Fall 9-1-2022

CHMY 122.H11: Introduction to General Chemistry Lab - Hamilton

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Syllabus and Manual for Introduction of General Chemistry Lab
CHMY122 – CRN 71378 (1 credit)
FALL 2022

COURSE OBJECTIVES:

CHMY122 is the laboratory component of our Introductory General Chemistry course and is essential as most science majors require basic-to-high laboratory proficiency with use of equipment and chemical reagents. As much as possible, I have chosen laboratory experiments that complement the CHMY121N lectures and that will hopefully pique your interests. CHMY122 exposes students to a wide range of relevant laboratory techniques including measuring volumes and masses of solids, liquids, and gases using various instruments such as pipets and graduated cylinders, and top-loading and analytical balances. In CHMY122, students will learn to interpret observations, develop and use critical thinking skills, classify types of matter, identify and classify various chemical reactions, identify limiting reactants, plot and interpret data in Excel, apply the localized-electron model of molecular formation, determine molar mass, and perform titrations to determine concentration. CHMY122 students will also apply problem-solving skills gleaned in CHMY121N to solve previously unseen, experiment-related problems. Throughout the semester, CHMY122 students will also learn to research the health and safety hazards of various chemical reagents and learn to organize a Lab Notebook.

Lab is a place to discuss chemistry and be actively engaged in asking questions and participating in discussions. The lab period lasts for approximately 3 hours, in which you will be involved in performing the day's experiment (see Schedule) in teams or individually. Detailed information about each experiment can be found in corresponding Experiment Handout and Prelab Lecture notes posted on the course website.

COURSE INFORMATION:

- **Lab sessions**: Thursdays, 1pm – 3:50pm
  - Location: BC – 115 (Science Lab)
- **Course website**: http://moodle.umt.edu
- **Office Hours**: By Appointment
  - Location: BC – 101C or on Zoom
- **Prerequisites and co-Requisites**
  - Fundamental algebraic skills – ability to rearrange equations and fractions, and work with exponents and the base-10 logarithmic function.
  - Completion of college algebra is STRONGLY recommended.
  - CHMY121N is a pre- or co-requisite for CHMY122.

CONTACT INFORMATION:

- **Instructor**: Jennifer Johnson
- **Email**: jennifer.johnson@mso.umt.edu
- **Office**: BC – 101C
- **Office Phone**: (406) 541-3186
- **Cell Phone (call or text)**: 406-282-1480

IMPORTANT DATES:

- 9/7 (5pm) – Last Date to Add without override consent
- 9/19 (5pm) – Last Date to Drop course with refund and without "W"
- 10/31 (5pm) – Last Date to Drop course with "W"

REQUIRED MATERIALS:

- **Experimental Handout:** Downloadable from course website for each experiment, used to prepare for experiment, bring to each lab session
- **Lab Notebook with carbonless copies (50-page minimum)**
- **Scientific Calculator:** Texas Instruments TI-30X IIS calculator is recommended; it's cheap and functional, but any calculator able to handle logs, exponents, and lots of decimal places is fine. Bring it to EACH lab session.

Technology Requirements

- Scientific Calculator: Texas Instruments TI-30X IIS calculator is recommended; it's cheap and functional, but any calculator able to handle logs, exponents, and lots of decimal places is fine.
  - Bring it to lab EACH day.
- All CHMY122 students are expected to be familiar with computers and the internet. Students are responsible for their own software and computer maintenance and setup as recommended by UM IT (https://www.umt.edu/umonline/distance-learning/tools.php).
  - Students are expected to be able to use a computer to access UM email, Moodle and UMBox accounts as well as review and download posted course materials. Students are also expected to have a "back-up plan" if personal computers become compromised. Bitterroot College maintains a computer lab on campus in BC-103.

MOODLE:

Moodle is our course website (http://moodle.umt.edu), and you may log in using your NetID to login. Moodle will be used extensively during the semester to post experimental handouts and other relevant course materials.

COURSE EXPECTATIONS:

In addition to gaining content knowledge, this course will hopefully improve your Thinking and Reasoning Competencies, as defined below by the Association of American Medical Colleges (www.aamc.org):

- Thinking and Reasoning Competencies
  - Critical Thinking: Uses logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions, or approaches to problems.
  - Quantitative Reasoning: Applies quantitative reasoning and appropriate mathematics to describe or explain phenomena in the natural world.
  - Scientific Inquiry: Applies knowledge of the scientific process to integrate and synthesize information, solve problems and formulate research questions and hypotheses; is facile in the language of the sciences and uses it to participate in the discourse of science and explain how scientific knowledge is discovered and validated.
  - Written Communication: Effectively conveys information to others using written words and sentences.

