

# **CHEM1A: General Chemistry: Section 0285, 0284, 0288: Raola O**

## **Syllabus and Course Information**

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## Faculty Information



**Instructor:** Dr. Orlando E. Raola

**Office Phone:** (707) 527-4660

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## Course Information

**Course:** CHEM 1A General Chemistry

**Sections:** 0284, 0285, 0288

**Credits: 5 Locations:**

Lectures: Bech 1901 Labs discussion: Bech 1910 Labs: Bech 1980

**Prerequisites:** Course Completion of CHEM 42 AND Course Completion of MATH 154 or Course Completion of MATH 155 or higher; OR Course Completion of CHEM 42 AND Qualifying Test Score in Math OR two years of high school algebra or equivalent. Students who think they may be ready for CHEM 1A or CHEM 4A without completing CHEM 42 should take the Chemistry Diagnostic Test AND complete and return the Chemistry Diagnostic Review form to the Student Success and Assessment Services Office. After Chemistry Department's review and approval, the Admission and Records Office will lift prerequisite block and notify student through the portal.

**Web Pages:**

1. This class uses the OWL v. 2 online homework system provided by Cengage. [Follow the instructions here](#) to register for the course homework.
2. Santa Rosa Junior College provides a [Canvas website](#) for all sections of this class. There you can find the most current information, additional materials and grades.

**Meetings**

**Lecture:** Tuesday and Thursday 3:00 - 4:30 pm

**Lab Lecture:**

Tuesday 11:00 am - 12:00 noon (Sect. 0285) Thursday 5:00 pm - 6:00 pm (Section 0288)

Thursday 8:00 am - 9:00 am (Section 0284, Instr: I. Jones)

**Laboratory Exercise:**

Tuesday 12:00 - 3:00 pm (Sect. 0285) Thursday 6:00 pm - 9:00 pm (Section 0288)

Thursday 9:00 am - 12:00 noon (Section 0284, Instr: I. Jones)

**Office hours:**

Tuesday : 9:30 - 11:00 am (Bech 1974)

Wednesday 1:30 pm - 3:00 pm (PC 242)

Thursday 2:00 - 3:00 pm (Bech 1974)

**Materials****Required text:**

- Chemistry Steven S. Zumdahl, Susan A. Zumdahl and Donald J. DeCoste ©2018 10th edition, ISBN 978-1-305-95740-4

**Additional materials (required, available from the campus bookstore):**

- Chem 1A General Chemistry Laboratory Manual, SRJC Chemistry Department.
- Lab apron (rubberized)
- Safety Goggles (Stealth Tlgry C or UVEX S360 Clear)
- Scientific or graphing calculator. Stylus-operated, wireless or web-enabled devices, including cell phone calculators, or QWERTY-keyboard devices (ex. TI-92, Voyage 200) may NOT be used during examinations.

**Additional materials (suggested):**

- Hyperchem 8.0 Modeling software package. The department has a site license, you can purchase a Student version from [hyper.com](http://hyper.com).
- LoggerPro 3.15 program, good tool for data processing. The college has a site license, you can get a copy for personal use from Vernier. [Follow the instructions given in the link](#).

## Grading policy

Activity	% of grade
Online quizzes	10
Homework	10
3 midterm exams	40
Laboratory work	25
Final comprehensive exam	15
TOTAL	100

## Grading scale

% achieved	Letter grade
100 – 89	A
88 – 79	B
78 – 65	C
64 – 50	D
< 50	F

## Important dates and deadlines

What?	When?
Classes begin	August 19, 2019
Last day to add without instructors signature	August 25, 2019
Last day to drop with refund	September 1, 2019
Last day to add with instructors signature	September 8, 2019
Last day to drop without "W"	September 8, 2019
Last day to drop with "W"	November 17, 2019

## Emergency Preparedness

The Sonoma County Junior College District maintains a [plan for emergency preparedness](#) in case of any disaster or critical incident occurring. In case of earthquake, fire or similar emergencies, the Chemistry department building (Bech Hall) should be evacuated. The evacuation assembly area is in front of the East exit, in the lawn between Bech, Shuhaw and Baker halls.

In case of an emergency, contact the District Police at (707) 527-1000

## Attendance policy and due dates for tasks

Since regular attendance promotes success in class work, a student is expected to attend all sessions of each class in which he/she is enrolled. Attendance is the students responsibility. Any student who ceases to attend a class and fails to drop it officially in the Admissions and Records Office may receive a grade of "F".

