

General Chemistry I - CHEM 1311 Syllabus**College of Arts & Sciences****Instructor: Sambuddha Banerjee, Ph. D.****Email:** sbanerjee@tamusa.edu**Office: STEM 311Y****Class Hours:** Tuesday, Thursday (9.30-10.45 am)**Class location:** STEM 161**Office Hours: Monday 9.30-11.30 am, Wednesday 11 am-1 pm** (Book an appointment using your Outlook calendar. [HERE](#) is a link that will show you how)

Some guidelines for being on track with this class

- a) Come to class, the recitation sessions, and the SI sessions regularly. I understand that things happen, and you might miss one or two sessions, but DO NOT make it a habit.
- b) Use the textbook as your study guide. The textbook is interactive and has videos and other resources (like translation to other languages) to help you learn.
- c) Talk to your instructor when you miss a class/recitation/assignment, irrespective of if you missed it for excused or unexcused reasons.
- d) Attend office hours from the start of the semester. Studies show that attending office hours/study sessions just before the exams is not effective.
- e) Study regularly. The exit slips are designed to help you give you a structure for studying regularly.

Required Course Materials

Access code: Your homework and e-text subscription is included with this course. In order to obtain your access code, follow the BryteWave link in blackboard. Alternatively, follow the instructions sent by the bookstore (search for BryteWave in your inbox).

Homework: Mastering Chemistry is required. To access it through blackboard, go to the homework folder. Click on the first assignment, which will prompt you to link an account to your blackboard course.

Log in or create an account if it is the first time using Mastering. Use the access code described above. If there are any issues obtaining your access code, you can get a 2-week temporary access while we sort your code with the bookstore.

To see your points once you start working on problems, click on mastering scores in the blackboard homework folder

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Textbook: Chemistry, A Molecular Approach by Nivaldo J. Tro (6th ed). The e-book is included with this course. To access your book, please link your account to blackboard as explained above first. Then click on the textbook folder in blackboard followed by Pearson etext

Calculator: You need a scientific calculator for this course. Any non-graphing calculator is acceptable. If you are unfamiliar with scientific calculators, [HERE](#) is a short video tutorial on how to use it. I am also happy to help during the recitation sessions.

Notebook sheets/Notebook: Students MUST take notes and actively engage during the class session. The instructor might ask students to turn in handwritten class notes for assessments.

Course Description

The first semester of a two semester sequence, this course introduces many chemical concepts, problems, and calculations. Principles and quantitative relationships in chemistry that will be introduced include stoichiometry, chemical equilibrium, acid-base chemistry, thermochemistry, rates and mechanisms of reactions, changes of state, solution behavior, atomic structure, periodic relationships, and chemical bonding. **Prerequisite:** MATH 1314 or equivalent. **Corequisite:** CHEM 1111 (Laboratory).

Learning Objectives

By the end of this course students will be able to:

1. Identify the fundamental units of the SI system, perform dimensional analysis calculations, gain conceptual understanding of the mole, explain how matter is organized and classified as well as distinguish between kinetic and potential energy.
2. Apply the scientific method as a strategy to solve problems through science and creativity.
3. Define and explain Dalton's atomic theory and describe the structure of an atom.
4. Describe and explain the properties of electromagnetic radiation, the photoelectric effect, the Bohr model and use the quantum mechanical model to describe the structure of an atom.

5. Utilize the periodic table to make predictions as to how elements react to form matter based on their properties. In addition, the student will be able to use the Aufbau principle and Hund's rule to determine the electronic configuration of an atom.
6. Demonstrate their understanding of basic facts, principles, theories, and methods of modern science as well as use general chemistry concepts and theories to solve complex multi-variable chemical problems.
7. Describe the fundamental properties of chemical bonds, perform lattice energy calculations, draw Lewis structures with possible resonance structures and name simple compounds.
8. Utilize the VSEPR model to predict molecular structure the properties of a molecule, identify molecular orbitals according to shape and energy, calculate bond order, predict paramagnetism and use both the molecular orbital and delocalized electron models to describe resonance in molecules.
9. Calculate percent composition, determine molecular and empirical formulas, balance chemical reactions, apply stoichiometry to solve limiting reactant problems and calculate percent yield.
10. Identify weak, strong and nonelectrolytes, calculate the amount of mass product formed in precipitation reactions, determine the amount of titrant required for a neutralization reaction, and specifically describe how to determine the amount of analyte using volumetric analysis and balance redox reactions.
11. Perform enthalpy change calculations for a given reaction, utilize Hess law to determine the enthalpy formation for a compound, define and use heat capacity to perform calorimetry calculations, identify exothermic and endothermic reaction and predict how temperature affects such reactions.
12. Perform calculations using the ideal gas law and describe why chemists modify the ideal gas equation to describe real gas behavior.

