## General Chemistry Laboratory II

The University of Toledo  
College of Natural Sciences and Mathematics  
CHEM 1290 – All Sections

<table>
<thead>
<tr>
<th>Instructor:</th>
<th>Dr. Samantha Schachermeyer</th>
<th>Email:</th>
<th><a href="mailto:Samantha.Schachermeyer@utoledo.edu">Samantha.Schachermeyer@utoledo.edu</a></th>
</tr>
</thead>
<tbody>
<tr>
<td>Office Hours:</td>
<td>M: 12:00-2:00pm</td>
<td>Term:</td>
<td>Spring 2019</td>
</tr>
<tr>
<td></td>
<td>TR: 10:30am-12pm</td>
<td>Lab Location/Times:</td>
<td>Multiple areas/times</td>
</tr>
<tr>
<td></td>
<td>or by appointment</td>
<td>Course Website:</td>
<td><a href="http://dl.utoledo.edu">http://dl.utoledo.edu</a></td>
</tr>
<tr>
<td>Office Location:</td>
<td>BO 2036</td>
<td>Instructor’s Website:</td>
<td>N/A</td>
</tr>
<tr>
<td>Office Phone:</td>
<td>(419) 530-4582</td>
<td>Credit Hours:</td>
<td>1</td>
</tr>
</tbody>
</table>

### COURSE/CATALOG DESCRIPTION

The course is 1 credit hour lab experiments about topics covered in CHEM 1240 lectures. Approved chemistry safety goggles meeting ANSI Standard Z87.2003 must be worn by every student during every laboratory class meeting.

### PREREQUISITES AND COREQUISITES

Prerequisite: Chem 1280 General Chemistry I Laboratory  
Corequisite: Chem 1240 General Chemistry I. Please note that withdrawal from CHEM 1240 during the semester will necessitate withdrawal from CHEM 1290.

### INSTRUCTIONAL MATERIALS (TEXTS AND ANCILLARY MATERIALS)

- **Text:**  
  **REQUIRED:** *(Either Printed Loose Leaf or E-Book)*  
  **Loose Leaf:** CHEM 1290: Manual, Cengage, ISBN 9781337447782  
  **E-Book:** CHEM 1290: Manual, Cengage, ISBN 9781337705950  
  **Supplementary:** CHEM 1290: Lab Handbook, Cengage

- **Eye Protection:**  
  **REQUIRED:** Approved chemical safety goggles are required at all times. Goggles may be purchased at the UT bookstore or from the UT Student ACS chapter.

- **Equipment:**  
  **Supplementary:** USB flash drive

- **Blackboard:**  
  **REQUIRED:** This website is available through the University of Toledo Distance Learning program and can be accessed via the MyUT portal or via blackboard.utdl.edu. Your access code is your UTAD username and password.

### GENERAL EDUCATION REQUIREMENT

This course fulfills the Undergraduate General Education/Core Curriculum requirement of one semester hour of credit in a natural science as a lab.
TECHNOLOGY EXPECTATIONS
Most activities in this course will be done through your lab manual and your lab notebook. There may be a few times in the semester where the lab coordinator will send materials to you, either through Blackboard or via your Rockets email address. It is your responsibility to check both places on a regular basis.

TEACHING STRATEGIES
This face-to-face course is designed to stimulate student learning though the delivery of readings, in-course lectures, and performance of experiments.

COURSE OVERVIEW
Welcome to the Bowman-Oddy General Chemistry Laboratories! I suspect you are asking, “Why am I here?” You are here because you selected a science-related field for your major, which requires a specific number and level of chemistry courses and lab in order to obtain a degree in that field. We honor that requirement and will work with you to make this experiment as worthwhile as possible.

The major objective of this laboratory course is to allow you to learn various concepts through hands-on experiences while learning proper analytical and preparative techniques, the use of analytical equipment, how to collect, analyze and report data, and how to work safely in a laboratory. You probably aren’t a chemistry major, but you will be working in a science-related field. Whether you are pre-pharm, pre-med, pre-dent, an engineering major, etc. you will be working in numerous labs here on campus, and once you have graduated, you will probably work for a company whose facilities are regulated by OSHA (Occupational Safety and Health Administration). For this reason, we stress not only the learning of the concepts of the lab, but also the various safety concerns and proper use of equipment that accompany those concepts. Proper use of safety goggles and chemical fume hoods, and proper attire will be strictly enforced at all times! Your failure to abide by these policies will result in your expulsion from lab.

