



General Chemistry I

The University of Toledo
Department of Chemistry and Biochemistry
CHEM1230, CRN 24167, Section 001

Instructor: Dr. Kristi Mock

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Student Drop-in Hours: MW 11:30- 1, TR 1-2, and by appointment

Drop-in Hours Location: Bowman-Oddy (BO)2086F

Instructor Phone: 419-530-4080

Offered: Spring 2022

Course Website: [Blackboard Learn](#)

Class Location: WO1201

Class Day/Time: MWF 10:00-10:55 am

Recitation Location: Varies (see your schedule)

Recitation Day/Time: Tuesday (see your schedule)

Credit Hours: 4

CATALOG/COURSE DESCRIPTION

An introduction to atomic structure, chemical bonding, kinetic-molecular theory, energy relationships and structural concepts. This sequence is for students who major in science, engineering or other fields which require chemistry as a prerequisite subject. Three hours lecture and one-hour discussion (recitation) per week.

COURSE OVERVIEW

CHEM 1230 General Chemistry I and CHEM 1240 General Chemistry II are the lecture courses in the general chemistry sequence. The parallel lab courses are CHEM 1280 and CHEM 1290, which you may be taking with the lecture. General Chemistry is appropriate for students who are majoring in the natural sciences, science education, pharmacy, engineering, and some allied health fields. Chemistry is sometimes called the “central science” because application of chemical principles is key to understanding many other sciences. In CHEM 1230 you will study the atomic level structure of matter and how this structure determines the physical properties and reactions of substances. You will become familiar with the language and symbolism of chemistry as well as sharpen your critical thinking and problem-solving abilities.

STUDENT LEARNING OUTCOMES

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.

PREREQUISITES AND COREQUISITES

Because your success in CHEM 1230 is important to me and the other General Chemistry instructors, we require that you meet one of these course prerequisites:

- A score of 50% or higher on the ALEKS chemistry placement exam (earned on the *initial* assessment or after learning in ALEKS), **OR**
- A grade of C or above in CHEM 1090.

If your ALEKS *initial* assessment is below 50% you are required to take CHEM 1200 with CHEM 1230. If your grade in CHEM 1090 was below a B, you are strongly encouraged to take CHEM 1200 with CHEM 1230. Taking CHEM 1200 with CHEM 1230 can benefit ALL students.

TEXTS AND ANCILLARY MATERIALS

Required Materials:

- Regular access to a properly functioning computer with internet access to login to Blackboard (<https://blackboard.utdl.edu/webapps/login/>). Because this course is part of the inclusive access program, you have already paid for access to the following through Blackboard:
 - An electronic copy of the textbook, *Chemistry* by Julia Burdge 5th edition
 - ALEKS practice
 - Quizzes
- An iClicker account which you can purchase for \$5.99 here: <https://store.macmillanlearning.com/us/storefront/201801213>
- A laptop computer with Lockdown Browser installed from this link: <https://download.respondus.com/lockdown/download.php?id=213815819> **For students who do not own, and cannot borrow a laptop (or tablet) for exams, contact me immediately to make other arrangements.**
- A non-programmable calculator for use during exams. Only non-programmable calculators are allowed when you take exams. Examples of non-programmable calculators include: TI-30XIIS, TI-30Xa, TI-30XS Multiview, TI-32, TI-34 II, TI-34 Multiview, TI-36, TI-36X Solar, Casio FX-77, Casio FX-260, Casio FX-65. Many of these can be purchased for about \$10. A calculator that has any of the following functions is not permitted for use on General Chemistry exams: solver, integration, differentiation, unit conversions, or a calculator that allows you to type an equation.

Optional Materials:

- Hard copy of *Chemistry* by Julia Burdge, 5th edition (a 3-ring hole-punch version is in the bookstore).
- Updated versions of plug-ins, recent software, and the necessary tools to be kept free of viruses and spyware (<https://www.utoledo.edu/dl/main/downloads.html>).

TECHNOLOGY REQUIREMENTS – see *Required Materials* section above.

ACADEMIC POLICIES

The University of Toledo maintains 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: <http://www.utoledo.edu/policies/academic/undergraduate/>. If you have any questions after reading through the policies, let me know.

COURSE EXPECTATIONS/ TEACHING METHODOLOGY

Students entering general chemistry are often nervous and unsure about whether they can do well. Being successful *will* require time and effort, however, if you have met the pre-requisites for this course, you belong here and are in the position to learn, grow and meet the challenge. The following are used to facilitate learning in this course.