Class policies

Communication: The best way to contact me is through email, sbanerjee@tamusa.edu. All correspondence between professors and students must occur via university email. You must have Jaguar email account ready and working. If it is not working, contact the help desk at sahelp@tamusa.tamus.edu or at 210-784-4357. Students are expected to access Blackboard for updates on the course, announcements and other course materials. All students are strongly encouraged to come to office hours or make appointments at other times to discuss course material and answer questions.

**Emails should be professional (I am happy to explain this, but professional emails are NOT text messages), clear, and preferably sent within working hours (8 am-6 pm). If you do not hear back in 48 hours, please reach back again. **

Attendance Policy: All students are expected to attend lectures and actively engage in class discussion, activities, and online assignments. Attendance will be monitored and can be used to make decisions on cases of borderline grades. If you are absent, you are responsible for the material covered and are expected to get notes, announcements and any other material from another student in the class.

Absences will be excused if due to illness (medical excuse), death of a close family member, religious holiday, official university activity or cancellation of classes, military duties, pregnancy & related conditions and participation in legal proceedings. Students are STILL REQUIRED TO MAKEUP THE MISSED WORK DUE TO EXCUSED ABSENCE WITHIN SEVEN CALENDAR DAYS AFTER DISCUSSING WITH THE INSTRUCTOR.

Excessive absences (more than 3) and tardiness will not be tolerated. Accumulation of more than three unexcused absences can result in the student being dropped from the class or in one letter lecture grade decreased at the discretion of the instructor.

Conduct and Behavior: As an instructor my goal is to create a safe and engaging learning environment for ALL. Class disruptions are unacceptable, asking questions to clarify material during class does not qualify as a disruption and is encouraged. Disruption of the learning environment means creating a situation where other students cannot learn and if such situations arise, the instructor reserves the right to ask the disruptive party to leave the classroom. This includes but is not limited to talking loudly about things not discussed in the class, physical or verbal hostility, texting, use of headphone/listening to music during the class, actively disrupting others or the instructor from learning/teaching.

Use of electronic devices during the class session is not allowed unless instructed by the instructor. During the exams all electronic and transmitting devices MUST be placed in the silent mode and stored in the bag.

Academic misconduct and attempts to cheat during the exam will be pursued according to Texas A&M-San Antonio code of conduct policy. If you need to use the restroom, ask and leave all electronic devices with the instructor.

Visitors. Only students enrolled in the course are allowed in the classroom. No visitors are allowed.

IMPORTANT. Each student receives this information during the first lecture. It is your responsibility to read this material and be familiar with the course content, procedures, and grading.

Grading

Your final grade will be assigned based on your performance in five areas: (1) three 100 points exams, (2) homework assignment within Mastering Chemistry, (3) a final examination, (4) Exit slip activities, and (5) recitation attendance. **Any extra credit opportunities (if any) will be announced in class during the semester.**

| Item | Total points |
|-----------------------|--------------|
| 3 hourly exams | 300 points |
| Final | 100 points |
| Exit slip activities | 150 points |
| Homework | 150 points |
| Recitation attendance | 100 points |
| Total | 800 points |

$$\% \text{ of Total Points} : \left(\frac{\text{You total points}}{800} \right) \times 100$$

The letter grades will be assigned based on the following distribution:

| Letter Grades: | A | B | C | D | E |
|-------------------|--------------|----------------|----------------|----------------|------------|
| % of Total Points | 90.00 - 100% | 80.00 - 89.99% | 70.00 - 79.99% | 60.00 - 69.99% | 0 - 59.99% |

Exams

If you miss a test due to illness, you must provide a doctor's note to the dean of students and notify the instructor immediately, within 24 hrs of the test date. You are allowed **one** make-up test due to illness.

Tests will be taken in-person when you are able to return to campus. Should you miss an exam for any other reason, the final exam score will be used for your missed exam. Should you miss two or more exams via an unexcused absence a grade of FA will be assigned. Should you have a question concerning the way that your examination was graded, or if you think that there was an error in calculating the exam score, then it is your responsibility to bring the matter to the attention of the instructor when you pick up your test. Corrections will not be granted after you leave the office. No extra

examination time will be given; the only time that the students have to work on the examination is the allotted time.

Homework

All homework will be assigned via Mastering chemistry which is available through blackboard. I encourage you to work on a few problems after every class to reinforce the lecture material. If you miss a homework deadline due to university excused absence, you MUST contact your instructor within 48 hours of the missed homework to plan an extension. After that no extension will be afforded.