Any student enrolled in a course who is not present or who has not made prior arrangements with the instructor by the second class roll call will be dropped from the course by the instructor. (From SRJC Catalog)

You are expected to attend all lectures. There are no make-up midterms. If you cannot attend a midterm because of legitimate, unavoidable reasons such as illness, injury, or family emergency, you should contact the instructor before the scheduled time for the test.

You must attend all lab sessions. Completed pre-lab assignments are due at the beginning of the lab. Lab write-ups are due at the end of the next lab session. Late work may be turned in up to one week past due date for half-credit. There are no "make-up labs" scheduled for this semester.

The Sonoma County Junior College District attendance procedure (Policy 8.1.5 and Procedure 8.1.5P ,

Revised February 2014 ) states that students with excessive absences may be dropped from the class. According to the scheduled instruction time in this class, excessive absence would be missing more than 13 hours of combined lecture and/or labs. If for any reason you expect to be absent from the lab more than twice in the semester or if you have a conflict with any of the midterms or final, it is in your best interest to take this class at some other time.

## **Due dates for online assignments**

The online component of this class amounts to 20% of your grade, therefore it is in your best interest to start working on your assignments right away. The problem sets in the homework assignments are due on the day of the midterm corresponding to each group of chapters. Only homework completed before the due date counts for grade. Past the due date you will be able to access the problem sets but no grade will be recorded. You need to complete at least 70% of all the homework problem sets in a timely fashion in order to receive full credit for homework (10% of final grade). Your grade for homework will be then the fraction of that 70% that you complete on time. See instructor if you need further clarification on this matter.

During the semester you will access also online quizzes. The quizzes do not have a deadline, but it is in your best interest to complete a quiz as soon as you have finished the corresponding homework assignment.

## **Academic Integrity**

According to the college's academic integrity policy (Policy 3.11, as revised 7/10/2012), "Sonoma County Junior College District (SCJCD) holds that its primary function is the development of intellectual curiosity, integrity, and accomplishment in an atmosphere that upholds the principles of academic freedom. All members of the academic community - student, faculty, staff, and administrator - must assume responsibility for providing an environment of the highest standards, characterized by a spirit of academic honesty and mutual respect.

Because personal accountability is inherent in an academic community of integrity, this institution will not tolerate or ignore any form of academic dishonesty. Academic dishonesty is regarded as any act of deception, benign or malicious in nature, in the completion of any academic exercise. Examples of academic dishonesty include cheating, plagiarism, collusion, and other academic misconduct."

## **Examination Policy**

There will be three midterm exams and a final. The midterms will consist of questions and problems related to the content of the chapters indicated in the schedule. The final will be a comprehensive exam of all the subject matter covered in the course and will take place on Tuesday, December 17, 1 – 3:45 pm If you have a scheduling conflict for the final, let the instructor know as soon as possible.

## **Accommodations for students with disabilities**

If you need disability-related accommodations for this class, such as a note taker, test taking services, special furniture, use of service animal, etc., please provide the Authorization for Academic Accommodation Authorization (AAA letter) from the Disability Resources Department (DRD) to me as soon as possible. You may also speak with me privately during office hours about your accommodations. If you have not received

authorization from DRD, it is recommended that you contact them directly. DRD Bertolini Student Center, 3rd Floor (East wing).

## Course description

CHEM 1A General Chemistry: General principles of chemistry including atomic theory, bonding, stoichiometry, kinetic-molecular theory, properties of mixtures, the periodic table, and thermodynamics. First semester of a one year program of general chemistry. (from SRJC Catalog)

## Course Contents and Objectives

Upon completion of the course, the student should be able to:

1. Describe matter, its transformations and corresponding energy changes according to prevailing chemical theories.
2. Collect accurate data in the laboratory, and analyze with methods such as graphical and error analysis.
3. Communicate the findings of laboratory work in written laboratory reports.

