reactions and kinetics
- 7) Solution chemistry and solids, liquids and gases
- 8) Acids, bases, salts, and equilibrium
- 9) pH
- 10) Gas Laws, basic stoichiometry, yield calculations
- 11) Lewis structures and intermolecular forces
- 12) Laboratory theory and techniques

## The Top Reasons students are successful in chemistry.

1. They actively study (re-work notes and pencasts) the same day of lecture for that material [increased memory retention 90 -95 %]. Write their own test/quiz questions from that day's lecture.
2. They are focused during lecture. Their minds are actively thinking/analyzing/reflecting on what is being said and they are writing good notes and putting question marks next to material they may need further clarification.
3. They utilize the instructor provided resources – outline, pencasts, reading assignments, all homework... They focus on these without distractions such as receiving and making phone calls or text message or surfing the internet or doing this in front of a TV. Typically, they study in the same, clutter free, and media free area. Note: However, some music is conducive to studying (music with good tempo and no lyrics) some music is not (in general - music with lyrics).
4. They proceed to do the homework that pertains to the lecture after they have actively studied their notes from that lecture that day.
5. They are in class or at least on time, organized with all their materials needed (notes, paper, pen or pencil, calculator, Survivor Guide, reference sources such as periodic tables).
6. They start memorizing any material the instructor asked them to memorize right away and keep practicing. This helps them to have the basics needed to connect the dots to better understanding and comprehension of the material. They are prepared for daily quizzes.
7. They properly prepare for the final comprehensive exam by doing # 1-6 above, but they also start a more dedicated review on weekends by reworking previous material learned in preparation for the final. The week before they are less stressed than others because they did not procrastinate.
8. They clearly demonstrate with extra paper they used that they re-worked notes, wrote mock tests or practice quiz type questions from notes and pencasts before doing the homework. They only look at the answer key after they have worked the homework problem.

## Tentative SYLLABUS for Spring 2024 CHEM 42 [subject to change as I deem necessary]

Day	Date	Lecture Topics
T	1/16	Introduction, administrative, learning resources, begin Unit 2
Th	1/18	Atoms, matter, mole, significant figures, structure of the atom.....
T	1/23	Atoms, matter, mole, significant figures, structure of the atom.....
Th	1/25	Quantum numbers, Periodic Table...
T	1/30	Atomic and ionic radius size, electronegativity...
Th	2/1	Oxidation numbers, bonding...
T	2/6	Naming, formula writing, precipitation
Th	2/8	Percent composition, molar mass of compounds, empirical formula, molecular formula
T	2/13	<b>Exam 1</b> Content covered from 8/15 – 9/5
Th	2/15	Lewis Structures
T	2/20	Lewis Structures, IMF
Th	2/22	IMF
T	2/27	Balancing Chemical Equations
Th	2/29	Balancing Chemical Equations, Electrochemistry
T	3/5	Electrochemistry, Redox
Th	3/7	Electrochemistry, Redox
T	3/12	Electrochemistry
Th	3/14	<b>Exam 2</b> Cumulative material, but primarily content covered from 9/12 – 10/5
T	3/19	<i>No classes – Spring Break</i>
Th	3/21	<i>No classes – Spring Break</i>
T	3/26	Gas Laws

Th	3/28	Gas Laws, Stoichiometry
T	4/2	Stoichiometry
Th	4/4	Stoichiometry
T	4/9	Acids, Bases & Salts
Th	4/11	Acids, Bases & Salts
T	4/16	Acids, Bases & Salts, pH
Th	4/18	pH
T	4/23	<b>Exam 3</b> Cumulative material, but primarily content covered from 10/12 – 11/7
Th	4/25	Buffers and shifts
T	4/30	Acid/base titration demo and practice
Th	5/2	pH of strong acids and bases
T	5/7	Equilibria and buffer practice
Th	5/9	Applications of equilibria
T	5/14	<b>Exam 4</b> Cumulative material, but primarily content 4/16 – 5/9
Th	5/16	Important tips for taking final exam successfully
Th	5/23	<b>Final Exam</b> Thursday, May 23 from 10:00 AM - 12:45 PM

**For student privacy reasons: I do not give or discuss individual grades via email.**

**Exam dates: Exam # 1: 2/13/2024, Exam # 2: 3/14/2024, Exam # 3: 4/23/2024  
Exam # 4: 5/14/2024 Cumulative Final Exam: 5/23/2024**

**Other Important Dates: 1/28 – last day to drop and be eligible for a refund, 2/4 - Last day to drop without a “W”, 2/25 – last day to opt for P/NP, 3/25 – 3/30 – Midterm progress indicators posted in student portal, 4/21 – last day to drop with a “W”**