Chemistry 4 (Chemical Calculations)  

**Instructor:** Dr. Jeffrey Paradis  
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**Email:** jparadis@csus.edu (Please include your full name and course section when emailing me.)  
**Web page:** www.csus.edu/indiv/p/paradisj/index.htm  
**SacCT:** sacct.csus.edu

**Instructor office hours:** MW 9:00 – 9:50 am (SQU 312). Office hours are first-come, first-served and no appointment is needed. Students who need to meet with me and are unable to make scheduled office hours are encouraged to email me to set up an individual appointment.

**Lecture:** Sec 01/80: MWF 8:00 – 8:50 am (MND 1005)

**Required materials:**

1) **Textbook and MasteringChemistry online homework access code:** *Introductory Chemistry; Nivaldo Tro*, custom edition for SacState (in campus bookstore for $147.25). The custom version in the bookstore includes the eight chapters of Tro’s *Introductory Chemistry* textbook that we cover in CHEM 4 and is bundled with an access code for MasteringChemistry online homework system and the access code to Learning Catalytics student response system. You also have the option of buying the e-text and the MasteringChemistry access code directly from the publisher (see class website for details). Several copies of the textbook have also been placed on reserve in the SacState library.

Feel free to buy/rent any edition of Tro’s *Introductory Chemistry* (I’ve seen old editions for < $10 online). If you buy a used textbook, you’ll need to separately purchase access codes to both MasteringChemistry (for $68) and Learning Catalytics (for $15) since they won’t be bundled with the book. Both codes can be purchased separately from the publisher. Regardless of the version of the textbook that you use, everyone in class must register for the 6th edition of the online homework. More information is included below under “On-line Homework” and the registration process will be explained in class.

2) **Learning Catalytics (Student Response System, “Clickers”):** We will be using a cloud-based clicker system that can be run from any portable electronic device that you have that has internet access (phone, laptop, tablet). Access to Learning Catalytics is included in the bundled version of the CHEM 4 textbook available in the bookstore. Students who don’t purchase their textbook through the bookstore will need to purchase access to the Learning Catalytics system through the MasteringChemistry website. As with the adoption of any new technology, there can occasionally be issues, so please be patient as we implement this new system.

3) **Calculator:** Students should bring a non-programmable calculator with log and exponent functions to every lecture and exam period. Programmable calculators and cell phone calculators will not be allowed during quizzes and exams. If you bring a programmable calculator (or none at all) to an exam, you will have to take the exam without a calculator. Alternatively, calculators can be checked out from the chemistry department stockrooms in SQU hall.

4) **Scantrons:** Students will need 4 scantrons (#4521) for taking exams. (Bookstore, 0.30¢ each)

**Catalogue description:** Introductory chemistry for students who plan to major in a scientific field. Appropriate for students desiring to prepare themselves for Chemistry 1A. Emphasizes chemical nomenclature and techniques of chemical problem solving. Topics covered include: dimensional analysis; conversions between measuring units; weight, mole and chemical equations; density; elementary gas laws; heat and temperature; elementary acid and base chemistry; oxidation and reduction; solutions. 3 hours lecture. **Prerequisite:** High school algebra and college algebra; sufficient performance on the college algebra diagnostic test, or equivalent. **Units:** 3.0

**Who should take Chem 4:** The goal of this class is to prepare you to succeed in Chem 1A or Chem 1E. If you need to take Chem 1A/1E for your major and you do not have the required content prerequisite (i.e. a passing grade in high school chemistry or a passing score on the Chem 1A diagnostic exam), then Chem 4 is the place for you! If you are not planning on taking Chem 1A/1E, please talk to me so we can clarify if Chem 4 is an appropriate course based on your academic goals.

