



## Problem Solving in General Chemistry I

The University of Toledo  
Department of Chemistry and Biochemistry  
CHEM1200 Sections 1-15

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**Instructor:** Amy Toole (pronouns: she, her, hers)  
**Email:** amy.toole@utoledo.edu  
**Student Drop-in Hours:** MT 11:30-12:30; WTh 2-3:30  
and by appointment. Talking to students is the best  
part of my job!  
**Drop-in Hours Location:** Bowman-Oddy (BO)2086G

**Instructor Phone:** 419-530-1503  
**Offered:** Fall 2021  
**Course Website:** [Blackboard Learn](#)  
**Class Location:** Varies (see your schedule)  
**Class Day/Time:** Varies (see your schedule)  
**Credit Hours:** 1 (Pass/No Credit)

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### CATALOG/COURSE DESCRIPTION

Problem solving and skill development for students enrolled in CHEM 1230 who obtained a satisfactory score on the chemistry placement test but need additional assistance in selected topics. May be taken only as P/NC (pass/no credit).

### COURSE OVERVIEW

A method of teaching/learning that has been shown both within our university and nation-wide (<https://pubs.acs.org/doi/10.1021/ed085p990>) to improve student success rates in Science, Technology, Engineering and Math (STEM) courses is "Peer-Led Team Learning (PLTL)". Here are some findings at UToledo:

- At the end of the course, 80% of students said they would recommend it to their friends. That sounds like very strong evidence for what the course can do for you.
- At the end of the semester, students who take CHEM 1200 with CHEM1230 indicate a significantly greater confidence in their ability to solve problems in general chemistry than those who do not take CHEM 1200.
- For students with comparable backgrounds, taking CHEM 1200 with 1230 makes an average difference of one-third of a letter grade, that is, from a C to a C+ or from a C+ to a B-. The course gives you an **EDGE!**

This course supplements CHEM 1230, General Chemistry I. It is hoped that your experiences in this course will help you 1) to improve your understanding of the material from that course and to 2) develop study, problem solving and communication skills valuable in many courses.

### STUDENT LEARNING OUTCOMES

Because this is a supplement to General Chemistry I, the outcomes expected for this course are identical to those for General Chemistry I. At the conclusion of the course students will be able to:

1. Demonstrate the use of equations and dimensional analysis to solve problems in chemistry and justify the number of significant figures in the result.
2. Explain the underlying principles for their calculations.
3. Explain fundamental chemical terms and concepts.
4. Convert between atomic level representations, symbols and names of atoms, isotopes, ions and molecules (including Lewis structures and geometric descriptions).
5. Describe the modern model of the atom and explain how it compares to earlier models.



6. Describe and compare bonding in different types of substances.
7. Identify and describe intermolecular forces in given substances, then predict relative physical properties based on intermolecular forces.
8. Qualitatively and quantitatively, describe the behavior of real and ideal gases.
9. Describe the interconnectedness between periodic trends, atomic properties and element reactivity.
10. Predict, complete and balance reactions (double replacement, combustion and single replacement).
11. Describe and calculate work, enthalpy and internal energy changes in reactions and phase changes.
12. Identify and describe societal applications of chemistry.

### TEACHING METHODOLOGY

The general format for this course is small group workshop and discussion. During class time, you will solve general chemistry problems with a small group of peers (usually 6-8). A student who has successfully completed General Chemistry I, and who trains weekly on how to facilitate group learning, will guide your group. In addition to acquiring a better understanding of chemistry, students who take CHEM1200 will sharpen problem solving, collaboration and communication skills.

As your instructor, I am here to help. **I am available throughout the week by appointment.** We can talk on the phone or meet in a Collaborate room. I will do my best to respond to email within 24 hours. I will also be soliciting frequent feedback regarding your experience in the course to constantly improve your experience.

### PREREQUISITES AND COREQUISITES

All students taking CHEM1200 will also be taking CHEM1230.

### TEXTS AND ANCILLARY MATERIALS

All problems to be solved during your CHEM1200 session will be made available on. Some weeks you will also be accessing your textbook for CHEM1230.

### ACADEMIC POLICIES

The University of Toledo has a number of academic policies intended to promote fairness and equity among students. These are wide ranging and include policies on adding and dropping a course, dual degree requirements, graduation with honors, academic dishonesty, confidentiality of student records and veteran assistance to name just a few. Please use the following URL to read a comprehensive list of academic policies that may pertain to you in this class and throughout your academic journey: <http://www.utoledo.edu/policies/academic/undergraduate/>. If you have any questions after reading through the policies, let me know.

