TENNESSEE STATE UNIVERSITY

**COLLEGE OF LIFE AND PHYSICAL SCIENCES**

**DEPARTMENT OF CHEMISTRY**

**CHEM 1110-01: GENERAL CHEMISTRY I**

# SEMESTER: Fall 2019 INSTRUCTOR: Dr. Sujata Guha

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# OFFICE: Boswell 214 OFFICE HOURS: M(11:30-1:30); W(11:30-2:30)

1. **CATALOG COURSE DESCRIPTION:** Three (3) credit hours. A comprehensive study of chemical principles designed for students pursuing a career in chemistry or other scientific areas. Material to be covered includes introduction to metric system and scientific notation, structure of matter, nomenclature, composition and reaction stoichiometry, types of chemical reactions, atomic structure, chemical bonding, reactions in aqueous solutions, gases and kinetic molecular theory, and thermochemistry.

# COURSE OBJECTIVE: Upon successful completion of General Chemistry I, a student will develop the analytical and critical thinking skills necessary to solve chemical problems, with special emphasis on measurements, nomenclature, stoichiometry, and basic molecular structure.

1. **STUDENT LEARNING OUTCOMES**
   1. Describe the scientific method
   2. Describe and fully classify matter
   3. Use dimensional analysis techniques to solve various types of problems
   4. Express measurements using the metric system
   5. Perform stoichiometric and theoretical yield calculations
   6. Describe chemical compounds in terms of their nature, composition, formulas, and systematic nomenclature
   7. Write and balance chemical equations
   8. Understand and describe the structure of the atom, both nuclear and electronic
   9. Draw and describe the molecular structure and molecular shapes of covalent compounds
   10. Describe the major classes of chemical reactions and predict their products
   11. Describe the properties and behavior gases at the macroscale and molecular levels
   12. Understand and describe the basic principles energy, heat, and thermochemistry
   13. Describe the set-up of the periodic table of elements and predict various physical properties based on the periodic table
   14. Describe solutions and calculate solution concentration
   15. Describe and apply simple bonding theories
2. **GENERAL INFORMATION**

**Number of Credit Hours:** 3.0

**Class Days:** M/W, 8:00 – 9:25 AM, Boswell 12

**Required Text Book:** *“CHEMISTRY: An Atoms First Approach”* 2nd Ed. By Zumdahl and Zumdahl, Cengage Learning, ISBN 1-305-07924-8 (part of the university book bundle)

**Prerequisites:** High school chemistry or CHEM 1000 and two years of high school algebra or MATH 1010. Students without any previous chemistry course should consider taking CHEM 1000 before taking this course.

1. **CLASS ATTENDANCE:** Students are expected to attend every lecture in its entirety. Students are expected to read and study the material to be discussedpriorto the lecture. This includes working on problems and exercises given in the text. Students should review the material discussed until comprehension is acquired and seek assistance when necessary. The Chemistry Department Tutorial Center is available to students needing help with chemistry. The Tutorial Center is in room 106 (Boswell Chemistry Building).
2. **GRADING POLICY:**

Homework 30%

Exams 50%

Final Exam 20%

TOTAL 100%

Homework: 6 @ 30 points each = 180 points

Exams: 3 @ 100 points each = 300 points

Final Exam: 1 @ 120 points each = 120 points

(Extra credit: 6 @ 10 points each = 60 points)

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TOTAL: = 600 points

1. **GRADING SCALE**

**Grade Score Range Significance**

A 90 - 100% Excellent, work of exceptional quality

B 80 - 89% Good, work above average

C 70 - 79% Work of average quality

D 60 - 69% Poor, representing passing work

F 0 - 59% Failure, representing unacceptable performance

1. **EXAM POLICY:** Exam dates are listed in this syllabus (any changes to the schedule will be announced in class) and course coverage of the exams will be announced by the instructor at least one week prior to the exam. You must let the instructor know as soon as possible if you know you will miss an exam. There will be **NO** make-up exams. If you miss an exam AND you provide a VALID excuse, your score on the final exam will be used in place of the exam you missed. All excuse notes should be stamped by TSU’s One Stop Shop (located in Kean Hall). This will be allowed for only ONE missed exam. Cell phones or ipods cannot be used as calculators in class or during exams. You will not be allowed to leave the room until you turn in your exam.