## Objectives

1. Use dimensional analysis and stoichiometry to solve quantitative chemical problems.
2. Apply atomic theory in describing matter, including chemical nomenclature and physical and chemical processes.
3. Summarize the quantum mechanical structure of the hydrogen atom in light of its emission spectrum, and apply it to many-electron systems.
4. Calculate energy changes in calorimetry and chemical reactions.
5. Use the periodic table of elements to recognize trends and patterns, and to perform calculations.
6. Describe the bonding and shapes of simple compounds with a range of models.
7. Apply kinetic-molecular theory to the behavior of ideal and real gases.
8. Relate intermolecular forces to the physical properties of matter.
9. Calculate the effects of solute concentration on the physical properties of solutions.
10. Use appropriate techniques to obtain accurate and precise measurements in the laboratory.
11. Identify the uncertainty and analyze experimental error associated with measurements.
12. Graph (as appropriate), interpret, and communicate the results of laboratory experiments in writing.
13. Apply chemical principles to real world situations.

## Teacher's Expectations

You are expected to acquire the basic intellectual tools needed for understanding the wide world of chemical interactions from the formation of the simplest molecules in intergalactic space to the inner workings of neurons in the human brain. In order to achieve this, you are expected to come to class every day on time, to read the material suggested in preparation for the lecture, to do all the homework problems assigned, to participate actively in class, to take notes and ask questions, to take all three midterm and the final exam. You are also expected to show respect for your instructor, teaching assistants and staff, to abide by SRJC Student Conduct Code as outlined in the corresponding [policy](#) and [procedure](#), and by the academic integrity [policy](#) and [procedure](#) regarding the individual authorship of all material that you turn in for grade.

## Learning Support

Some laboratory experiments will require the use of personal computers with Microsoft Excel, Microsoft Word, and Vernier Logger Pro programs. The computers are located in each of our Laboratories and in the Mathematics Department Computer Lab. in Shuhaw Hall, in the Multi- Curricular Computer Lab. in Barnett Hall, and in the Computer Lab. on the Petaluma Campus.

**If you have any problem, opinion, issue, comment, suggestion, in short, anything that could improve your experience taking this class, or the experience of your fellow students, or that of your instructor, please do not hesitate to contact the instructor in person, during office hours, after class or at any other time, or use email or the phone.**

## DISCLAIMER

This syllabus sets the basic information you should be aware of in order to succeed in this class, but you should regard it as a “living document”. It is your responsibility to check the course link on the Canvas frequently in order to find out about changes and updates.

## Laboratory

### Grading

Each one of the 13 lab exercises will be graded on a scale 0..5, according to a specific rubric that will be explained during the lab discussion. Your lab grade average will constitute 25% of the course grade.

### Notebook

The laboratory is an essential component of any chemistry course because it provides a situation for learning in which abstract principles may be brought down to the level of comprehension. However, your laboratory experience will not be complete until all data and observations have been properly recorded and reported. Therefore, an accurate record of experimental results is an indispensable part of all scientific research. In many university, government, and industrial laboratories, for example, a notebook must be kept so that it can be admitted as evidence in court should a dispute arise as to the priority of discovery for patent rights. In such a notebook, each page is dated and all significant results are witnessed. Of course, we shall not need to take such elaborate precautions, but our awareness of them may serve to emphasize the fact that a laboratory notebook is not a private diary. Since the material in the notebook is subject to the scrutiny of others, it must be intelligible to anyone conversant with chemistry and in such a format as to leave no doubt as to its reliability and honesty. Therefore, the following format is suggested. Before coming to the laboratory each day, study the assigned experiment until you thoroughly understand the purpose of the experiment. Consult with the instructor prior to this time if necessary to understand all parts of the purpose and procedure. Prepare

your lab notebook by writing on it the purpose of the experiment (only a few sentences). If the lab manual indicates prelab questions, they should be completed before coming to the lab. Use a bound Laboratory Notebook, (quadrille ruled) 8.5 ×11" with numbered pages to record laboratory observations. The Laboratory Notebook may be purchased at the campus bookstore. In the event your notebook is misplaced, its rapid return will be facilitated if you print the following your personal information on the inside cover or the first page of the notebook.