### COURSE EXPECTATIONS

Each week you are expected to:

- Access the materials for the week from Blackboard and have them available to you during the class session.
- Show that you have completed a *brief* pre-class assignment (usually 5-15 min). These assignments are meant to help assure that all students have reviewed some common background material



- before attempting the session problem solving.
- Arrive on time, participate, ask questions, and help others.
  - Treat others with respect, patience and dignity.
  - Check your UToledo email and Blackboard for Course News (consider setting up notifications on your phone!).

Additionally, there are brief learning analyses, plus four 1-hour quizzes for you to complete during the semester.

### OVERVIEW OF COURSE GRADE ASSIGNMENT

**Course Points:** The following is the distribution of possible points in the course.

Course Aspect	Points
Pre-class assignments (2 pts each x 10)	20
Weekly sessions (6 pts each x 10)	60
Online quizzes (5 pts each x 3)	15
Learning Analysis (2 pts each x 4)	8
<b>TOTAL</b>	<b>103</b>

**Midterm Grading:** Midterm grades are assigned the 8th week of class and are used to assist students with determining their academic standing. This course is graded on the Pass/No Credit grading system. If you have earned 70% of the available points at that time you will receive a P (pass); otherwise NC (no credit).

**Final Grading:** If you earn 70 of the 103 possible points in the course you will receive a grade of P (pass). If you earn less than 70 points you will receive a grade of NC (no credit). If you miss a class due to a reason that is consistent with the university's Missed Class Policy, you should immediately contact the instructor in order to request an excused absence. Your goal should be to not miss any classes since each class will help you.

**Drop, Withdrawal and Incomplete Grades:** Dropped courses do not appear on your transcript. The deadline for dropping is September 13<sup>th</sup>. You may withdraw from the course and receive a grade of W. The deadline for withdrawal is November 5<sup>th</sup>. W's do not affect your GPA but do appear on your transcript. If you drop or withdraw from CHEM 1230 you should also drop or withdraw from this course.



## UNIVERSITY POLICIES

### ***Policy Statement on Non-Discrimination on the Basis of Disability (ADA)***

The University is an equal opportunity educational institution. Please read [The University's Policy Statement on Nondiscrimination on the Basis of Disability Americans with Disability Act Compliance](#).

### ***Academic Accommodations***

The University of Toledo embraces the inclusion of students with disabilities. We are committed to ensuring equal opportunity and seamless access for full participation in all courses. For students who have an accommodations memo from Student Disability Services, I invite you to correspond with me as soon as possible so that we can communicate confidentially about implementing accommodations in this course. For students who have not established affiliation with Student Disability Services and are experiencing disability access barriers or are interested in a referral to healthcare resources for a potential disability or would like information regarding eligibility for academic accommodations, please contact the Student Disability Services Office (<http://www.utoledo.edu/offices/student-disability-services/>) by calling 419.530.4981 or sending an email to [StudentDisability@utoledo.edu](mailto:StudentDisability@utoledo.edu).

### ***Additional Policy Statements***

Students can find other university policies listed by audience on the University Policy webpage (<http://www.utoledo.edu/policies/audience.html/#students>).

## ACADEMIC AND SUPPORT SERVICES

**Most students need some help outside the classroom during their college career.** Whether you need to ask a question, get help with an assignment, seek advice from a counselor, find a job or join a club, UToledo is there for you! You may contact me, or use the following resources to find the academic support or service you need:

***Chemistry Department Help Center*** is where the teaching assistants (TAs) have drop-in hours and is a great place to receive assistance. A schedule and virtual link will be posted on your CHEM1230 Blackboard section early in the term. No appointment is necessary during drop-in hours and you are welcome to ask question of the TA in your recitation section or any others that are staffing the center.

***The Learning Enhancement Center (LEC)*** located in the Carlson Library provides help to all students in a variety of courses, including chemistry: <http://www.utoledo.edu/success/lec/>

***Success Coaching:*** <https://www.utoledo.edu/successcoach/>

***Student Affairs:*** <http://www.utoledo.edu/studentaffairs/>

***Office of Student Advocacy:*** <https://www.utoledo.edu/studentaffairs/student-advocacy/> (help with the non-academic challenges)

***Library:*** <http://www.utoledo.edu/library/>

***Career Services:*** <http://www.utoledo.edu/success/career/>



**Course Scheduling Assistance:** The Chemistry Department Secretary, Ms. Samples can assist you with scheduling changes for chemistry courses (Room BO2022; email: [pamela.samples@utoledo.edu](mailto:pamela.samples@utoledo.edu) ; phone: 419-530-2698).