**Exam Schedule:**

Exam 1 - Wednesday, September 4, 8:00 – 9:00 AM

Exam 2 - Wednesday, October 2 (mid-term exam), 8:00 – 9:00 AM

Exam 3 - Wednesday, November 13, 8:00 – 9:00 AM

Final Exam - Monday, December 2, 8:00 – 10:00 AM

1. **READING ASSIGNMENTS & HOMEWORK:** Reading assignments will be given immediately prior to the beginning of the next chapter topics. We will begin with chapter R and proceed in the order as stated in the lecture schedule. After the first lecture it will be assumed that you have read the appropriate chapter before coming to class. The homework will be assigned on a regular basis. Homework will be assigned, tracked, and graded using the *OWLv2®* online system. There is a strong, positive correlation between actively practicing the concepts and problem-solving techniques discussed in lecture by completing the homework assignments and doing well in this course.
2. **ACADEMIC INTEGRITY:** In accordance with the university’s policy on academic and classroom misconduct found in the catalog, cheating will not be tolerated in this course and a zero-tolerance policy regarding cheating will be followed throughout the course. A student who is caught cheating or attempting to cheat will be given a zero (F) for that particular assignment/test/quiz for the first offense. If a student is caught cheating a second time, that student will be given an overall grade of “F” for the course. To this end, the following classroom policies will be in effect and enforced.
   * Cell phones and any other electronic devices (including smart watches) that connect to wireless networks will not be permitted during any exam or quiz. These devices may not be on your desk during an exam or quiz and must be stored in your bag or purse and/or turned off. Calculators may be used, only if the questions on the exam or quiz warrant their use.
   * Once an exam or quiz period has started, you will not be permitted to leave to go to the restroom during the exam period. Please be sure to use the restroom before coming to class. Exceptions will only be made for those with documented medical needs.
   * No outside materials may be used during an exam or quiz. Any necessary materials (*i.e.* periodic table, equations & constants, scratch paper, *etc.*) will be provided for you.
   * Sunglasses and hats may not be worn during an exam or quiz period.
   * The use of headphones and/or earbuds during an exam or quiz is strictly prohibited.
   * Duplication or copying of homework assignments will result in a score of zero (F) for each student submitting a copied homework assignment.
3. **DISABILITY ACCOMODATIONSTATEMENT**

TSU is committed to creating inclusive learning environments and providing all students with opportunities to learn and excel in their course of study. Any student with a disability or condition which might interfere with his/her class performance or attendance may arrange for reasonable accommodations by visiting the Office of Disability Services (ODS). ODS is located in Kean Hall, room 131 and can be reached at 963-7400 or [www.tnstate.edu/disabilityservices](http://www.tnstate.edu/disabilityservices) .  You will be required to speak with ODS staff and provide documentation of the need for an accommodation.  If you qualify for an accommodation you will be provided with a document stating what type of classroom accommodations are to be made by the instructor.  It is your responsibility to give a copy of this document to the instructor **as soon as you receive it**.  Accommodations will only be provided **AFTER** the instructor receives the accommodation instructions from ODS; accommodations are not retroactive.  You must follow this process for each semester that you require accommodations.

1. **SEXUAL MISCONDUCT, DOMESTIC/DATING VIOLENCE, STALKING**

TSU recognizes the importance of providing an environment free of all forms of discrimination and sexual harassment, including sexual assault, domestic violence, dating violence, and stalking.  If you (or someone you know) has experienced or is experiencing any of these incidents, there are resources to assist you in the areas of accessing health and counseling services, providing academic and housing accommodations, and making referrals for assistance with legal protective orders and more.

Please be aware that most TSU employees, including faculty and instructors, are “responsible employees”, meaning that they are required to report incidents of sexual violence, domestic/dating violence or stalking.   **This means that if you tell me about a situation involving sexual harassment, sexual assault, dating violence, domestic violence, or stalking, I must report the information to the Title IX Coordinator.**  Although I have to report thesituation, you will still have options about how your situation will be handled, includingwhether or not you wish to pursue a formal complaint.  Our goal is to make sure you areaware of the range of options available to you and have access to the resources youneed.