Certain student performance standards are expected and unconditional. **You are expected to:**

- **Stay home if you feel sick** and/or if exhibiting COVID-19 symptoms.
  - If you are sick or displaying symptoms, contact your primary care physician or you can get testing at the Curry Health Center; (406) 243-4330.
- **Stay up-to-date with COVID-19 information** from the University of Montana Coronavirus Website: https://www.umt.edu/coronavirus.

- **Budget enough time in your life** for prelab and lab-report work.
- **Prepare by reading** the day's experiment and prelab lecture notes **and by completing** Prelab Preparation work (see Prelab Preparation section and Schedule) for EACH new experiment;
- **Bring your Experiment Handout, ball-point pens, your Lab Notebook, and a scientific calculator** to EACH lab session.
- **Be on time.** Prelab lectures begin promptly at the scheduled lab-session time, so plan to arrive a few minutes early. Prelab Preparation work and lab reports are due *at the beginning of the scheduled lab session*. Lab Reports turned in after the Prelab Lecture has begun will be considered late (see Late Lab Report section);
- **NOT eat or drink within the lab**; eating and drinking in lab is a violation of lab safety rules. All food or drinks should be left outside of lab.
- **Always consider safety** and obey safety regulations during lab sessions;
- **Participate** in discussions **and be able to work both independently and respectfully with partners** in EACH lab session;
- **Clean lab glassware** and other equipment used, hood space (if used), counter tops (if used), and your lab bench or station **after experimentation is completed** for the day;
- **Check out with me and turn in In-Lab work *before* leaving lab** after EACH lab session;
- ***Be professional and polite to everyone in lab and at the Bitterroot College*** *before, during, and after lab sessions.*

BE AWARE: Your behavior and social patterns outside of class can make you more likely to encounter someone carrying COVID-19, who may or may not be exhibiting symptoms of illness. Please be conscientious of your social interactions and practice social distancing, mask wearing, and good hygiene outside of the classroom; in this way, you protect yourself and your community.

RESPONSIBILITIES AND SUCCESS:

As your professor, I am responsible to present course materials to you in as clear and organized of a way as I am able and to support you should you ask. Among various issues, I can help you with problem-solving strategies, with getting focused on pertinent ideas, and with sorting through hazy concepts and misconceptions. My goal is to show you how to think autonomously through an observation or problem and reason out possible solutions. By taking advantage of this opportunity to learn, you will develop critical thinking skills that are key to a successful career.

As my student, *you are responsible* for preparing for lab (see Course Expectations section). Most importantly, ***you alone are responsible for understanding what you are being taught***. In other words, you will need to make the connections between what you hear and observe in lab to what you know and, eventually, to answering questions; connections of this sort cause you to be a better thinker and increase your reasoning skills. Applying chemistry in lab requires an investment of your time and energy. How well you understand why you are doing or seeing something will likely have a positive effect on your grade because a good grade is a direct product of your understanding. If you are proactive about learning lab technique and the chemistry related to what you are doing, and by seeking out help when needed, you can expect to be successful in my course. In contrast, procrastination in completing prelab preparation work and lab reports will not help you understand the course material or be a proficient thinker, and your grade will likely reflect your lack of understanding.

CLASS ACTIVITIES AND COURSE CONTENT:

Attendance in all lab sessions is mandatory. *Due to lab availability, there are no make-up labs.*

This course consists of one (1) lab session per week in which we will be engaged in discussions and individual and in-group experimentation. You should expect to use scientific calculators during lab sessions and to engage in experiments that mirror topics covered in CHMY121N (see Schedule for details).

- If you must miss lab session due to illness, family emergency, religious observance, military service, participation in a University-sponsored activity, or other documented excuse (see full university policy at http://archive.umt.edu/catalog/14_15/academics/academic-policy-procedure.php), **you must inform me by email BEFORE LAB BEGINS, so alternatives can be considered**. If you choose not to notify me about your absence beforehand, your absence will be viewed as "unexcused" and you will receive a "zero" for the missed lab.
- Any tardiness to lab may be considered an "unexcused" absence.

PRELAB LECTURES:

I will give a prelab lecture before each experiment begins to help you have a successful lab experience and make you aware of safety concerns. Prelab lecture notes will be available on the course website prior to that lab session; you may wish to bring these notes with you to lab to write down additional information and problem-solving logic discussed in the prelab lecture.