Chem 4 is not meant for allied health students, unless they are exercise science or dietetics special majors (since these majors require Chem 1A). Chem 4 is not intended for students who need Chem 6A or Chem 5.
Chemistry 4 (Chemical Calculations)  
Fall 2018: Course Syllabus

Math prerequisites: Chem 4 involves algebraic problem solving, therefore it is important that students have sufficient math background in order to be successful. Students who have not met at least one of the following math prerequisites will be dropped Chem 4:

1) Have passed Math 12 (college algebra, previously Math 11) with a C or better or have taken and passed or be concurrently enrolled in a math class where Math 12 is a prerequisite such as Math 26A/B, Math 29, Math 30 or higher. Stats 1, Math 17 and 24 do not meet the requirements.
2) Have an ALEKS placement score of ≥ 61. You do not need to take the ALEKS PPL if you have passed Math 12 (formerly math 11) or a class where math 12 is prerequisite.
3) NOTE: Students planning on going on to CHEM 1E need to have passed Math 29 (i.e. in Math 30 or Math 30 eligible) or have an ALEKS score ≥ 76.
4) For Fall 2018 semester only, we are also accepting one of the following:
   a. an ALEKS score of 51 – 60 and concurrent enrollment in Math 12.
   b. passing Stat 1 with a C or better and concurrent enrollment in Math 12.

NOTE: Stats 1 alone no longer meets the math requirement. Math 17 and Math 24 do not meet the requirement because its prerequisite is Math 10.

To prove that they have the require Math prerequisite, students may show transcripts or their ALEKS scores. Student transcripts or class schedule must show one of the following:
1) A passing score of C or better in an equivalent Math 12 course from another institution.
2) A passing score of C or better in any math course where Math 12 is a prerequisite, such as Math 26A/B, Math 29...

Learning outcomes: To achieve the goal of preparing you for Chem 1A, you will be required to learn basic principles of chemistry, problem solving techniques, and the basic language and concepts of chemistry. Chem 4 will also provide you with the opportunity to develop study skills and attitudes to become more successful in future science classes. By the end of the semester, successful students will be able to...

- develop strong study skills that will serve as the foundation for success in future science courses.
- name and write the chemical formulae of ionic compounds, molecular compounds, acids, and bases.
- appropriately use significant figures, rounding, and scientific notation in measurements and calculations.
- convey an understanding of dimensional analysis, unit conversion, the metric system, and the general importance of the use of units in chemistry.
- write balanced chemical equations for various types of reactions, predict in what physical states the products and reactants will be found, and write ionic and net ionic equations.
- perform calculations related to the mole including molar mass calculations, mole-mole calculations, mole-mass calculations, mass-mass calculations, and other stoichiometric calculations.
- solve chemically related word problems.

Grading: Because the focus of Chem 4 is on content mastery and because competition for grades goes against the philosophy of team-work as practiced in this class, there will be no curving of grades. Other than what I have built into the homework, there is no extra credit given in this course. My goal is always to write exams that are fair to all students and that provide you with the opportunity to show how well you understand the material we have been learning. Your overall course grade will be rounded to the tenths place and will be based on the % format below. Note: A grade of “C” or better is required to move on to Chem 1A/1E.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
</tr>
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<tbody>
<tr>
<td>F</td>
<td>0.0 – 59.9%</td>
</tr>
<tr>
<td>D</td>
<td>60.0 – 69.9%</td>
</tr>
<tr>
<td>C-</td>
<td>70.0 – 72.9%</td>
</tr>
<tr>
<td>C</td>
<td>73.0 – 76.9%</td>
</tr>
<tr>
<td>C+</td>
<td>77.0 – 79.9%</td>
</tr>
<tr>
<td>B-</td>
<td>80.0 – 82.9%</td>
</tr>
<tr>
<td>B</td>
<td>83.0 – 86.9%</td>
</tr>
<tr>
<td>B+</td>
<td>87.0 – 89.9%</td>
</tr>
<tr>
<td>A-</td>
<td>90.0 – 92.9%</td>
</tr>
<tr>
<td>A</td>
<td>93.0 – 100.0%</td>
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The above grade cutoffs are firm. For example, an 89.94% is not considered to be an "A-" because when rounded to the tenths place it would be 89.9%. An 89.95% or above, however, would round to 90.0% and would earn an "A-". The only adjustment to course grades will be if a student completes the Student Success Contract (see below). Student grade percentages will be based on the breakdown of points on the next page:
Updated homework and clicker grades will be posted before each exam on Canvas. Exam grades will be posted later on the day that you take them. You are automatically enrolled in the Canvas course and can login using your SacLink "user name" and "password". See the class website for a direct link to the Canvas page.

