**CHEMISTRY 1110-Section 01**

# General Chemistry I

# Tennessee State University

**SPRING 2018**

**Instructor:** Dr. Sujata Guha

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**Class Days/Time:** 8:00 AM – 9:25 AM Monday/Wednesday

**Classroom:** Boswell 12

**Office Hours:** Tuesday (8-11 AM) and Thursday (8-10 AM)

## 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.

## 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.

## Lecture Text:

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

## Learning Objectives:

Upon successful completion of General Chemistry I, students should be able to:

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

**Course Presentation:**

Lecture material will be taken from the textbook.

**Grading Policy:**

Homework: 30% of the course grade

Exams: 50% of the course grade

Final Exam: 20% of the course grade

Homework: 6 homework assignments x (30 points each) = 180 points

Exams: 3 exams x (100 points each) = 300 points

Final Exam: 120 points

Bonus: 40 points

TOTAL: 600 points

The following grading scale will be used for assigning term letter grades:

**90 – 100 🡪 A**

**80 – 89 🡪 B**

**70 – 79 🡪 C**

**60 – 69 🡪 D**

**00 – 59 🡪 F**

**Schedule of Exams:**

Exam 1 on February 7

Exam 2 on March 7 (mid-term exam)

Exam 3 on April 4

Final Exam TBA

## Homework:

After the first lecture, it will be assumed that you have read the appropriate chapter before coming to class. 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. The OWL course key is E-X7FG6WTBN4RFM.

## Exams:

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. This will be allowed for only **ONE** missed major exam.

## Final Exam:

A two-hour comprehensive final exam will be administered. Questions will be taken from all chapters covering major course competencies. Date, time and location of the final exam will be posted at least two weeks prior to the exam. The final exam is mandatory. No late finals are allowed and no makeup for the final exam is allowed.

**Bonus:**

Questions for bonus points will be assigned using the *OWLv2®* online system.

**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 located in Rm. 106 (Chem. Bldg.).

## Participation:

It is assumed that you want to do the best you can in this class. This means that you want to actively participate in the course. By active participation we mean the following:

* Assignments are completed and, if requested, submitted on time
* You are willing to answer questions put forth by the instructor
* You are willing to ask questions in and out of class
* You arrive to class on time
* Your attention is focused on the material being presented by the instructor

The following behaviors are demonstrative of a lack of class participation:

* Arriving late for or not attending class; not handing in assignments on time
* Talking while the instructor or another classmate is speaking
* Being generally disruptive

## Policy on Cell Phones in Class:

Use of cell phones in class is strictly forbidden. Ringers on phones need to be turned off prior to lecture. Cell phones are not acceptable as calculators in class or on quizzes/exams. Only regular scientific calculators, not cell phones, may be used in class.

## Policy on Academic Misconduct, Cheating and Plagiarism:

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 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.

## TSU Disability Accommodation Statement:

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](https://email.tnstate.edu/owa/redir.aspx?C=gk6WOH_1TE-MCLQNo_mn52fQIPFZzNMIw444dBa7_m0A7UvXztod9aW6iBa4gjigMROwMmBdzho.&URL=http%3a%2f%2fwww.tnstate.edu%2fdisabilityservices) .  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.

## TSU Sexual Misconduct, Domestic/Dating Violence, Stalking Statement:

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, McWherter Administration Building, Ste. 260 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](https://email.tnstate.edu/owa/redir.aspx?C=gk6WOH_1TE-MCLQNo_mn52fQIPFZzNMIw444dBa7_m0A7UvXztod9aW6iBa4gjigMROwMmBdzho.&URL=http%3a%2f%2fwww.tnstate.edu%2fequity). 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](https://email.tnstate.edu/owa/redir.aspx?C=gk6WOH_1TE-MCLQNo_mn52fQIPFZzNMIw444dBa7_m0A7UvXztod9aW6iBa4gjigMROwMmBdzho.&URL=http%3a%2f%2fwww.sacenter.org) or the Tennessee Coalition to End Domestic & Sexual Violence at 615-386-9406 or [www.tncoalition.org](https://email.tnstate.edu/owa/redir.aspx?C=gk6WOH_1TE-MCLQNo_mn52fQIPFZzNMIw444dBa7_m0A7UvXztod9aW6iBa4gjigMROwMmBdzho.&URL=http%3a%2f%2fwww.tncoalition.org).

## TSU Harassment and Discrimination Statement:

TSU 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 McWherter Administration Building, Ste. 260, 615-963-7494 or 963-7438, [www.tnstate.edu/equity](https://email.tnstate.edu/owa/redir.aspx?C=gk6WOH_1TE-MCLQNo_mn52fQIPFZzNMIw444dBa7_m0A7UvXztod9aW6iBa4gjigMROwMmBdzho.&URL=http%3a%2f%2fwww.tnstate.edu%2fequity).

## Classroom Misconduct:

Academic and classroom misconduct will not be tolerated. Students are expected to conduct themselves appropriately at all times. In keeping with the purpose of the university, it is expected that all students will maintain proper attitude and behavior at all times during lecture. Respect for colleagues must also be maintained (arrive on time, no excessive talking during lecture, etc.) so that each class member will have equal opportunity to receive the best education for that student.