ATTIRE:

- **BODIES WORKING IN THE LABORATORY WILL BE COVERED FROM SHOULDER TO KNEES INCLUDING FEET. DO NOT WEAR** open-toed shoes, flowing skirts, skirts or shorts above the knees, kilts, dangling necklaces, bracelets, or rings; ***if you are wearing such items or clothing, you will NOT be allowed to work in the lab***. Certain chemicals can react with most metals and cause serious burns. Additionally, chemicals can be knocked over by dangling jewelry and loose or flowing clothing and cause you or others injury. You may wear a lab coat to wear over shorts or over a tank top on hot days.
- **FOR MINIMUM PERSONAL PROTECTION, UV-PROTECTIVE SAFETY GLASSES OR GOGGLES ARE REQUIRED TO BE WORN BY ANYONE IN THE SCIENCE LAB WHEN CHEMICALS AND/OR EQUIPMENT ARE PRESENT**. These items will be provided for you to use during lab sessions or you can purchase your own.
    - **NOTE**: If you choose to purchase your own safety glasses, a Z87.1 and a "U" ***must be stamped*** on the frame. The "U" indicates the lenses will filter UV light and safety glasses without a "U" will not be allowed in lab. The Z87.1 is an American National Safety Institute (ANSI) safety rating standard for safety glasses.

SAFETY:

Laboratory safety is critical to your and to your fellow researchers' well-being. Thus, each student in my course will receive safety training and will be tested on their knowledge of safety rules. Any researcher violating safety rules will not be allowed to remain in the lab.

Chemical Safety (Disposal and SDS Search): Chemical exposure can be minimized through good chemical-hygiene and lab practices. All chemical waste must be properly disposed of according to standard procedures, and you will be informed of these procedures in your Prelab Lecture notes, Experiment Handout, or by me. As part of your Prelab Preparation work, *you must research the health and safety hazards* of each chemical used during a given experiment; this information is located on a Safety Data Sheet (SDS) for a given chemical. You will be trained on how to find SDS's for a specific chemical during the first

experiment. Failure to research the safety hazards of chemicals you use in lab is dangerous to you and others and will be interpreted as incomplete Prelab Preparation work, which will delay you in beginning your experimentation for that lab session.

LABORATORY NOTEBOOK:

Keeping efficient and accurate records of relevant observations and data is an important skill possessed by any professional researcher of any kind, *in any profession (scientific or non-scientific)*. Thus, you will be expected to keep organized and detailed notes of each experiment in a lab notebook with carbonless copies (NOT in a 3-ring binder), ***using a ballpoint pen with non-erasable ink*** (gel ink or pencil is NEVER acceptable). If you have difficulty keeping organized notes, do not worry . . . it is a skill you will develop quickly during this course. Clearly written notations, including observations and results, will greatly increase your ability to write observant and relevant reports. Read the "Laboratory Notebook Guidelines posted on the course website for further details. Your Lab Notebook is a legal document that needs to be neat and organized enough that another chemist could come in and understand your work. Even though it is NOT your final report, it is a record of your experiment and data obtained and can be used in a courtroom.

PRELAB PREPARATION:

To help you understand what you will be doing and to make you aware of safety issues during a lab session, you must prepare for each new experiment. To receive any credit for Prelab Preparation, ***the following information must be written in your Lab Notebook prior to beginning experimentation***:

1) **Date**
2) **Lab Title**
3) **Purpose of Lab/Work**
4) **Safety notes** (SDS research of chemical hazards – training to come during 1st experiment)
5) **Disposal notes**
6) **Answers to any prelab questions listed in the Experiment Handout**

For more details about what to write in each section, see Lab Notebook Guidelines on the course website. ***To receive any credit, ONLY the carbonless copies, NOT the originals,*** of your Prelab Preparation work will be turned in ***AT THE BEGINNING OF LAB***, and I will be checking them for completeness once they are turned in. **NOTE: Any incomplete Prelab Preparation work will be considered "late"** and ***you will NOT be allowed to begin experimentation until it is completed***; any delay this lack of planning causes in finishing the day's experiment or collecting data is *your responsibility*. Late Prelab Preparation work will only be worth 50% of possible points for its corresponding experiment.

IN-LAB WORK:

In-Lab work is what is written in your Lab Notebook during your lab session. To receive credit for In-Lab work, the following sections must be filled out in your Lab Notebook during each experiment:

1) **Changes or Corrections to Procedures (if any)**
2) **Observation Tables / Data Tables completed with observations or data**
3) **Calculations (if any)**
4) **Questions that came up for you during experimentation or other thoughts (if any)**
5) **Conclusions based on observed data or calculated results (if any)**

For more details about what to write in each section, see Lab Notebook Guidelines on the course website.

To receive In-Lab points, the carbonless copies of your day's **IN-LAB WORK MUST BE TURNED IN *PRIOR TO LEAVING LAB*** that day.

CORRECTIONS:

Any written errors should be corrected with the following procedure:

1. Mark a single line through the erroneous word/number and write the correct the word/number next to or above it (e.g., ~~hidrochloric~~ hydrochloric)
2. Mark your initials near any changes/corrections

LAB REPORTS:

Lab reports consist of any report sheets and calculation sheets from your Experiment Handout, any collected data (i.e., plots, tables, etc.), and answers to any questions posed in the Experiment Handout. What and when lab reports are due are tentatively listed in the Schedule.