### SAFETY AND HEALTH SERVICES FOR UT STUDENTS

Many students face obstacles to their education because of work, family obligations or unforeseen personal difficulties. If you are experiencing challenges throughout the term that are impacting your ability to succeed in this course, or in your undergraduate career more broadly, please reach out to your peer leader or me so that we can work together to form a plan for your academic success. Also consider this comprehensive list of [Campus Health and Safety Services](#).

### INCLUSIVE CLASSROOM STATEMENT

In this class, we will work together to develop a learning community that is inclusive and respectful. Our diversity may be reflected by differences in race, culture, age, religion, sexual orientation, gender identity/expression, socioeconomic background, and a myriad of other social identities and life experiences. We will encourage expression and appreciation of different ideas, opinions, and beliefs so that conversations and interactions that could potentially be divisive turn, instead, into opportunities for intellectual and personal development. If we ever miss the mark please don't hesitate to come and talk to your peer-leader or me. We are all learning together.

### COURSE SCHEDULE

A summary of the weekly assignments and anticipated course schedule is provided below. Note the Learning Analysis and Quiz dates. As instructor, I reserve the right to modify the schedule of topics if I believe it to be in the best interest of the class, however, Quiz and Survey dates will NOT change.

WEEK	Class Meeting Date	CHEM1200 Topics <sup>1</sup>	SLOs	Assignments <sup>2</sup>
1	Sept 2 or 3	Getting Started in CHEM1230 and CHEM1200		Learning Analysis 1 due Sunday, Sept. 5 at 11:59 PM (found on Blackboard)

<sup>1</sup> The numbers refer to chapters and sections in the CHEM1230 textbook. **Unfortunately, there is not enough time in CHEM1200 to cover ALL of the CHEM1230 topics, but we hit a lot!**

<sup>2</sup> Every week after Week 1, you will come to class with a completed Pre-Class Assignment (see Blackboard – “Weekly Assignments” link) and a copy of the problems you will work on during your session.

2	Sept 9 or 10	3.1 Molecular and Formula Mass 3.2 Percent Composition 3.3 Balancing Equations 3.4 The Mole, Grams and Numbers of Things, Empirical Formula	1,2,3,4, 10	Week 2 Pre-class Assignment (found on Blackboard)
3	Sept 16 or 17	3.5 Combustion Analysis and Molecular Formula 3.6 Reaction Stoichiometry 3.7 Limiting Reagents, Reaction Yield and Types of Reactions	1,2,3,4, 10,12	Week 3 Pre-class Assignment <b>Learning Analysis 2 due Sunday, Sept. 19 at 11:59 PM</b> (found on Blackboard)
4	Sept 23 or 24	4.1 Solutions and Electrolytes 4.2 Precipitation Reactions 4.3 Acid-Base Reactions	1,2,3,4, 10,12	Week 4 Pre-class Assignment (found on Blackboard)
5	Sept 30 or Oct 1	4.4 Redox Reactions, Oxidation Numbers and Activity Series 4.5 Molarity, Dilution, Solution Stoichiometry Prepare for Exam 1	1,2,3,4, 10,12	Week 5 Pre-class Assignment (found on Blackboard)
6	Oct 7 or 8	<b>No CHEM 1200 Meeting – Exam 1 in CHEM 1230 is Wednesday of this week.</b>		<b>Quiz 1 Due Monday, Oct. 4 at 11:59 PM</b> (found on Blackboard)
7	Oct 14 or 15	<b>No CHEM 1200 Meeting – Fall Break</b>	1,2,3,4, 10,11,12	Week 7 Pre-class Assignment <b>Learning Analysis 3 due Sunday, Oct. 17 at 11:59 PM</b> (found on Blackboard)
8	Oct 21 or 22	CHEM1230 Week 7 and 8 Material: 5.4 Specific Heat and Calorimetry 5.5 Hess's Law 5.6 Standard Enthalpies of Formation 6.1 The Nature of Light 6.6 Quantum Numbers	1,2,3,4,5 6,12	Week 8 Pre-class Assignment (found on Blackboard)
9	Oct 28 or 29	7.3 Effective Nuclear Charge 7.4 Periodic Trends (Radii, Electron Affinity and Ionization Energy) 7.5 Electron Configurations of Ions 7.6 Ionic Radii	3,4,5,9	Week 9 Pre-class Assignment (found on Blackboard)