**Key dates:** The following are important dates in Chem 4. Please mark them on your calendar.

<table>
<thead>
<tr>
<th>No class</th>
<th>M 9/3 (Labor Day); M 11/12 (Veteran's Day); W 11/21 – F 11/23 (Thanksgiving)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exam dates</td>
<td>W 9/26 (Exam #1); W 10/24 (Exam #2); F 11/30 (Exam #3)</td>
</tr>
<tr>
<td>Final exam</td>
<td>M 12/10, 8:00 – 10:00 am</td>
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**On-line homework (MasteringChemistry):** Starting the first day of class, homework is assigned daily throughout the semester and is due 1 hour before the start of the next class. The on-line homework system MasteringChemistry will be used for this course. The points for your homework will be normalized to a total of 50 points at the end of the semester. For example, if you earn a total of 250 out of a possible 280 points (i.e. 89.3%), your homework grade would be (250/280) x 50 = 44.6 pts. Remember, 50 points can make the difference of a +/- grade. There will be extra credit questions on several of the homework assignments.

In order to keep the amount of homework to a minimum I have divided each assignment into “optional” and “required”. Most of the “required” questions are worth 1 point each, though some are worth 2 or 3 points if they are expected to take you longer to complete. If you are able to do all the “required” problems without any trouble (earning at least 80% of the points) then I don’t want to give you a tedious amount of homework to do. However, if you are struggling with the “required” problems, the “optional” problems are an important resource. It is going to be up to you to determine if you are in good shape and, if not, to put in the extra time to master the material. Additional uses of the “optional” problems include: (1) try them before you do the “required” problems to make sure you understand the concepts, (2) go back to them if you are starting to lose points on the “required” problems, or (3) save them for review before you take an exam.

All homework is available for review for the entire semester; so you can go back and redo homework for practice (though it won’t change your grade). To get as much as possible out of your homework, it is important not to treat it as busy-work. Students who “request solutions” without putting effort into the question or who try to guess the answer are wasting the opportunity to learn from the homework and most likely will not end up earning the 80% required for the Student Success Contract.

A link to MasteringChemistry can be found on our class website. I will show you how to register during the first day of class; you should complete your registration by the end of the first week of class. Students must use their official university name when registering for their homework. If you have recently gotten married or have a hyphenated name, be sure to check your MySacState to ensure you are registering with your official university registered name. It is also crucial that you enroll in the correct section of MasteringChemistry.

**Clickers (Learning Catalytics):** In an effort to maximize student attendance and engagement in class as well as to encourage retention of the course material, we will be using the cloud-based, student response system, Learning Catalytics in Chem 4. Access may be purchased at the bookstore (bundled with the textbook) or through the MasteringChemistry website. I will show you how to register during the second day of class and then you should complete your registration by the start of week two. Students can use any internet-enabled electronic device (phone, laptop, tablet) to access and vote through Learning Catalytics.

Each day there will be several questions presented throughout lecture. There will be questions that review the previous day’s material (to motivate you to review previous lectures), questions that cover the assigned textbook reading for that day (to motivate you to complete the assigned reading before lecture), and questions that test your comprehension of topics as they are being discussed (to motivate you to pay attention in class). Sometimes you will be asked to work alone on your clicker questions, but usually you will be allowed to work with your classmates. Points for clicker questions are: 0 points if you are absent; 1 point
for each wrong answer; 2 points for each correct answer. On random days, we will have “double clicker points” with the following: 0 points if you are absent; 3 points for each wrong answer; 4 points for each correct answer. The points for your clicker responses will be normalized to a total of 50 points at the end of the semester. For example, if you earn a total of 110 out of a possible 130 points (i.e. 84.6%), your clicker grade would be (110/130) x 50 = 42.3 pts. If you forget your electronic device then you can see me after class in order to get 1 point for each question.

If a student is found voting with another student’s Learning Catalytics account when that student is not present (in order to make it appear that the student is present), both students will break their Student Success Contract and will lose all their clicker points for the semester. Also, students should not be using Learning Catalytics to vote on questions unless they are present in class. If a student is found to be voting on questions when they are not present, they will break their Student Success Contract and lose all their clicker points for the semester. It is your responsibility to remember to bring your clicker to class each day. In terms of the Student Success Contract, students who arrive late to class may be counted as absent for that day if two or more clicker questions have been asked by the time they arrive.