- Answers to lab questions should be written in passive voice (i.e., *NOT* using I, we, our, she, he, her, him, them, etcetera) and they should be either typed or printed (no cursive).
- **To ensure you get full credit on your lab reports, be sure to include your name, the names of your lab partners (when applicable), and the date. You are responsible for turning in all parts to each lab report, including calculation pages.**

For some experiments, you will be working in groups, in which data collected will be identical. However, answers to questions are considered individual work and should be completed on your own. This means ***you should NEVER copy a lab partner's work or allow another person to copy from you; this is considered plagiarism (i.e., cheating) and is a violation of the University's Student Conduct Code***. Academic honesty is expected (see ACADEMIC HONESTY section), and you will be reported to the Director of Bitterroot College and the UM Office of Community Standards for violations.

Late Lab Reports:

Due dates for lab reports are given during prelab lectures and are tentatively listed in the Schedule. Typically, lab reports are due **at the beginning of lab** within **one (1) week *after completing the experiment. If your lab report is turned in after the prelab lecture has begun, it will be considered late*.** The total score of a late lab report will be reduced by 10% for each day late (*including weekend days*) and will not be accepted after 1 week late. Late lab reports may be turned in to the BC Main office (BC101). **NOTE: It is your responsibility to email me when you have dropped your report off, so that I may retrieve it that day**; otherwise, your late lab report may be lost and remain ungraded.

DISRUPTIVE BEHAVIOR:

This course is designed to be an interactive learning environment open to everyone wishing to learn chemistry. Thus, behavior which unreasonably interferes with my ability to instruct students and students' ability to learn will not be allowed. **Disruptive behaviors during Prelab Lectures are not limited to but include talking, texting, tweeting, using a computer, a cell phone or another handheld device for non-CHMY122 activities. During lab, disruptive behaviors may include those previously mentioned but also include any behavior deemed as hazardous.** If I consider your behavior as disruptive, you may be asked to move to another seat or leave the lab, and such behavior will be grounds for disciplinary action through the UM Office of Community Standards.

ACADEMIC HONESTY – CHEATING AND PLAGIARISM:

- Honesty is an important quality for any scientist to possess because experimental evidence must be reliable; as chemists, we are the reporters of such evidence. Thus, incidences of cheating will be taken seriously and dealt with swiftly. I expect you to follow the guidelines specified in the University of Montana Student Conduct Code (https://www.umt.edu/student-affairs/community-standards/student-code-of-conduct-2021-pdf). No cheating**,** tampering, fabrication, assisting, or plagiarism will be

tolerated, including allowing other students to copy your work or copying work done by other students. For definitions, please see https://www.umt.edu/student-affairs/community-standards/student-code-of-conduct-2021-pdf. Any student(s) cheating, tampering, fabricating, assisting, or plagiarizing on any worksheet or lab report will receive a zero on the assignment, and an Academic Dishonesty Report will be filed with the Director of Bitterroot College and the UM Office of Community Standards.

- For clarity, **plagiarism is the act of representing someone else's work as yours**. You may even do this mistakenly by working with other students or with the same tutors; thus, avoid using language used by other students and tutors. Use your own words and your own voice! Even though the majority of CHMY122 students are honest and responsible, academic misconduct may affect those students, so please be advised that I do enforce the Student Conduct Code in order to protect the honest students from academic misconduct. To that end, student assignments will be regularly screened for plagiarism and any plagiarized work will be dealt with as per recommended in the Student Conduct Code.

GRADING POLICY:

The different aspects of the course are graded using the following percentage distribution:

Course component	Percent Allocated (Weight)
Prelab Preparation	15%
In-Lab Participation	10%
Lab Reports	75%
Total	**100%**

OVERALL GRADE FOR THE COURSE:

Your overall grade for the course is determined by the number of points you earn and how much "weight" they carry. I will attempt to keep the Gradebook as current as possible, so you can know your percentage in the course and determine your grade at any time. Grading for this course is NOT based on a "curved" scale; because of this, I highly encourage you to work in groups to maximize understanding. The following are the grade ranges for the course:

Grade	Percentage Range	Grade	Percentage Range
A	92.0 and higher	C	71.9 – 68.0
A–	91.9 – 88.0	C–	67.9 – 64.0
B+	87.9 – 84.0	D+	63.9 – 60.0
B	83.9 – 79.0	D	59.9 – 56.0
B–	78.9 – 76.0	D–	55.9 – 52.0
C+	75.9 – 72.0	F	51.9 and below

Please know your success in lab will NOT be determined by achieving any "correct" results, but rather by how prepared you are for lab, by your attention to detail when following laboratory and experimental protocols, by performing calculations correctly, and by your ability to think about and reason through using observations to support or refute hypotheses or theories. The total points for each lab (prelab, in-lab, and report) will not be equal for each experiment due to timing within the semester and differences in difficulty. The experiment with your lowest percentage score will be replaced with your average percentage for the semester. If you have concerns or question about any aspect of this course, including your grade, please feel free to discuss them with me.

