**CHEMISTRY 1120-Section # 01**

**General Chemistry II**

**Tennessee State University**

**SPRING 2018**

**Instructor:** Dr. Tasneem Ahmed Siddiquee

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**Class Days/Time:** 8:00 am – 9:35 am M/W

**Classroom:** Boswell 113

**Office Hours:**  M W 9:40-11:00 (office) ; MW 12:45-1:45 (office), R 12:00-1:00 (room #106)

**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.

**Prerequisite:**

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 II, students should be able to:

* Describe the various intermolecular forces and how they influence various properties of matter and changes of state
* Describe solution composition, concentration and how they form
* Explain, calculate and use the Colligative properties of solutions; the van’t Hoff factor in electrolyte solutions
* Describe the factors that affect kinetics (rate) of a reaction
* Explain how concentration affects reaction rate using rate laws and how time is involved in kinetics using integrated rate laws
* Describe a reaction mechanism and explain how a catalyst functions
* Explain the equilibrium condition and describe it in terms of the equilibrium constant
* Solve equilibrium problems using various strategies
* Apply LeChatelier’s principle to equilibrium systems
* Describe and define acids and bases using the Arrhenius and Brönsted-Lowry theories
* Explain acid strength, the pH scale and calculate the pH of strong and weak acid and/or base solutions
* Describe the pH properties of salt solutions
* Describe buffered solutions, buffer systems and the Common Ion effect
* Describe the equilibria involving slightly soluble salts and complex ion formation
* Explain and describe the three laws of thermodynamics; enthalpy and entropy
* Describe Gibbs free energy and reaction spontaneity; free energy and the equilibrium state
* Describe an electrochemical cell and know the difference between Galvanic and electrolytic cells
* Carry out various electrochemical calculations including cell potential and using the Nernst equation

**Course Presentation:**

Lecture material will be taken from the textbook.

**Grading Policy:**

**Evaluation of Course Competencies:**

Three In-class Exams:           45% of the course grade (15% per exam)

In-class Quiz:                        10% (taken at the beginning of each class)

Homework:                           25% of the course grade (each chapter has at least one assignment)

Comprehensive Final Exam:    20% of the course grade

**Total: 100 %**

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:**

**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.).

**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 midterm exam.

**Reading Assignments and Homework:**

Reading assignments will be given immediately prior to the beginning of the next chapter topics. We will begin with chapter 1 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.

**Comprehensive Final Exam:**

A two-hour departmental 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.

**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 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.

**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

1/16-19:          Late Registration/Schedule Students

2/26 –3/2        Student Study Week – No Activities Scheduled

3/3-3/9            Mid-term Examination Week-all classes meet as scheduled

3/12-3/16        Spring Break

3/30                 Last day to withdraw from a course and/or the University

4/2 – 4/28        Registration for Summer 2018

4/2 – 8/24        Registration for Fall 2018

April TBA       Honors Convocation

4/23-4/25         Early Exams ( Candidates for Spring 2018 graduation ONLY)

4/23-4/27         Student Study Week – No Activities Scheduled

4/24-4/27         Faculty Submit grades (Candidates for spring 2018 graduation)

4/27                 Last day of class

4/28-5/4           Final examinations for Spring 2017 semester

5/4 (Friday)     Graduate Commencement Ceremony, 5:00 p.m., Gentry Complex

5/5 (Saturday) Undergraduate Commencement Ceremony – 8:00 a.m., Hale Stadium

5/7                   Faculty must have posted all grades via “MyTSU”

**2/7/2018        Exam 1 (Wednesday)**

**3/21/2018      Exam 2 (Wednesday)**

**4/23/2018      Exam 3 (Monday)**

**TBA              Final Examination**

**21. General Course Outline:**

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| --- | --- | --- |
| **Chapter**  | **Topic** | **Reading Assignment (pages)** |
| **9** | **Liquids and Solids*** Intermolecular forces
* The liquid state
* Types of solids
* The various forces in substances
* Vapor pressure and changes of state
* Phase diagrams
 | 363-412 |
| **10** | **Properties of Solutions*** Solution composition
* The energies of solution formation
* Factors affecting solubility
* Vapor pressure of solutions
* Boiling point elevation and freezing point depression
* Osmotic pressure
* Colligative properties of electrolyte solutions
 | 413-445 |
| **11** | **Chemical Kinetics*** Reaction rates
* Rate laws
* Determining the form of the rate law
* Integrated rate laws
* Reaction mechanisms
* A model for chemical kinetics
* Catalysis
 | 446-487 |
| **12** | **Chemical Equilibrium*** The equilibrium condition
* The equilibrium constant
* Equilibrium expressions involving pressures
* Heterogeneous equilibria
* Applications of the equilibrium constant
* Solving equilibrium problems
* Le Chatelier’s principle
 | 488-524 |
| **13** | **Acids and Bases*** The nature of acids and bases
* Acid strength
* The pH scale
* Calculating the pH of strong acid solutions
* Calculating the pH of weak acid solutions
* Bases
* Polyprotic acids
* Acid-base properties of salts
 | 525-575 |
| **14** | **Acid-Base Equilibria*** The common ion effect
* Buffered solutions
* Buffering capacity
* Titrations and pH curves
 | 576-614 |
| **15** | **Solubility and Complex Ion Equilibria*** Solubility equilibria and the solubility product
* Equilibria involving complex ions
 | 615-637 |
| **16** | **Spontaneity, Entropy and Free Energy*** Spontaneous processes and entropy
* Entropy and the second law of thermodynamics
* The effect of temperature on spontaneity
* Free energy
* Entropy changes in chemical reactions
* Free energy in chemical reactions
* The dependence of free energy on pressure
* Free energy and equilibrium
 | 638-674 |
| **17** | **Electrochemistry*** Balancing redox reaction equations
* Galvanic cells
* Standard reduction potentials
* Cell potential, electrical work, and free energy
* Dependence of cell potential on concentration
* Batteries
* Electrolysis
 | 675-720 |