Please note: the first three pages should be reserved for a table of contents. The table will be developed as experiments are completed and added to the table. Use black or blue ink to write in the lab notebook. Ink labeled as archival is recommended. Press firmly in order to create a legible copy. Record all data and observations directly and immediately into the laboratory notebook. When they are written days or even hours after the experiment was conducted, they inevitably are unreliable records of what actually happened in the laboratory. Only the original, unedited record has any scientific significance. Your name and the experiment number should be written at the top of each page since the yellow carbon copies occasionally get shuffled. Each day's entry should be dated even if it appears in the middle of a page. In some cases it is helpful to record the time at which a particular observation was made. Do not record data on any surface other than your lab notebook. It is extremely important that you acquire this habit and compliance with this rule will be strictly enforced. Mistakes should be crossed out, never erased or obliterated. Draw a single line through a ~~mistake~~ mistake and write the correct entry above or beside it, but never on top of it. All deletions should be accompanied by a brief statement of explanation. If considerable material on a page is to be disregarded, cross it out with a large X. In every case the deleted entry must still be legible. Record all data (masses, volumes, temperatures, times, colors, odors, evidence of physical or chemical changes, descriptions of experimental problems, etc.). Since this written record serves as the basis on which your report will be composed outside of the laboratory at a later date, it is important that a generous amount of information be recorded in the notebook. Whenever it is possible, organize the data in tables. At the end of the laboratory period, carefully check your work for omissions or errors. Initial and date the bottom right hand corner of each page, certifying the work as your own and confirming the completion date of the portion of your experimental work. At the completion of an experiment, have the instructor initialize your lab notebook.

## Reports

After the completion of each laboratory session, you must prepare a laboratory report that will be due on the dates detailed in the schedule. There are two types of reports: abbreviated reports and formal reports. Neatness, organization, completeness and accuracy of assignments are expected in both of them. Any work that is sloppy, poorly organized, incomplete or inaccurately done will be returned with a zero grade and/or instructions to rewrite the report. The pages of the report should be stapled in the upper left-hand corner. Do not use folder covers for your report. The data to be included in the abbreviated reports is listed at the end of each lab description in the lab manual. There are samples of the format required for the formal and abbreviated reports in the section's Canvas page.

In the following paragraphs, the major sections of the formal report will be discussed in order of their expected appearance:

**Cover page:** Follow the format suggested. No handwritten changes are accepted; just make the corrections to your word processor file and reprint.

**Purpose:** The purpose or objective of the experiment should be stated concisely in a few compete sentences.

**Procedure:** When following a procedure that is published, cite the reference and describe only significant deviations from or modifications to the procedure. You should not copy the entire procedure into your report, nor should you describe changes in procedure that are prepared and distributed by your instructor. Such modifications should be attached to the report as an addendum. Use subsections as needed to enhance readability.

**Data Numerical:** data should be presented in tables, with headings and clearly labeled rows and columns. Include the units on all measured quantities and detailed observations. Indicate the amount, concentration and identity of the chemicals used. Graphs should be used to illustrate the relationships between the measured quantities. Graphs must have heading, clearly labeled x- and y axis and include the units. Organization and neatness are extremely important.

**Calculations:** Only one sample of each type of calculation performed in obtaining your results needs to be presented. First show the equation to be used, and then insert a typical set of data being certain to identify from which trial it was derived. All final results expressed numerically should be rounded so as to be consistent with the rules for significant figures. Include the units in all calculation examples. Use your word processor equation editor or similar software to insert all the calculations and equations in your report. Present the numerical values corresponding to the results of assigned computations or other significant findings in tabular form. In some instances, results may be shown effectively in graphical form.

**Discussion:** This is the most critical section of the entire report. Begin your discussion with a consideration of the results just presented in the table of results. Relate them to the objectives set forth in the experiment, and demonstrate your understanding of the concepts used in this exercise. Comment on the precision of your work. Compare your results for accuracy with literature values whenever they are available, and comment on the agreement or disagreement. If you use information obtained from other reference materials, acknowledge these sources with footnotes (author, title, page number, edition or volume, publisher, date) at the bottom of the page of your report where the borrowed information is presented. Included in this section should be a detailed and quantitative discussion of the errors likely to be found in the data and the influence these errors had on the final results. Experimental error is that error which remains in spite of the experimenter's best efforts. "Spilling samples, carelessness, misreading the buret, or errors in calculations" are not considered experimental errors. These are mistakes, and they can be eliminated by being more careful and repeating the work. Students are encouraged to consult more advanced textbooks, specific reference books and journal articles containing material related to the experiment being studied. The open stacks and the Reserve Book Desk of the Doyle Library on the SRJC campus, the Sonoma State Library and your instructor's personal reference library are likely sources of information. The class textbook is not considered a reference book and should never be cited in any of your reports. Never use direct quotations from any of the reference sources. Instead, rewrite the relevant statements in your own words as a way of proving your mastery of the concepts and terminology as they apply to your particular experiment. Of course, still be certain to include detailed footnotes when you do this so that anyone could quickly locate the original source of such ideas.