Grade Rubric:

- An "A" student can solve homework-like, lab report problems of moderate or harder difficulty with near-100% accuracy, can demonstrate understanding of the major course concepts through using correct definitions, reasoning, or problem-solving methods and can use reasoning and problem-solving methods to successfully explain observations or to solve problems not previously seen.
- A "B" student can solve most homework-like, lab report problems of moderate difficulty, can demonstrate understanding of the major course concepts through using correct problem-solving methods or reasoning, but struggles with using reasoning or correct problem-solving methods to successfully explain observations or to solve problems not previously seen.
- A "C" student can solve most homework-like, lab report problems of easy to moderate difficulty, needs guidance to demonstrate understanding of the major course concepts and use correct problem-solving methods or reasoning, and cannot demonstrate understanding or problem solving methods when solving problems not previously seen.
- A "D" student can solve most homework-like problems of easy difficulty but needs significant guidance to demonstrate understanding of major concepts, which includes the ability to solve more difficult problems or use reasoning, and cannot demonstrate understanding or problem solving methods when solving problems not previously seen.
- A student who cannot demonstrate an understanding of the major concepts of the course through his/her performance will not earn a passing grade.

NAVIGATE:

- I care about your success and utilize the Navigate student success network. Navigate is an early-alert, student-progress system used to inform you of specific concerns and help you succeed in this course. It is designed to promote student success through coordination and communication between students, instructors, and support staff, like advisors.
- Throughout the term, you may receive emails with {NAVIGATE} in the subject line regarding your attendance, course grades or academic performance. Receipt of a Navigate email is an indication that you; (a) should come meet with me to discuss the concerns listed in the email or (b) are being commended for a job well done. **To gain any benefit, it is important that you check your umconnect email regularly and take the recommended actions.** You may also be contacted directly by an Advisor or Campus Support Professional.

OFFICE OF DISABILITY EQUITY (ODE):

- Students experiencing course-related anxiety or students who require alternative formats for course materials or adaptive equipment because of a specific disability should contact Bitterroot College UM Associate Director, Terry Berkhouse (BC–101G; (406) 375-0100; (terry.berkhouse@mso.umt.edu) or the UM ODE office (https://www.umt.edu/disability/, Aber Hall first floor, (406) 243-2243). Once your needs are established, an original letter certifying ODE accommodations must be given to me as soon as possible.
- If you are already certified as an ODE student, please let me know via email as soon as possible and be sure to include your ODE Coordinator in the email, so necessary accommodations can be discussed to ensure full participation. Also, provide me with your ODE letter certifying such needs.

LIMITING COVID-19 TRANSMISSION

Some very basic steps you can take to help limit the transmission of COVID-19 to your family and community:

- **Get vaccinated**. UM students as well as their partners, spouses and household members, are encouraged to get vaccinated. The Health Services Pharmacy inside Curry Health Center are offering vaccines. See https://www.umt.edu/coronavirus/ for scheduling.
- **Wash your hands often** if possible or use hand sanitizer with greater than 67% isopropanol.
- **Avoid touching your eyes, nose, and mouth.**
- **Whether or not you have been vaccinated, wear a mask and stay at least 6 feet away from unmasked people.** When someone coughs or sneezes they spray small liquid droplets from their nose or mouth which may contain virus. Based on SERS and MERS outbreaks, it only takes 1000 virus particles to infect someone with COVID-19. If you are too close, you can breathe in the droplets.
    - Based on influenza studies, an infected person can release up to 33 virus particles per minute just by breathing, which ranges from 50 to 5000 droplets per breath; most of these droplets fall to the ground due to their low velocity. However, speaking increases the release of droplets about 10-fold (~330 virus particles) per minute; at 1000 virus droplets for infection dose, this equates to becoming infected if you have a 3-minute conversation with an unmasked, infected person who may *or may not* be exhibiting symptoms. A single sneeze or cough may contain as many as 200,000,000 (two hundred million) virus particles and, due to exhalation force, these travel far across rooms.
- **Do NOT shake hands or touch others.** According to current data, COVID-19 can be spread by fomite transmission (off of surfaces including hands) where droplets from coughing/sneezing have been deposited. Our goal is to limit transmission, so try bowing instead of a handshake ☺
- **If you have cough or flu-like symptoms, CALL the Curry Health Center or your Primary Care Provider for guidance.** National and local authorities will have the most up to date information on the situation. Calling in advance will allow your health care provider to quickly direct you to the right facility and will also protect you from becoming infected and hinder the spread of other illnesses.
    - Even when sick, you may feel like you can operate in the world; but **you put others around you at risk**. As healthy undergraduates, you are NOT the most "at risk" sector of our population. But it is your responsibility to make sure that you do not transmit any virus to others who might be at higher risk, including those with asthma, respiratory conditions, compromised immune systems, and older people.
- **Practice respiratory hygiene.** Cover your mouth and nose with your bent elbow or a tissue when you cough or sneeze. Then dispose of the used tissue immediately and wash or hands or use hand sanitizer as soon as possible.
- **Don't panic.** Panic is more dangerous than COVID-19.