A second goal of this course is to prepare you for higher level courses and labs as well as work in your field. You will start with labs that are straightforward and “easy” and gradually work up to labs that require independent thought and analysis. Some of the labs will require you to come up with your own plan of how to test an unknown compound or mixture. Some may require a group discussion after the experiment but still in the lab. Be sure to read all of the sections of the experiment each week before going to lab so you know what to expect. Essential to this process is coming to lab prepared – knowing what you will be working with and what you are going to do. If you are well prepared for lab, you should be able to answer these five questions before you enter lab:

- What is the purpose of today’s lab?
- Which chemicals will be used today?
- What are the safety concerns and/or hazards of these chemicals?
- Which equipment and/or technique will be used today?
- What are the critical steps in today’s procedure?

The thought process behind the experiment is more important than being able to “crank through the calculations.” You will learn why we use different pieces of equipment for various procedures and how improper use can affect your results. It is this analytical thinking that you will carry with you to other courses and into your career. Please note: Lab is NOT about getting the right/expected answer. It is about making observations, analyzing the data, and combining it with your observations to come to a valid conclusion. Lab is thinking about and understanding why something did or did not work and how to do it differently and better the next time.
Lab can be a lot of fun. Once you have settled in, I hope you will find the experiments and their results interesting, and you will be able to tie this information to the material you are learning in lecture. Enjoy your time in lab, and don’t hesitate to contact me, either during office hours or by e-mail.

COURSE OBJECTIVES
Upon completion of this course, the student will be able to:

• Reason for and the proper use of significant figures;
• Determination of precision and accuracy of different types of equipment;
• Determination of an unknown with the use of colligative properties;
• Spectrophotometric determination of an unknown with the use of a calibration curve;
• Effects of various parameters on reaction rates;
• Determination of the rate law of a chemical reaction;
• Determination of the activation energy of a chemical reaction;
• Effects of various changes on the equilibrium of a chemical system;
• Calculations needed for stoichiometric reactions;
• Determination of the acid content of a compound or drug sample;
• Determination of the pH of solutions;
• Analysis of local drinking water samples;
• Determination of the metals in an unknown solution via a qualitative analysis scheme;
• Design of a galvanic cell;
• Proper use of analytical and preparative equipment;
• Proper and effective collection, analysis, and reporting of data;
• Effective and efficient participation in a group;
• Communication and discussion of results and chemical principles in oral and written form; and
• Proper and ethical manner of working in a collaborative environment.

LAB ATTENDANCE POLICY
Attendance is mandatory. You are expected to be on time and ready for lab at the beginning of each lab period. You will not be admitted to lab if you are substantially late or if your pre-lab is incomplete or unsatisfactory. If you miss an experiment, you may make it up only by attending another lab section during the same week that particular experiment is scheduled. It is up to you to make these arrangements with your instructor, either in person or via e-mail. If you need to attend another lab section during the same week as your regularly scheduled lab section, send an e-mail to samantha.schachermeyer@utoledo.edu, put CHEM 1280, your section number, and “Need to attend another section” in the subject line. In the e-mail, list three or more days and times you CAN attend another lab section — check the Schedule of Classes on the UT website or at the top of the syllabus to see when other lab sections are offered and whether there is room for you to attend that lab. If you know in advance you will be absent due to travel, job conflicts, etc., send e-mail as soon as you can to maximize your chances of getting into another section. It will not always be possible to do so.

ADHERENCE TO SAFETY POLICY
Failure to follow the safety rules and policies will directly affect your grade.
• The first instance of failure to comply with these safety rules and/or policies will result in an immediate ten-point deduction for that laboratory exercise and possible expulsion for that day.
• A second violation will result in expulsion from the laboratory and a grade of zero being given for the laboratory exercise for that day.
• If there are further violations, the instructor can assign a failing grade for the course.
**EXCUSED ABSENCE POLICY**

You must fill out and submit an Excused Absence Request (EAR) form for each absence within two weeks of your return to campus.

Should you miss a lab, submit an EAR form (a copy is provided via Blackboard) and supporting documentation to the instructor via the department secretary in BO 2022. Do NOT give it to your TA. The lab report and any other papers that were due that day are to be attached to the EAR form. Your final grade for the course will be calculated based on the work you submit during the semester; your “Grade To Date” in the Blackboard grade center may be lower than your actual grade until the end of the semester.