10	Nov 4 or 5	8.1 Covalent Bonding in Molecules 8.2 Ionic Bonding 8.3 Covalent Bonding 8.4 Bond Polarity 8.5 Lewis Dot Structure	3,4,6	Week 10 Pre-class Assignment (found on Blackboard)
11	Nov 11 or 12	9.1 Molecular Geometry 9.2 Molecule Polarity 9.3 Valence Bond Theory (VBT) 9.4 Hybridization 9.5 VBT: Double and Triple bonds 9.6 Molecular Orbital Theory 9.7 Delocalized Bonding	3,4,6	Week 11 Pre-class Assignment (found on Blackboard)
12	Nov 18 or 19	<b>No CHEM 1200 Meeting – Exam 2 in CHEM 1230 is Wednesday of this week.</b>		<b>Quiz 2 Due Monday, Nov. 15 at 11:59</b> (found on Blackboard)
13	Nov 25 or 26	<b>No CHEM 1200 Meeting – Thanksgiving Break</b>	3,4,6	Week 13 Pre-class Assignment (found on Blackboard)
14	Dec 2 or 3	11.1 Intermolecular Forces 10.1 Properties of Gases 10.2 Gas laws 10.3 The Ideal Gas Law	1,2,3,8	Week 14 Pre-class Assignment <b>Learning Analysis Due Sunday, Dec. 3 at 11:59 PM</b> (found on Blackboard)
15	Dec 9 or 10	10.4 Reactions with Gases 10.5 Partial Pressures 10.6 Kinetic Molecular Theory		<b>Quiz 3 Due Sunday, Dec. 12 at 11:59 PM</b> (found on Blackboard)
Finals Week	Dec 13-17	No CHEM 1200 Final 😊!  <b><i>We hope your time in CHEM1200 pays off as you demonstrate your learning on the CHEM1230 Final!!</i></b>		

### SPECIAL COURSE EXPECTATIONS DURING COVID-19

Maintaining a safe campus during the ongoing COVID-19 pandemic remains a top priority. UToledo continues to follow the guidance of the U.S. Centers for Disease Control and Prevention and Ohio Department of Health to keep our campus safe.

#### ATTENDANCE

The University of Toledo has a missed class policy. It is important that students and instructors discuss



attendance requirements for the course. Before coming to campus each day, students should take their temperature and complete a self-assessment for symptoms of COVID-19, such as cough, chills, fatigue or shortness of breath. Anyone with a temperature at or above 100.0 degrees Fahrenheit or who is experiencing symptoms consistent with COVID-19 should not come to campus and contact their primary care physician or the University Health Center at 419.530.5549. For more information on the symptoms of COVID-19, please go to <https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html>

COVID-19 testing for sick students is available on both Main Campus and Health Science Campus. Call 419.383.4545 for an appointment. Absences due to COVID-19 quarantine or isolation requirements **are** considered excused absences. Students should notify their instructors and follow the protocols summarized in this document on [Navigating COVID-Related Course Concerns](#).

In the event that you have tested positive for COVID-19 or have been diagnosed as a probable case, please review the [CDC guidance](#) on self-isolation and symptom monitoring, and report the disclosure to the Division of Student Affairs by emailing [StudentAffairs@utoledo.edu](mailto:StudentAffairs@utoledo.edu) or by connecting with their on-call representative at 419.343.9946. Disclosure is voluntary and will only be shared on a need to know basis with staff such as in the Office of Student Advocacy and Support, The Office of Residence Life, and/or the Office of Accessibility and Disability Resources to coordinate supportive measures and meet contact tracing requirements.

## **FACE COVERINGS**

Face coverings are required while on campus, except while eating, alone in an enclosed space, or outdoors practicing social distancing. Students will not be permitted in class without a face covering. If you have a medical reason preventing you from wearing a face covering due to a health condition deemed high-risk by the CDC, submit an [online application](#) to request an accommodation through the Office of Accessibility and Disability Resources. Students will need to provide documentation that verifies their health condition or disability and supports the need for accommodations. Students already affiliated with the Office of Accessibility and Disability Resources who would like to request additional accommodations due to the impact of COVID-19, should contact their accessibility specialist to discuss their specific needs. You may connect with the office by calling 419.530.4981 or sending an email to [StudentDisability@utoledo.edu](mailto:StudentDisability@utoledo.edu).

## **VACCINATION**

Doctors and other health care professionals agree that the best way to protect ourselves and each other is to get vaccinated. Case data clearly show that vaccines remain highly effective at preventing serious illness from COVID, including the highly contagious delta variant. If you have not yet received your COVID vaccine, the University encourages you do so as soon as possible. No appointment is needed to get the shot at the UTM Outpatient Pharmacy, University Health Clinic or Main Campus Pharmacy. Once you receive the COVID vaccination, please register on the COVID Vaccine Registry site at: <https://utvaccinereg.utoledo.edu/>.



**SPECIAL NOTES**

It's important to note, that based on the unpredictability of the COVID-19 virus, things can change at any time. So please be patient and understanding as we move through the semester. I also ask that you keep me informed of concerns you may have about class, completing course work/assignments timely and/or health concerns related to COVID.