HELP:

Work with your research partners in and out of lab:

- Often you will have different partners to work with during experiments. However, I encourage you to work with your research partners out of lab also; most students find working with someone or in groups to be the most helpful way of learning chemistry! It is completely appropriate to seek help when completing lab reports. However, letting someone else solve your calculations or provide reasoning for observed phenomena, or copying work from another researcher and submitting it as your own are all

unacceptable practices; they are considered cheating and should be avoided (see ACADEMIC HONESTY).

- NOTE: If you hire non-UM tutors as you pursue your educational goals, please be aware that UM professors are prohibited by federal regulations from interacting with non-UM employees in the course of working with students enrolled in this course.

Office hours:

- Attending office hours is an opportunity for you to meet with me to discuss difficulties you are having with any part of CHMY122: prelab, experiment, problem solving or reasoning through questions asked.

The Internet:

- Search for chemistry resources and help.
  - http://chem.libretexts.org/
  - https://www.khanacademy.org/science/ap-chemistry
  - http://www.simbucket.com/welcome-to-simbucket/
  - http://molview.org/
  - http://www.learningscience.org/physci.htm

Technical Support

- For questions regarding your NetID or password, UMConnect email account, or for technical computer assistance, call the IT Central Help Desk (406) 243-HELP
- For technical support for UMOnline and Moodle, call the UMOnline Support Desk (406) 243-4999
  - Links to these and other technical support resources for students can be found at https://umt.teamdynamix.com/TDClient/2032/Portal/Home/

SOME TIPS FOR SUCCESS:

1) **Understand the time needed for success in this course.**
   - The Carnegie rule for college courses is 2 to 3 hours of outside study time for each hour spent in class, and we will be inside lab together almost 3 hours each week. Combining the time inside the lab and the calculated study time outside of class, that's 9 to 12 hours each week you should budget for this course. Consider this time commitment as you choose your semester course load and employment availability.
2) **Do NOT guess; instead, focus on critically thinking through the lab reports and data.**
   - Your comfort level in your future job and your grade will directly reflect your understanding of the empirical trends and phenomena, not whether you can guess it right. *If you are having difficulty with answering questions, please see me during office hours* or make an appointment.
3) **Go over prelab lecture notes, read the Experiment Handout, and do Prelab Prep work a day or two before the experiment (at minimum).**
   - If you don't fully understand the experiment, email me or see me during office hours.
4) **Keep your course materials together in a binder.**
   - Studies have shown that simply being organized helps you succeed.
5) **Avoid looking at how other people solve problems before attempting to solve it yourself.**
   - For you to gain confidence in your ability to solve problems, you must give yourself the chance to find ways of solving them. Sometimes your way of solving a problem may be different than the method another person uses; this does NOT mean it is wrong, if your method is mathematically logical. Alternative ways of solving problems is what leads to innovation and there are many creative ways of solving problems. If you cannot solve a problem, look back over the appropriate section in

your chemistry textbook, look at your lecture notes, etcetera. Remember, the point of solving problems in lab is to learn to think about *how* to solve them and then be able to solve them when you are working in a laboratory or other environment, where your patient or boss will not have "the answer".

- Avoid spending hours on any single problem. If you are having difficulties, consult your lab partner, if applicable, the SSC tutor, or me.

6) Bring prelab lecture notes to lab with your experimental handout.

- Prelab Lecture notes will be available on the course website for downloading and/or printing prior to their corresponding lab session; use these notes to write down personal notes, information, and problem-solving logic discussed during the prelab lecture. Many times, this will help clear up any misconceptions later and help you write your lab reports.

7) Look at and assess all returned lab reports for items you may have misunderstood.