Excused absences will be granted when school-related academic or athletic activities, medical problems, or other similar emergencies cause you to be absent. Absences due to work, schedule conflicts or family vacations will not be excused. No more than two excused absences per student per semester will be granted and no excused absences will be granted for the lab practical. **Excused absence requests that are received more than four weeks after the absence and those with no supporting documentation will not be approved.** All excused absence forms with attached supporting documentation must be submitted **no later** than the Friday before the lab practical.

**E-MAIL POLICY**

Most of the communication outside of the laboratory takes place via e-mail. Teaching assistants (TAs) are required to check and reply to your e-mail at least once daily Monday–Friday, between 9 am and 8 pm, weekends at a time that best fits their schedule. Part-time instructors who are TAs will let you know when they will check and reply to your e-mail. Your instructor will check their e-mail and reply frequently within normal hour on Monday–Friday. If you have not received a reply from your TA within 48 hours, send the e-mail again and copy your instructor on the e-mail. Please understand that you may not get a reply from your instructor within 48 hours based on the day and time you send the e-mail. If you do not get a reply within a few days, check that you used the correct e-mail address and that the e-mail was actually sent by your device. Feel free to resend the e-mail or stop by the instructor’s office to see whether the e-mail was actually received. If you need help urgently, please put URGENT in the subject line of your e-mail. We will do our best to help you quickly. An emergence which results in the inability to attend lab is urgent situation. Issues with data entry, calculations and deadlines are not considered to be urgent situations. Plan your time so you can get help from your TA and/or instructor in plenty of time ahead of the deadline.

**LATE WORK POLICY**

All assignments are due either upon entry to the lab. **Late work will not be accepted.** If necessary, you may submit papers that were due at the beginning of lab to your TA’s mailbox via the department secretary in BO 2022 by no later than 5 pm of the same day for a ten-point deduction; evening classes have until 12 pm the following day to submit their papers. This policy is to be used only as an exception, e.g., papers were left at home. Should this late submission become a regular occurrence, the submitted papers will be deemed late and will not be accepted for grading. In the event of an excused absence, work that as due (previous week’s lab) is to be submitted with the Excused Absence Request form. If the experiment is made up in another section that week, work that is due that day is to be submitted to the instructor in charge of the other section.

**ACADEMIC DISHONESTY**

*Academic Dishonesty* is defined by the university’s policy as specified in the university’s catalog. The rules of academic honesty will be strictly enforced. Academic dishonesty includes cheating by copying from any other student — past or present. All work submitted must be the work of the individual submitting it.
Academic dishonesty will result in a score of zero for an assignment and/or lab and can further result in a failing grade in the course that cannot be removed from the student’s transcript.

CLASS STRUCTURE AND COURSE EXPECTATIONS
Upon entry to the lab, you must be properly attired, including safety goggles.

For the each day in lab, your lab report from the previous week (including all data analysis and the completed Post-Laboratory Assignment page) and the pre-lab for that day’s experiment is due at the beginning of lab. If your prelab is not complete, you will not be admitted to lab until it is complete. Backpacks, coats, and other bulky items go immediately into the storage cubes at either entrance to the lab. Cell phones are to be set to silent; texting, etc. is not allowed in lab. No headphones or ear buds are allowed in lab. Only your lab manual and papers needed for lab, calculator, and pen are allowed at your workspace in the hood. Once everyone has been admitted to the lab, your TA will briefly review the safety hazards and critical steps of the experiment. Pay attention and take notes during this presentation so you do not lose valuable time during the experiment repeating steps. The remainder of the lab period is yours to complete the assigned experiment. Plan on being in lab each week for the full lab period. Data Sheets are to be completed in the laboratory in blue or black indelible ink; mistakes are crossed out with one line, and the correct value is written above or beside the incorrect value. Illegible work will not be graded. Once you are done with the experiment, use the remaining time to start your data calculations or to ask questions. You are responsible for cleaning your hood space and any assigned lab areas prior to leaving the lab. When done, present your Data Sheet(s) to your TA for his/her initials. All Data Sheets must be initialed by the TA before you leave the laboratory; a Data Sheet with no initials will not be accepted and a grade of zero will be awarded for that portion of the lab. You may remove your goggles once you are outside the lab.