You are encouraged to contact TSU’s Title IX Coordinator to report any incidents of sexual harassment, sexual violence, domestic/dating violence or stalking.  The Title IX coordinator is located in the Office of Equity and Inclusion, General Services Building, Room 210 and can be reached at 963-7494 or 963-7438.  For more information about Title IX and TSU’s SART or policies and procedures regarding sexual, domestic/dating violence and stalking please visit:  [www.tnstate.edu/equity](http://www.tnstate.edu/equity).

If you wish to speak to someone confidentially, who is not required to report, you can contact the TSU Counseling Center, located in the basement of Wilson Hall, at 963-5611 or TSU Student Health Services, located in the Floyd Payne Campus Center room 304, at 963-5084.  You may also contact the following off campus resources:  Sexual Assault Center of Nashville at 1-800-879-1999 or [www.sacenter.org](http://www.sacenter.org) or the Tennessee Coalition to End Domestic & Sexual Violence at 615-386-9406 or [www.tncoalition.org](http://www.tncoalition.org).

1. **HARRASSMENT & DISCRIMINATION**

Tennessee State University is firmly committed to compliance with all federal, state and local laws that prohibit harassment and discrimination based on race, color, national origin, gender, age, disability, religion, retaliation, veteran status and other protected categories.  TSU will not subject any student to discrimination or harassment and no student shall be excluded from participation in nor denied the benefits of any educational program based on their protected class.  If a student believes they have been discriminated against or harassed because of a protected class, they are encouraged to contact the Office of Equity and Inclusion at General Services Building, Room 210, 615-963-7494 or 963-7438, [www.tnstate.edu/equity](http://www.tnstate.edu/equity).

1. **IMPORTANT DATES**

8/19/19: Classes begin

8/30/19: Campus-Wide Assembly – first year students, 9 AM, Kean Hall

9/2/19: Labor Day (no classes)

9/22/19 - 9/28/19: Student Study Week

9/27/19: Midterm marathon recitation

9/30/19 - 10/4/19: Mid-term exam week

10/11/19: Last day to withdraw from a course and/or the University

10/28/19 - 1/17/20: Registration for Spring 2020

11/22/19: Final marathon recitation

11/25/19 - 11/29/19: Fall Break & Thanksgiving Holiday (no classes)

11/30/19: Last day of classes

12/2/19 - 12/6/19: Final exam week

12/7/19: Commencement

## TENTATIVE COURSE OUTLINE

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| Week | Topics Covered | Chapter/Sections |
| 1 | Units of Measurement, Significant Figures, Dimensional Analysis, Temperature | R |
| 2 | Density, Classification of Matter, Energy, The Mole, Fundamental Chemical Laws, Dalton’s Atomic Theory, Early Experiments to Characterize the Atom, Modern View of Atomic Structure | R, 1 |
| 3 | Exam 1 (September 4) |  |
| 4 | Electromagnetic Radiation, The Nature of Matter, Quantum Numbers, History of the Periodic Table, The Aufbau Principle and the Periodic Table | 2 |
| 5 | Periodic Trends in Atomic Properties, Types of Chemical Bonds, Electronegativity, The Localized Electron Bonding Model, Lewis Structures, Exceptions to the Octet Rule | 2, 3 |
| 6 | Naming Simple Compounds, The VSEPR Model, Bond Polarity and Dipole Moments, Atomic Masses, The Mole | 3, 4 |
| 7 | Exam 2 (October 2) – mid-term exam |  |
| 8 | Molar Mass, Percent Composition, Determining Formula of a Compound, Chemical Equations and Balancing, Stoichiometric Calculations | 5 |
| 9 | Limiting Reactants, Water: the Common Solvent, Solution Composition, Types of Chemical Reactions, Precipitation Reactions | 5, 6 |
| 10 | Stoichiometry of Precipitation Reactions, Acid-Base Reactions, Oxidation-Reduction Reactions | 6 |
| 11 | The Nature of Chemical Energy, Enthalpy, Calorimetry, Hess’s Law | 7 |
| 12 | Exam 3 (November 13) |  |
| 13 | Pressure, Gas Laws, Ideal Gas Law, Stoichiometry, Dalton’s Law | 8 |
| 14 | Kinetic Molecular Theory, Effusion and Diffusion, Real Gases | 8 |
| 15 | Thanksgiving Break |  |
| Final Exam (December 2) | | |