Assignments in advance of class: Before class, I ask that you watch a *Foundational Presentation* (10-15 min) OR read the relevant textbook sections to help you fill in portions of *Guided Note-Taking* sheets. During class, we will clarify concepts, then build from there. In preparing before class, you cover background material (primarily definitions) at your own pace, and we can use class time to help each other with more challenging applications and problem solving.

Class sessions: During class you will be actively involved in working through problems and calculations, using the iClicker polling system, and discussion with your peers.

ALEKS practice: ALEKS, an online homework system that adapts to different paces of learning among different students, is a great tool for practice and explanation outside of class. It also provides data on where students are struggling: pointing to topics and concepts we can revisit in class. Weekly ALEKS assignments are due every Sunday at 11:59 PM. There are two aspects to ALEKS: learning and assessment. When in the learning mode, you may ask questions of me, your TAs, tutors, your peers, textbook, and online resources but all answers should reflect your understanding of the material. During assessments, which ALEKS calls “Knowledge Checks”, you are expected to do the work on your own. Do not look things up or get help during Knowledge Checks as that will lead to future assignments that are too difficult.

Quizzes: Weekly online quizzes will give you the opportunity to test yourself and provide data to focus recitation sessions (see below). These quizzes should be taken after you have completed all the problems from class and your ALEKS assignment. You will have two attempts:

- First attempt (due Sunday at 11:59 PM): Open book, but you are encouraged to do as much as you can without consulting your notes as you will not have notes available to you during exams. You may not consult others.
- Second attempt (due Tuesday at 11:59 PM): Open book, and you will have the opportunity to collaborate with peers as well as a graduate teaching assistant (TA) to build on your learning and improve your score.

You will also take a Getting Started Quiz (accessed through Lockdown Browser) and a Lewis Structure Quiz.

Recitation sessions: During weekly “recitation sessions” you will work collaboratively with a teaching assistant (TA) and a smaller group of students than in the lecture hall. You will earn points toward your CHEM1230 grade by submitting quiz work and participating in discussions.

Exams: On two mid-term exams and a cumulative final you will demonstrate what you have learned. See course schedule for dates and times

You will take all exams during our regularly scheduled class time, in our classroom, using a computer with LockDown Browser. To take each exam you must show photo identification. You are not allowed to use any outside sources for the exams. That is, you are not allowed to consult other people, the internet, your textbook, or any notes. You will, however, be given a periodic table and the values of constants. Also, you may use a non-programmable calculator, NOT a programmable calculator or phone.

If you cannot take an exam at the scheduled time due to an irresolvable conflict, you must provide **written documentation** to verify the conflict before the exam date and obtain my **approval before the exam**. If the documentation is approved, you will be given an opportunity to take the exam at an arranged time before the scheduled test date.

Because of the large number of students that take this course, and in fairness to *all* students, make-up exams will not be given. If you unexpectedly miss a midterm exam due to illness, car accident or similar extreme circumstance please inform me of your difficulty by email as soon as possible. If you do not have access to email, leave a message on my office phone (see contact info above). If your excuse is acceptable and verified, your final course grade will be computed with the score on the missed exam equal to the average of the other midterm exam and final. In all other circumstances, a missed exam will result in a grade of 0.

Final Exam: The final exam cannot be excused.

Communication: As your instructor, I am here to help! The best way to contact me is through email and I will do my best to respond to you within 24 to 48 hours (often more quickly). I have specific drop-in hours listed at the very beginning of this syllabus. I will be ready to meet with students at those times, but you are always welcome to just come by BO2086G and see if I am around. You can also email me to make an appointment outside drop-in hours, including virtual appointments.

Summary of Resources allowed on ALEKS, Quizzes and Exams

Type of Assessment	Allowable resources*	NOT Allowed
ALEKS	Learning mode: <ul style="list-style-type: none"> • collaboration with others • textbook and your notes • internet sources • calculator** 	
	Assessments (Knowledge Checks): <ul style="list-style-type: none"> • calculator** 	Assessments (Knowledge Checks): <ul style="list-style-type: none"> • internet sources • collaboration with others • textbook and your notes
Quizzes	First attempt: <ul style="list-style-type: none"> • textbook and your notes • calculator** 	First attempt: <ul style="list-style-type: none"> • internet sources • collaboration with others
	Second attempt: <ul style="list-style-type: none"> • collaboration with others • textbook and your notes • calculator** 	Second attempt: <ul style="list-style-type: none"> • internet sources
Mid-term Exams and Final Exam	<ul style="list-style-type: none"> • calculator (non-programable) ** • periodic table and constants <u>provided</u> with the exam 	<ul style="list-style-type: none"> • internet sources • collaboration with others • textbook and your notes

*All work you submit should ultimately reflect your own thinking, understanding of the material, and effort.