The use of Learning Catalytics clickers with Chem 4 is new and some problems may occur. Please be flexible and understanding as we implement this new technology.

**Missed assignments:** Absolutely NO make-up exams will be given. Unless you provide a documented excuse, missed clicker points and exams will count as 0 pts. If you are excused, the due date of your homework will be negotiated (typically due one class period after you return to class). Excused exams will be replaced with the % grade you earn on your final exam. Students who lose clicker points due to excused absences will have the opportunity to earn those points back. All excuses MUST be documented and approved. To obtain an excuse, email me at jparadis@csus.edu and also provide me with documentation (for example, a doctor’s note, a note from the coach of your University sports team, funeral notice, or a court summons). Planned family vacations, transportation or child care emergencies, oversleeping and similar issues will not be counted as excused absences.

I appreciate that sometimes life, work, and other classes can get in the way of our learning goals in CHEM 4. It is important that you build a strong foundation though, so please feel that you can keep me posted if you get behind and need help catching up. Because the most important thing is that you learn the material, I am open to having students email me if they need an occasional extension on their homework.

**Attendance:** Although there is no direct grade given for attendance, missing class (or even being a few minutes late) can impact on your grade. Students who skip lecture miss out on clicker points and important information that is covered only in lecture. In addition, lectures are used to help you focus your studies so that you know what I think is the most important material that you will be held accountable for on exams.

Consider the Chem 4 data from a few semesters ago (see table below). The first column shows the number of classes a student missed during the whole semester. The second column shows what % of students with that attendance record passed the class. Many students might think that missing just 3 classes a semester is no big deal, but notice that only 50% of the students missing 3-5 classes ended up passing the class! Of the students missing 6 or more classes? Only 17% of them passed! Of course, perfect attendance doesn’t guarantee that you’ll pass the class (6.1% students with perfect attendance didn’t pass), but it is an important first step to success in Chem 4.

<table>
<thead>
<tr>
<th># of missed classes</th>
<th>% who passed the course</th>
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</thead>
<tbody>
<tr>
<td>0</td>
<td>93.9 %</td>
</tr>
<tr>
<td>1-2</td>
<td>73.1 %</td>
</tr>
<tr>
<td>3-5</td>
<td>50.0 %</td>
</tr>
<tr>
<td>≥ 6</td>
<td>17.0 %</td>
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</tbody>
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**Student work load and resources:** To be successful in Chem 4, you will likely need to schedule 6-9 hours of time outside of class each week. I recommend that you schedule regular study time on your weekly calendar. To help you budget your time, the Chem 4 website details the amount of time that each assignment and reading is expected to take; you’ll see that after you leave most lectures, you’ll have between 2-3 hours of work that you’ll need to complete before coming to the next class. In addition to good
time management skills, students who do well in Chem 4 also work hard to develop strong study skills. Additional study skill information is available at: www.csus.edu/indiv/p/paradisj/StudySkills.htm

Although Chem 4 requires a lot of work, you are all capable of passing if you put in the time and take advantage of the available resources. In addition to the usual instructor office hours, we have recently added some great resources that involve having you work with trained peer facilitator. (see next page)

1) PAL (peer assisted learning) sessions: PALs are 1 unit activity sessions where students work in small groups on worksheets that I have written. Each PAL is led by a trained peer facilitator. The PAL facilitators are not tutors, but they are students who passed Chem 4 and are there to help you figure out how to be successful in the class. Students enrolled in a PAL are expected to print out the PAL worksheets from the Chem 4 website and bring them to each PAL session. Time and locations of all the PALs will be posted on the Chem 4 website. To get added to a PAL, students should show up to one of the PALs during the first week and leave their name and student ID number with the PAL facilitator and he/she will add you. Spaces in PALs are limited to 15 and are filled on a first-come, first-served basis.

2) PAL leader office hours: The PAL facilitators also have weekly office hours in SQU 248 for additional help. I will be posting PAL leader office hours on our class website as soon as they are finalized. All students, not just those in a PAL, are encouraged to take advantage of PAL leader office hours.

3) Commit to Study mentoring: The Commit to Study program provides students with the opportunity to be paired up to work one-on-one with a peer mentor who has been trained to help students develop stronger study skills. If you would like to meet with a Commit to Study peer mentor, please email Jeff and he will refer you to the Commit to Study office (SQU 320). Our Chem 4 website also has a direct link to the Commit to Study website where you can book a meeting with a peer mentor to help you with your study skills.