- Compare your work to the solution provided and if they do not exactly match, figure out why. Sometimes your way of solving a problem may be different than the method a solution suggests; this does NOT mean your method is wrong, especially if it is mathematically logical and leads to the correct answer. Alternative ways of solving problems can lead to innovation; thus, creativity in problem solving is encouraged. Regardless, it is important to make notes of what you are learning from your returned work; you can do so right on the report or worksheet!
- This way of learning is utilizing a technique called the **Feedback Loop**. You match the question you're assessing to its solution and try to figure out why your answer wasn't correct. Was the error in word choice, usage, or clarity? Was your answer ambiguous or did you dance around the answer because you were unsure? Did you omit a conversion factor or not know how to apply it, or did you forget about sig figs? Keep notes in your returned reports about what you learned, and then, work on reducing the occurrences of those types of mistakes in your next report. This assessment – evaluation – notation feedback loop will help you learn from your mistakes, so you avoid repeating them. The goal is to figure out where the breakdown is occurring and take action to improve it.

8) Actively participate.

- Ask questions to clarify concepts that are not clear to you before, during, or after lab or during office hours. You may judge your question as "basic" or "simple", but you are certainly not the only student who has that same question, so help yourself and everyone else out and ask! Bring your calculator to lab; you will likely use it every day!

9) Set a goal of working each day on prelab preparation work and lab reports, even if it is only possible in 30-minute intervals.

10) Form study groups with your classmates.

- Get to know your fellow classmates EARLY; meet at least 2 students the first week and get their phone numbers or emails. Form a study group to work on problems.

11) Get help early!

Resources:

- Me: Ask me for help, both in and out of class. I am happy to meet with you if answer questions over email and during office hours, so make an appointment to see me.
- Other CHMY122 students. Schedule regular lab "jam" sessions in person or on Google Hangouts, Facetime, Skype, set up a Zoom meeting, or use another favorite video communication application to go over prelab preparation and lab report questions.
- The Internet: See HELP section.

FREQUENTLY ASKED QUESTIONS:

1) **How can I guarantee I get a grade of ___ to graduate/keep a scholarship/remain eligible?**
   - Your grade is solely based on the points you earn during your performance of course-related work. Your best bet is to take the advice I set forth in this syllabus and work diligently during the semester to ensure you earn the points you need for the grade you want. Grades are not changed post semester.
2) **I am going out of town. Can I turn in my lab report late?**
   - Yes, but late lab reports are penalized 10% each day, including weekends (See Lab Report section). If you know you are leaving town, I recommend turning in the lab report early rather than late.
3) **I study more for this course than I have for any other course in my whole life and I'm still getting a "B". What can I do to bring my grade up to an "A?**
   - This is a complicated question, as the answer may lie in several different areas. With respect, you may actually need to spend more time completing lab reports, which includes carefully thinking about your answers. Talk with an "A" student about their study habits and get them to join your study group! Additionally, speak with me or the SSC tutor for help.
4) **I'm not doing well in this course and I'm not going to pass. Is it ok for me to take an incomplete now and finish the course next semester?**
   - No. The only circumstances that a grade of "incomplete" is assigned is for students who are passing the course but have a documented reason for missing the final such as serious illness, etc.
5) **Even though I earned a _____ grade, I deserve a _____ grade because of circumstances I face in my life. Will you consider raising my grade?**
   - No, I cannot. I understand that some students have jobs, are single parents, are caring for elderly parents or grandparents, etcetera. While your efforts in taking this course under those circumstances are remarkable, your grade is solely based on the points you earn during your performance.

LEGAL NOTICES:

This course syllabus is not a contract; it is a tentative outline of course policies. I reserve the right the update this syllabus at any time during the semester. Last updated 9/20/22