## Alterations to Syllabus:

During the course, it may become necessary for the instructor to modify this syllabus to meet the changing needs of the students or because of unforeseen circumstances. All such changes will be announced in advance and in writing as soon as they are known. Additional information will be posted to the web page for this class.

## Important Dates:

1/16/18: Classes begin

2/29/18-3/2/18: Student study week

3/3-9/18: Mid-term exam week

3/12-16/18: Spring Break

3/30/18: Withdrawal deadline

4/23-25/18: Early final exams (candidates for Spring 2018 graduation only)

4/23-27/18: Student study week

4/27/18: Last day of classes

4/28/18-5/4/19: Final exams

5/5/18: Commencement

**General Course Outline:**

|  |  |  |
| --- | --- | --- |
| **Chapter**  | **Topic** | **Reading Assignment (pages)** |
| **R** | **Measurement and Calculation in Chemistry*** Units of measurement
* Uncertainty and significant figures
* Dimensional analysis
* Temperature
* Density
* Classification of matter
* Energy
* The mole
 | 1-27 |
| **1** | **Chemical Foundations*** Early chemical history
* Fundamental chemical laws
* Dalton’s atomic theory
* Early experiments to characterize the atom
* Modern view of atomic structure
 | 28-51 |
| **2** | **Atomic Structure and Periodicity*** Electromagnetic radiation
* The nature of matter
* Atomic structure of hydrogen
* The Bohr model of the atom
* Quantum numbers
* Orbital shapes and energies
* Electron spin and the Pauli principle
* Polyelectronic atoms
* History of the periodic table
* The Aufbau principle and the periodic table
* Periodic trends in atomic properties
 | 52-99 |
| **3** | **Bonding: General Concepts*** Types of chemical bonds
* Electronegativity
* Ions: Electron configurations and sizes
* The covalent chemical bond: a model
* Covalent bond energies and chemical reactions
* The localized electron bonding model
* Lewis structures
* Exceptions to the octet rule
* Naming simple compounds
 | 100-151 |
| **4** | **Molecular Structure and Orbitals*** The VSEPR model
* Bond polarity and dipole moments
* Hybridization and the localized electron model
 | 151-197 |
| **5** | **Stoichiometry*** Counting by weighing
* Atomic masses
* Learning to solve problems
* The Mole
* Molar mass
* Percent composition
* Determining the formula of a compound
* Chemical equations and equation balancing
* Stoichiometric calculations
* Limiting reactants
 | 198-240 |
| **6** | **Types of Chemical Reactions*** Water, the common solvent
* Electrolytes
* Solution composition
* Types of chemical reactions
* Precipitation reactions
* Describing reactions in solution
* Stoichiometry of precipitation reactions
* Acid-base reactions
* Oxidation-reduction reactions
* Balancing redox reactions
 | 241-281 |
| **7** | **Chemical Energy*** The nature of chemical energy
* Enthalpy
* Calorimetry
* Hess’s law
* Standard enthalpies of formation
 | 282-318 |
| **8** | **Gases*** Pressure
* Gas laws of Boyle, Charles and Avogadro
* Ideal gas law
* Gas stoichiometry
* Dalton’s law of partial pressures
* Kinetic molecular theory
* Effusion and diffusion
* Overview of real gas behavior
 | 319-362 |

**E-BOOK & OWL ACCESS**

**for**

**GENERAL CHEMISTRY I, CHEM 1110-01 (M/W, 8:00-9:25)**

**INITIAL SET-UP:**

1. Enter the “Course Key” E-X7FG6WTBN4RFM
2. Go to https://eLearn.tnstate.edu and login using your university username and password
3. Once in eLearn, scroll down, locate your general chemistry course/section and click on that link. This will take you to the course’s eLearn page.
4. In the box labeled ***“Course Textbook Access – Cengage OWL”***, click on the Cengage OWL link. This will take you into the Cengage system in a new window.
5. Click on **“REGISTER A PRODUCT.”**
6. Type your course key in the space where prompted. Then click **“REGISTER.”**
7. If you have never used the OWL system before, enter your email address in the box under **“NEW STUDENTS”** and then click on **“CREATE A NEW ACCOUNT”** and follow the prompts, providing the required information to create your account.
	1. If have used OWL before and have an account, enter your email address and password under **“RETURNING STUDENTS”** and click **“LOG IN.”**
8. Once you have created your account you will land in the **“MY HOME”** page at cengagbrain.com. Next to where is says OWL v2 GUHA\_CHEM\_1110-01\_F17, click **“OPEN.”** This will launch you into the OWL system.
	1. Any active homework assignments will appear here.
9. From that same page, if you click on **“STUDY TOOLS”** you will be directed to a page that will allow you to access the e-book for your general chemistry course via the embedded MindTap e-reader.

**SUBSEQUENT ACCESS:**

1. After your initial set-up, you will not need to log in to eLearn in order to access OWL and the e-book.
2. Go to https://login.cengagebrain.com and log in using the credentials that you created previously.
3. Once you click **“LOG IN”** you will, once again, land in the **“MY HOME”** page at cengagebrain.com. From here you can navigate to your homework assignments and the e-book.