Tentative lecture Schedule*

**Anything in double star will be discussed throughout the semester

| Day | Topic | Book chapter | Slide number |
|-----|--|-------------------------|---------------|
| 1 | Introduction, Matter and its classification | Chapter 1 | 1-43 |
| 2 | Energy, unit, introduction to **unit conversion**, errors**significant figures**, | Chapter 1 | 44-86 |
| 3 | Interpretation of data and graphs, Dalton's atomic theory, Discovery of nucleus, modern structure of atoms, Isotopes, isotopic mass | Chapter 1, Chapter 2 | 88-94 1-58 |
| 4 | Elements, compounds, ionic and covalent compounds, molecular formula, **mol**, **Avogadro number** | Chapter 2 | 59-104 |
| 5 | Ionic and molecular compounds, **Naming ionic & covalent compounds** | Chapter 3 | 1-77 |
| 6 | **Formula mass, empirical formula, %composition, combustion analysis | Chapter 3 | 77-108 |
| 7 | Writing balanced reaction (atom balancing), reaction stoichiometry, Limiting reagent, % yield, experimental yield, theoretical yield | Chapter 4 | 1-52 |
| 8 | Limiting reagent, % yield, experimental yield, theoretical yield | Chapter 4 | 1-52 |
| 9 | Test-1 | Chapters1-4 | |
| 10 | Solution, molarity, electrolyte, Solubility rule and different reactions | Chapter 5 | 1-56 |
| 11 | Acid base reaction, redox reaction | Chapter 5 | 57-93 |

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|---------|---|------------|--------|
| 12 | Ideal gas laws, partial pressure, mole fraction | Chapter 6 | 1-103 |
| 13 & 14 | Introduction to energy, state function, path function, first law, heat capacity | Chapter 7 | 1-40 |
| 15 | Test-2 | | |
| 16 | Energy transfer, enthalpy, calorimetry, Hess's Law | Chapter 7 | 41-93 |
| 17 | Wave properties of light, photoelectric effect | Chapter 8 | 1-35 |
| 18 | Atomic spectroscopy, Bohr's model | Chapter 8 | 36-60 |
| 19 & 20 | Quantum numbers, orbitals, shapes of orbitals | Chapter 8 | 61-96 |
| 21 & 22 | Effective nuclear charge, electron configuration of atoms and ions | Chapter 9 | 1-51 |
| 23 & 24 | Periodic trends | Chapter 9 | 52-102 |
| 25 | Lewis structure (ionic and covalent compounds), formal charge, resonance | Chapter 10 | |
| 26 | Hybridization, VSEPR | Chapter 10 | |
| 27 | Molecular shape and polarity | Chapter 11 | |
| 28 & 29 | Molecular shape and molecular property | Chapter 11 | |

* Dates, topics and exam coverage are tentative. The instructor reserves the right to make changes as deemed necessary.

Chemistry tutor: Tutoring can be obtained at the academic learning center. To book an appointment, go to blackboard and click on *brainfuse live tutoring*. Under tutor match, select *science* as a *topic* and CHEM 1311 under subject. Click *Schedule* and choose your preferred date and time.

Visit the academic learning center website for more information: <https://www.tamusa.edu/student-resources/Academic-Success-Center/tutoring-services/index.html>

Follow the academic learning center on Instagram: @tamusa_alc

Student Misconduct. Appropriate conduct is essential to the effective functioning of the University. University policy defines unacceptable conduct, both academic and non-academic misconduct, and penalties for such behavior in The Student Handbook and The Student Code of Conduct.

Academic Misconduct Policy. Students at Texas A&M University-San Antonio are expected to adhere to the highest standards of academic honesty and integrity. Academic misconduct for which a student

is subject to penalty includes cheating, plagiarism, fabrication, multiple submissions, misrepresentation of academic records, facilitating academic dishonesty, unfair advantage, violating known safety requirements and ethical misconduct. This includes holding other students to the same standards and reporting any incidents of alleged violation of the honesty policy to the instructor involved or, if necessary, to the appropriate academic department head. All students are responsible for being familiar with the Academic Misconduct Policy, which may be found in the Texas A&M University-San Antonio Student Handbook.

University policy prescribes serious consequences for acts of academic misconduct including, but not limited to, a grade of 'F' on the particular paper or assignment or a failing grade in the course. Also, a referral may be issued to the Office of Student Rights and Responsibilities where the sanctions can vary up to possible expulsion from the University. Considering the potential consequences of academic misconduct, it is obviously in students' best interests to avoid even the appearance of such behavior. If you are ever unclear whether a specific act might constitute academic misconduct, please contact your instructor for an assessment of the situation.

All written assignments must be worked on individually. All student term papers, and other written assignments are subject to analysis by anti-plagiarism software. Plagiarism will result in a grade of zero for the assignment.

Key dates

| | |
|---------------------|--|
| Aug 25 | First day of classes |
| September 10 | Census Day |
| Nov 14 | Last day to drop with an automatic W |
| Nov 25 | Last day to withdraw from the university |
| Dec 4 | Last day of scheduled classes |
| Dec 6-12 | Final exams |
| Dec 17 Noon | Grades due |

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|---------------------|------------------------|
| Aug 25 | First day of classes |
| September 10 | Census Day |
| Final Exam | 12/9/25, 12.00-1.50 pm |

The complete academic calendar is available online:

<https://www.tamusa.edu/academics/academic-calendar/current-year/fall-2025.html>