** Only non-programable calculators are allowed on General Chemistry exams so I recommend you practice with the same one throughout the course. However, there are also calculators in ALEKS and Lockdown Browser.

OVERVIEW OF COURSE GRADE ASSIGNMENT

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

Course Aspect	Max. Points	Approximate Percentage of Total Points
ALEKS <ul style="list-style-type: none"> • 100 pts on-time completion • 100 pts pie completion at semester end 	200	23.5%
Quizzes <ul style="list-style-type: none"> • Getting Started Quiz (Lockdown Browser required) - 5 pts • Weekly Quizzes – 156 pts (Includes 12 for Lewis Quiz) <i>No one can earn more than 150 pts – extra points are offered to cover technical & other difficulties</i>	150	18%
Participation <ul style="list-style-type: none"> • Class iClicker Questions – approx. 74 pts (2-3/day) • Recitation – 66 pts (4/session; 10 for exam corrections) <i>No one can earn more than 100 pts – extra points are offered to cover technical & other difficulties</i>	100	12%
Mid-term exams - 100 pts each	200	23.5%
Final exam	200	23.5%
TOTAL	850	100%

Midterm Grading: Midterm grades are assigned the 8th week of class to assist students in determining their academic standing. Your midterm grade in CHEM1230 will be based on your quiz average up through Week 6, and your first exam score. Letter ranges corresponding to percentages of points earned, are given under Final Grading.

To meet state and federal laws regarding financial aid disbursement, attendance is also recorded during the 8th week. Please note, if you are not attending class and completing assignments it could affect your financial aid (scholarships, grants, loans, or Federal Work Study). If you decide you are not going to attend this class (or any other class you have registered for), you must formally withdraw (drop) from the course. You can do this by logging onto the myUT portal, clicking on the “Student” tab, and then under “My Toolkit” click on Register/Drop/Withdraw.

Final Grading: Below are minimum percentages of total points needed to receive the indicated letter grade.

	A	93%	A-	90%
B+	B	83%	B-	80%
C+	C	73%	C-	70%
D+	D	63%	D-	60%

Drop, Withdrawal and Incomplete Grades: Dropped courses do not appear on your transcript. The deadline for dropping is **February 1st**. You may withdraw from the course and receive a grade of W. The deadline for withdrawal is **March 25th**. W's do not affect your GPA but do appear on your transcript.

NOTE: A student, registered for both this course and the laboratory (CHEM 1280), who drops or withdraws from the lecture course in the first 8 weeks must also drop/withdraw from the laboratory course. A student

withdrawing from the lecture during the last weeks of allowed withdrawal (weeks 9-10) may be allowed to finish the lab course if they have a grade of C or better in the lab and permission of the lab instructor. In this case, the student must complete the required paperwork for the registrar and obtain the signature of the lab instructor to certify they meet the criteria for remaining in the lab.

A course grade of Incomplete is given only to those who have completed all but a small percentage of course requirements for an acceptable reason. The Incomplete must be removed before you take CHEM 1240.

UNIVERSITY POLICIES

Institutional Classroom Attendance Policy

Please be aware that the university has implemented an attendance policy, which requires faculty to verify student participation in every class a student is registered at the start of each new semester/course. For this course, if you have not attended/participated in class (completed any course activities or assignments) within the first 14 days, I am required by federal law to report you as not attended. Unfortunately, not attending/participating in class impacts your eligibility to receive financial aid, so it is VERY important that you attend class and complete course work in these first two weeks. Please contact me as soon as possible to discuss options and/or possible accommodations if you have any difficulty completing assignments within the first two weeks.

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.

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 (BO2043) 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 Blackboard early in the term. No appointment is necessary.

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/>

CHEM 1200 – Problem Solving in General Chemistry: CHEM 1200 is a supplemental course to CHEM 1230 and I encourage you to add it to your schedule if it is not there now. It is a workshop-based, pass/no credit course designed to help you master the CHEM 1230 material. You will work in small groups (6-8 students) under the guidance of a student who recently took and did well in the course. It is scheduled for 1 hour 50 minutes at various times on Thursdays.

Supplemental Instruction (SI) Supplemental Instruction (SI) Out-of-class study sessions will be scheduled several times a week and are another option for working with a peer well-trained in helping other students. The SI sessions are led by students who have previously taken the course and attend every lecture with you. No credit is offered for attending SI sessions and the group tends to be larger than in CHEM 1200, but you can pick and choose when to attend.