It is your responsibility to know which assignment is due when and where. There are multiple sources that list these deadlines: the Experiment Schedule, the weekly PowerPoint presentation in lab, and the posted PowerPoint presentation online in Blackboard. Some TAs also send out reminders about upcoming deadlines via e-mail. The failure of the TA to send out such a reminder does not remove you from your responsibility to know that an assignment is due. Be sure to check your UT Rockets e-mail frequently so you do not miss important information.

There are no regularly scheduled office hours during the week of the lab practical. During and following the week of the lab practical you may contact the instructor with your questions via e-mail or schedule an appointment to discuss them. Any questions or concerns about grading, missing scores, etc. must be addressed with the instructor of the course, not the TA, no later than the Friday before the week of the lab practical.

You have the opportunity to earn 5 extra credit points for most labs by writing the procedure for the lab in your own words and using this procedure, not the lab manual, during lab. You must put your own procedure in flowchart form. This procedure is turned in the following week with the other papers that are due and credit will be assigned during the grading of the lab report. Copying the procedure from the lab manual is not valid work; a score of zero points will be awarded if you do this.

A Sample Final and a Key to Sample Final will be available on Blackboard at the end of the semester. These are provided to you so you can see some of the question types on the lab practical. While you may use this as a study tool for the lab practical, do not lean on it too much. Because of this, few students have gotten an “A” on the lab practical. Questions have changed over the years, particularly in the last section of the practical. This is a lab course — you will be tested on your knowledge of the proper use of equipment, safety, observations of reactions and conclusions. While you will need to be able to do the
various calculations you did in lab on the practical, the practical will focus on your logical thinking skills, not your calculation prowess.

**ASSIGNMENT OF COURSE GRADE**

Your grade will be based on your lab reports, quiz, and a lab practical. Lab report grades include prelaboratory questions, Data Sheets, graphs, if any, and post-laboratory questions, which include the analysis of the data collected. Most labs are worth 80 points as follows: 10 points for the pre-laboratory assignment, 20 points for the post-laboratory assignment, and 50 points for the rest of the lab (lab completion, data work-up, sample calculations, unknown assignment). The average score on an 80-point lab is 69 points. Doing average work and turning in your assignments on time will result in a grade of “B.” Consistent improvement throughout the semester and a high score on the lab practical will generally result in a grade of “A–” or “A.”

As part of this course you will receive a score called “Laboratory Assessment.” Throughout the semester your TA will observe your skills when working with the various pieces of equipment and performing reactions. The score is based on your *improvement* throughout the semester. The average for this assessment is 18 points.

Students who have a grade of D or below will have a mid-term grade reported during the 5-8th week of the semester. This grade notification does not appear on your transcript; its purpose is to notify you of your academic standing in the class. Attendance is also recorded during the *Midterm Grading Period*. This reporting is done in compliance with state and federal and federal laws regarding financial aid disbursement. Please note: if you are not attending class it could impact 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.

**Course Points will be distributed in the following manner:**

<table>
<thead>
<tr>
<th>Assignment/Assessment</th>
<th>Points</th>
<th>% of Final Grade</th>
<th>SLO Alignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety Quiz</td>
<td>20 pts.</td>
<td>2.1%</td>
<td>1, 2</td>
</tr>
<tr>
<td>Comprehensive Lab Practical</td>
<td>100 pts.</td>
<td>10.6%</td>
<td>1 – 7</td>
</tr>
<tr>
<td>Lab report, 10 @ 80 points each</td>
<td>800 pts.</td>
<td>85.1%</td>
<td>1 – 7</td>
</tr>
<tr>
<td>Laboratory Assessment</td>
<td>20 pts.</td>
<td>2.1%</td>
<td>1 – 3</td>
</tr>
<tr>
<td><strong>Total possible points</strong></td>
<td><strong>940 points</strong></td>
<td><strong>100%</strong></td>
<td></td>
</tr>
</tbody>
</table>

In order to complete this course with a grade of C+ or higher, you will need to:

- Achieve a score of 50% or higher on the comprehensive lab practical.
- Achieve at least 75% of the total points for the course.

College laboratory classes often have lower grade averages and wider ranges than those in high school. While the average grade in lab is a B, it is common for some students to receive a lower grade. You can monitor your grade throughout the semester via the online grade book in Blackboard. It is your responsibility to ensure every entry made by your TA is correct. The deadline to report any error to the instructor of the course is 5 pm of the Friday before the laboratory practical. At the end of the semester a Final Grade will appear in Blackboard. You will have two days to notify your instructor via e-mail of an error in your final grade. Once the grades are uploaded to the official UT grade system, grade changes can no longer be done quickly.