**Conclusions:** You must address specifically which of the purposes of the experiment were accomplished and any failure to accomplish such purposes. Attach all other sheets that may be required for a particular experiment such as charts and/or graphs. Post-laboratory questions Answer the assigned questions and problems for the experiment and attach them to the end of the report.



## Course Schedule

<b>Week</b>	<b>Date</b>	<b>Lecture Topic</b>	<b>Lab Exercise</b>	<b>Assignments Due</b>	<b>Comments</b>
1	8/20/2019	Welcome. Intro Chem 1A. Ch. 1 Chemical Foundations	no lab this week		
	8/22/2019	Ch. 1 (cont.)	"		
2	8/27/2019	Ch. 2 Atoms, Molecules, Ions	Safety Training. Check in.		
	8/29/2019	Ch. 2 (cont.)	"		
3	9/3/19	Ch. 2 (cont.)	Lab # 1 Scientific Measurements and Calculations		
	9/5/19	Ch. 3 Stoichiometry	"		
4	9/10/2019	Ch. 3 (cont.)	Lab # 2 Det. of the Formula of a Hydrate	Report 1	
	9/12/2019	Ch. 3 (cont.)	"	"	
5	9/17/2019	Ch. 4 Types of Chemical Reactions	Lab # 3 Estimation of Avogadro's Constant	Report 2	
	9/19/2019	Ch. 4 (cont.)	"	"	
6	9/24/2019	Review Ch. 1 - 4	Lab # 4 Synthesis of $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$	Report 3	
	9/26/2019	First Midterm Exam	"	Report 3 Homework Set # 1	
7	10/1/2019	Ch. 5 Gases	Lab # 5 Solutions and Conductivity	Report 4 (formal, first draft)	
	10/3/2019	Ch. 5 (cont.)	"	"	

8	10/8/2019	Ch. 6 Thermochemistry	Lab # 6 Estimation of Molar Gas Constant	Report 5	
	10/10/2019	Ch. 6 (cont.)	"	"	
9	10/15/2019	Ch. 7 Atomic Structure and Periodicity	Lab # 7 Heat Capacities	Report 4 (formal) Report 6	
	10/17/2019	Ch. 7 (cont.)	"	"	
10	10/22/2019	Ch. 7 (cont.)	Lab # 8 Hess's Law	Report 7	
	10/24/2019	Ch. 7 (cont.)	"	"	
11	10/29/2019	Review Ch. 5 - 7	Lab # 9 Molar Mass of a Diprotic Acid	Report 8	
	10/31/2019	Second Midterm Exam	"	Homework Set # 2 Report 8	
12	11/5/2019	Ch. 8 Bonding	Lab # 10 Atomic Spectroscopy		
	11/7/2019	Ch. 8 (cont.)	"		
13	11/12/2019	no classes PDA day			
	11/14/2019	Ch. 8 (cont.)	Lab # 11 Lewis Structures and VSEPR	Report 9 (formal) Report 10	
14	11/19/2019	Ch. 9 Covalent Bonding: Orbitals	Lab # 11 Lewis Structures and VSEPR	Report 9 (formal) Report 10	
	11/21/2019	Ch. 9 (cont.)	Lab # 12 Visible Spectroscopy Cr <sup>3+</sup> and Co <sup>2+</sup>	Report 11	
15	11/26/2019	Ch. 9 (cont.)	Lab # 12 Visible Spectroscopy Cr <sup>3+</sup> and Co <sup>2+</sup>	Report 11	
	11/28/2019	Thanksgiving Holiday			

16	12/3/2019	Ch. 10 Intermolecular Forces	Lab # 13 Intermolecular Forces	Report 12 Report 13		
	12/5/2019	Ch. 10 (cont.)	"	"		
17	12/10/2019	Review 8 - 10	Check out			
	12/12/2019	Third Midterm Exam	"	Homework Set # 3		
	Tuesday, 12/19/2019 1 – 3:45 pm	Final Comprehensive Examination				