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 ; 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 me or your TA immediately 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. I 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 I ever miss the mark please don't hesitate to come and talk to me. We are all learning together.

COURSE SCHEDULE

Our anticipated course schedule is given below. **Please note the Exam dates, in particular, and that you must take these exams during your scheduled class time.** Be sure that potential travel or employment plans do not conflict with the exam schedule. Exam dates will not change, however, I reserve the right to modify other aspects of the schedule if I believe it to be in the best interest of the class.

*Weekly Assignment Due Dates:

- MWF Pre-Class Preparation by the start of class.
- Sunday at 11:59 PM
 - ALEKS Objectives
 - Quiz Attempt 1
 - Quiz Attempt 1 work upload to recitation section
- You have until Tuesday at 11:59 of the following week to complete Quiz Attempt 2. Discussion in recitation on Tuesday can help you!

Anticipated Course Schedule

Week	Dates	Chapter and Topics	Assignments* (see details on Blackboard and due dates above)	Student Learning Outcomes (see descriptions on page 1 of syllabus)
1	Jan 18-21	Getting Started 1 Matter and Measurements 2 Atoms, Molecules, and Ions	Pre-Class Preparation ALEKS Practice Quiz after Week 1 Getting Started Quiz (you must use Lockdown Browser to take this Quiz)	1,2,3,4
2	Jan 24-28	3 Stoichiometry Ratios of Combinations	Pre-Class Preparation ALEKS Practice Quiz after Week 2	1,2,3,4,10
3	Jan 31-Feb 4	3 Stoichiometry Ratios of Combinations (cont'd) 4 Reactions in Aqueous Solution	Pre-Class Preparation ALEKS Practice Quiz after Week 3 Last day to Drop Feb 1	1,2,3,4,10,12
4	Feb 7-11	4 Reactions in Aqueous Solution (cont'd)	Pre-Class Preparation ALEKS Practice Quiz after Week 4	1,2,3,4,10,12

5	Feb 14-18	4 Reactions in Aqueous Solution (cont'd) 5 Thermochemistry	Pre-Class Preparation ALEKS Practice Quiz after week 5	1,2,3,4,10,11,12
6	Feb 21-25	5 Thermochemistry (cont'd)	Midterm Exam 1: Wed, Feb 23 - Chapters 1-5.3 Pre-Class Preparation ALEKS Practice Quiz after Week 6	1,2,3,4,11,12
7	Feb 28-Mar 4	5 Thermochemistry (cont'd) 6 Quantum Theory & Electronic Structure of Atoms	Pre-Class Preparation ALEKS Practice Quiz after Week 7 + Exam Corrections	1,2,3,4,11,12
Mar 7-11 Spring Break				
8	Mar 14-18	6 Quantum Theory & Electronic Structure of Atoms (cont'd)	Pre-Class Preparation ALEKS Practice Quiz after Week 8	3,4,5,9
9	Mar 21-25	6 Quantum Theory & Electronic Structure of Atoms (cont'd) 7 Electron Configurations & The Periodic Table 8 Chemical Bonding I	Pre-Class Preparation ALEKS Practice Quiz after Week 9	3,4,5,6,9
10	Mar 28-Apr 1	8 Chemical Bonding I (cont'd) 9 Chemical Bonding II	Pre-Class Preparation ALEKS Practice <i>Lewis Structure Part 1 Quiz</i> (replaces Quiz after Week 10) <u>Last day to Withdraw: March 25</u>	3,4,6
11	Apr 4-8	9 Chemical Bonding II (cont'd)	Pre-Class Preparation ALEKS Practice Quiz after week 11 <i>Lewis Structure Part 2 Quiz</i>	3,4,6
12	Apr 11-15	9 Chemical Bonding II (cont'd) 11.1 Intermolecular Forces	Midterm Exam 2: Wed, Apr 13 - Chapters 5.4 (calorimetry) to 9.5 Pre-Class Preparation ALEKS Practice Quiz after week 12	1,2,3,4,5,9,11,12

13	Apr 18-22	10 Gases	Pre-Class Preparation ALEKS Practice Quiz after Week 13 + Exam Corrections	1,2,3,8
14	April 25-29	10 Gases (cont'd) 11.6 Phase Changes 21. Environmental Chemistry	Pre-Class Preparation ALEKS Practice Quiz after Week 14	3,4,7,12
Finals Week	May 2-6	*** Comprehensive Final Exam*** Monday, May 2nd 10:15-12:15 PM You Must Take the Final at This Time!		ALL

SPECIAL UNIVERSITY-WIDE 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 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.

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 UTMC 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.