**NOTE:** While we try very hard to ensure that the Grade to Date shown in Blackboard is correct, mistakes do happen. Verify your grade by dividing your Total Points to Date by the Points Possible to Date, and multiplying by 100.
In order to compensate for differences in grading among TAs, different grading scales or grading adjustments may be used in order to ensure that fair grade assignments are made for each lab section. This will be done on a section-by-section basis. Final grades are determined by the instructor. The following is a general guideline:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>A, A−</td>
<td>90–100%</td>
</tr>
<tr>
<td>B+, B, B−</td>
<td>80–89%</td>
</tr>
<tr>
<td>C+, C, C−</td>
<td>70–79%</td>
</tr>
<tr>
<td>D+, D, D−</td>
<td>60–69%</td>
</tr>
<tr>
<td>F</td>
<td>&lt; 60%</td>
</tr>
</tbody>
</table>

Course drop and withdrawal procedures have been set by the University of Toledo. The Experiment Schedule that will be handed out during the first day of lab and is posted on Blackboard lists the drop and withdrawal deadlines for the course. You can also find these deadlines on the UT website, under the Academic Calendar. *There are no office hours during the week of the lab practical: schedule an appointment if you need to see the instructor.*

**ACADEMIC POLICIES**

As a student at The University of Toledo you should be familiar with the policies that govern the institution’s academic processes, for example, Academic Dishonesty, Enrollment Status, and Grades and Grading. Please read *Undergraduate Academic Policies*. Students are expected to attend every class meeting of courses in which they are registered. Please read the *Missed Class Policy*.

**UNIVERSITY POLICIES**

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 is committed to providing equal access to education for all students. If you have a documented disability or you believe you have a disability and would like information regarding academic accommodations/adjustments in this course please contact the *Student Disability Services Office*.

**GENERAL ASSISTANCE**

The *General Chemistry Secretary*, Ms. Pam Samples, in BO 2022, tel: 419-530-2109, can assist you if you have further questions or if you need assistance. If you have *special needs*, please contact me as soon as possible so we can work together on matching lab to your needs. I will gladly work with you and the Office of Student Disability Services to accommodate your needs.

**ACADEMIC SUPPORT SERVICES**

The University of Toledo offers a wide range of academic and student support services to help you succeed:

**Chemistry Help Center**: The *Chemistry Help Center* in BO2043 offers free help from chemistry graduate students and teaching assistants. It is staffed Monday through Thursday from 9 am until 8 pm and on Friday from 9 am until 4 pm during the Fall and Spring semesters. Each teaching assistant, with the exception of part-time instructors who generally teach in the evening, is required to schedule at least two hours of time, designated as office hours, which are held in the Help Center. Your instructor also provides help during her *office hours* (see top of syllabus) as well as by e-mail.
**Discussion Boards and E-mail within Blackboard:** Discussion boards and e-mail within Blackboard allow you to communicate 24/7 with your classmates and teaching assistant so you can get quick answers to your questions before and after lab.

**University Libraries:** University Libraries are your gateway to information at The University of Toledo connecting you with the resources you need for education, research, and patient care.

**Tutoring Services:** Free tutoring support for all UT students is available through the Learning Enhancement Center located in the Carlson Library. Tutoring Services are offered in an array of subjects, including Writing, Math (Calculus, Statistics, Accounting) Biology, Chemistry, and Anatomy and Physiology. Further information and schedules will be posted in Blackboard as they become available.

**The Writing Center:** The Writing Center provides free, face-to-face and online tutoring for writers in all disciplines. The staff there can assist you with a variety of writing assignments.

**The Counseling Center:** Transitioning to college and/or maintaining a healthy well-being while attending college can be difficult, if you or a friend ever feel overwhelmed adjusting to college or in need of crisis intervention or mental health services please contact the Counseling Center.

**SAFETY AND HEALTH SERVICES FOR UT STUDENTS**
A number of different health and safety services are available to UT students. For a complete list, go to [http://www.utoledo.edu/offices/provost/utc/docs/CampusHealthSafetyContacts.pdf](http://www.utoledo.edu/offices/provost/utc/docs/CampusHealthSafetyContacts.pdf). Other information that is presented to you in class will also be available to you in Blackboard.