4) Emailing Jeff for help: Include your full name and course section when emailing me. For homework questions, please cut and paste the question from MasteringChemistry so I know exactly which question you are referring to. Also show all of your work so I can see where you went wrong; either type your work in your email or take a picture/scan your handwritten work and attach it to your email.

**Student Success Contract:** Because having strong study skills is fundamental to student success in Chem 4 and in future science courses, I have developed an optional Student Success Contract in which students can take part. To meet the conditions of the contract, students must complete the following criteria:

1) Miss no more than 2 classes all semester. Anyone missing more than 2 classes must document their absences (for example, with a doctor’s note) in order to keep the contract. Because non-excused emergencies can happen (like car trouble or illness without a doctor’s note), it is recommended that you save your absences in case you really need them! Students who arrive late to class may be counted as absent for that day if two or more clicker questions have been asked by the time they arrive.
2) Turn in completed exam corrections by their due dates. Exam corrections must follow the provided template. Directions can be found at: www.csus.edu/indiv/p/paradisj/studyskills.htm
3) Earn at least 80% (i.e. ≥ 40/50 points) of the homework points for the overall semester.
4) Earn at least 70% (i.e. ≥ 140/200 points) on the final exam.

Students who successfully complete the above conditions will:

1) Increase their end of semester letter grade by one step (for example, a “C-” becomes a “C” or a “B+” becomes an “A-” on your transcript). Note: an “F” will only become a “D” if a student earns ≥ 50.0% overall in the course.

To get the most out of the Student Success Contract, it is important that you don’t treat the conditions like busy-work to “just get through”, but rather consider each component as an important learning experience to get as much out of as possible. Because I feel that the Student Success Contract is so generous, I am very strict with enforcing the criteria. No late materials or absences (beyond the 2 allowed) will be accepted without written documentation. Students who have an excused absence for one of the exams, must turn in worked answers for all of the exam questions (once the exam is posted on line), in place of their normal exam corrections. Please see me if you have questions about this.
Professionalism: Students disrupting class (including those who are talking while I am talking and those whose cell phones go off) may be asked to leave. Students coming to class late or those who will need to leave early are asked to sit near one of the doors. No photographing or recording is allowed during class without my permission.

Cheating and plagiarism: Students found copying or assisting other students in copying any graded class assignments will be subject to punishment. Punishment may range from receiving a zero on the assignment to expulsion from the University. Please refer to the CSUS statement on Academic honesty.

Students with disabilities: I am happy to accommodate your documented needs, so please discuss them with me after class or during my office hours early in the semester. Please refer to the following website for more information on University services: www.csus.edu/sswd

Information regarding course repeats: The Academic Repeat Policy and the Financial Aid Repeat Policy are separate. Although the Academic Repeat Policy allows students to repeat courses in which they received a C- or lower, the Financial Aid Repeat Policy is based on whether students receive passing grades in courses. Passing grades include A, B, C, D and all associated "+" or "-" as well as a grade of CR (Credit). In addition, the Academic Repeat Policy allows a student to repeat a course two times in an attempt to pass it (a total of three attempts); however, the units associated with the repeated course will only count toward the student's financial aid eligibility twice. For more information: www.csus.edu/student/CourseRepeatUpdate

Dropping Chem 4: The student ultimately has the responsibility of dropping courses.

- Students who do not officially withdraw from the course by the prescribed deadline and also fail to complete course requirements (so that it is not possible for normal evaluation of academic performance) will receive a final grade of either “WU” (Withdrawal Unauthorized) or “F”. For purposes of grade point average, a “WU” is equivalent to an “F”. “WU” grades will not be assigned to students after Exam #2. That means that if you take Exam #2, you will not be given a WU and will end up with the grade you earn (even if you skip all assignments/classes after that point).

- A grade of incomplete, will only be assigned to students with a passing grade who have completed at least ¾ of the course. Students will have a maximum of 1 year to make up the missing work (to be averaged with the work already completed during the semester) or the grade will become an “F”.

The instructor reserves the right to make changes to the syllabus when deemed necessary for the success of the class.