POINT-BY-POINT COMPARISON BETWEEN HIGH SCHOOL AND COLLEGE *by Pat Feldman and Vicki Hill of Southern Methodist University's Altschuler Learning Enhancement Center*	
PERSONAL FREEDOM IN HIGH SCHOOL VS. PERSONAL FREEDOM IN COLLEGE	
High school is mandatory and free (unless you choose other options).	College is voluntary and expensive.
Your time is usually structured by others.	You manage your own time.
You need permission to participate in extracurricular activities.	You must decide whether to participate in extracurricular activities. (Hint: Choose wisely in the first semester and then add later.)
You need money for special purchases or events.	You need money to meet basic necessities.
You can count on parents and teachers to remind you of your responsibilities and to guide you in setting priorities.	Guiding principle: You're old enough to take responsibility for what you do and don't do, as well as for the consequences of your decisions.
HIGH SCHOOL TEACHERS VS. COLLEGE PROFESSORS	
Teachers check your completed homework.	Professors may not always check completed homework, but they will assume you can perform the same tasks on tests.
Teachers remind you of your incomplete work.	Professors may not remind you of incomplete work.
Teachers approach you if they believe you need assistance.	Professors are usually open and helpful, but most expect you to initiate contact if you need assistance.
Teachers are often available for conversation before, during, or after class.	Professors expect and want you to attend their scheduled office hours.
Teachers have been trained in teaching methods to assist in imparting knowledge to students.	Professors have been trained as experts in their particular areas of research.
Teachers present material to help you understand the material in the textbook.	Professors may not follow the textbook. Instead, to amplify the text, they may give illustrations, provide background information, or discuss research about the topic you are studying. Or, they may expect you to relate the classes to the textbook readings.
Teachers often write information on the board to be copied in your notes.	Professors may lecture nonstop, expecting you to identify the important points in your notes. When professors write on the board, it may be to amplify the lecture, not to summarize it. Good notes are a must.
Teachers impart knowledge and facts, sometimes drawing direct connections and leading you through the thinking process.	Professors expect you to think about and synthesize seemingly unrelated topics.
Teachers often take time to remind you of assignments and due dates.	Professors expect you to read, save, and consult the course syllabus (outline); the syllabus spells out exactly what is expected of you, when it is due, and how you will be graded.
GRADES IN HIGH SCHOOL VS. GRADES IN COLLEGE	
Grades are given for most assigned work.	Grades may not be provided for all assigned work.
Consistently good homework grades may help raise your overall grade when test grades are low.	Grades on tests and major papers usually provide most of the course grade.
Initial test grades, especially when they are low, may not have an adverse effect on your final grade.	Watch out for your first tests. These are usually "wake-up calls" to let you know what is expected—but they also may account for a substantial part of your course grade. You may be shocked when you get your grades.
You may graduate as long as you have passed all required courses with a grade of D or higher.	You may graduate only if your average in classes meets the departmental standard--typically a 2.0 or C.
Guiding principle: "Effort counts." Courses are usually structured to reward a "good-faith effort."	Guiding principle: "Results count." Though "good-faith effort" is important in regard to the professor's willingness to help you achieve good results, it will not substitute for results in the grading process.

A BRIEF PRIMER ON DELIBERATE PRACTICE

by Geoffrey Colvin

The best people in any field are those who devote the most hours to what the researchers call "deliberate practice." It's activity that's explicitly intended to improve performance, that reaches for objectives just beyond one's level of competence, provides feedback on results and involves high levels of repetition. For example: Simply hitting a bucket of balls is not deliberate practice, which is why most golfers don't get better. Hitting an eight-iron 300 times with a goal of leaving the ball within 20 feet of the pin 80 percent of the time, continually observing results and making appropriate adjustments, and doing that for hours every day—that's deliberate practice.

Consistency is crucial. As Ericsson notes, "Elite performers in many diverse domains have been found to practice, on the average, roughly the same amount every day, including weekends." Evidence crosses a remarkable range of fields. In a study of 20-year-old violinists by Ericsson and colleagues, the best group (judged by conservatory teachers) averaged 10,000 hours of deliberate practice over their lives; the next-best averaged 7,500 hours; and the next, 5,000. It's the same story in surgery, insurance sales, and virtually every sport. More deliberate practice equals better performance. Tons of it equals great performance.

All this scholarly research is simply evidence for what great performers have been showing us for years. To take a handful of examples: Winston Churchill, one of the 20th century's greatest orators, practiced his speeches compulsively. Vladimir Horowitz supposedly said, "If I don't practice for a day, I know it. If I don't practice for two days, my wife knows it. If I don't practice for three days, the world knows it." He was certainly a demon practicer, but the same quote has been attributed to world-class musicians like Ignace Paderewski and Luciano Pavarotti.

Many great athletes are legendary for the brutal discipline of their practice routines. In basketball, Michael Jordan practiced intensely beyond the already punishing team practices. (Had Jordan possessed some mammoth natural gift specifically for basketball, it seems unlikely he'd have been cut from his high school team.)

For most people, work is hard enough without pushing even harder. Those extra steps are so difficult and painful they almost never get done. That's the way it must be. If great performance were easy, it wouldn't be rare. Which leads to possibly the deepest question about greatness. While experts understand an enormous amount about the behavior that produces great performance, they understand very little about where that behavior comes from. The authors of one study conclude, "We still do not know which factors encourage individuals to engage in deliberate practice." Or as University of Michigan business school professor Noel Tichy puts it after 30 years of working with managers, "Some people are much more motivated than others, and that's the existential question I cannot answer “why."

The critical reality is that we are not hostage to some naturally granted level of talent. We can make ourselves what we will. Strangely, that idea is not popular. People hate abandoning the notion that they would coast to fame and riches if they found their talent. But that view is tragically constraining, because when they hit life's inevitable bumps in the road, they conclude that they just aren't gifted and give up. Maybe we can't expect most people to achieve greatness. It's just too demanding. But the striking, liberating news is that greatness isn't reserved for a preordained few. It is available to you and to everyone.