Fall 9-1-2022

CHMY 123.BH00: Introduction to General, Organic and Biochemistry - Hamilton

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Syllabus and Manual for
Introduction to General, Organic, and Biochemistry
CHMY123 – CRN: 73614 / 73615 (4 credits)
FALL 2022

COURSE OBJECTIVES:

CHMY123 is designed for students requiring an introductory understanding of organic chemistry though the study of nomenclature and chemical and physical properties of simple organic compounds and some of their fundamental reactions in biochemical environments. As a student in this course, you will be using this background to focus on organic compounds found in biological structures, their polymerization into larger molecules (like proteins and nucleic acids), and the metabolic function and information transfer that occur in living systems.

Learning Outcomes – Upon completion of CHMY123, students should expect to successfully:

- Name common and substituted organic molecules containing various organic functional groups using IUPAC and common nomenclatures.
- Compare and contrast the chemical and physical properties of organic functional groups, including how dominant intermolecular forces define the function and structure of different classes of macromolecules.
- Predict ionization of amphipathic organic molecules in aqueous acidic, basic, or physiological environments and the impacts on structure and/or function.
- Recognize and predict structures for the major biological molecules including proteins, carbohydrates, lipids, and nucleic acids.
- Examine the kinetics and predict regulation of enzyme–catalyzed reactions.
- Understand the role of reduction–oxidation (redox) reactions occurring in metabolism and identify the key energy-absorbing and energy-emitting steps involved.
- Demonstrate how oxidation of organic substrates is coupled to production of chemical energy in biological systems.
- Identify biochemical mechanisms of information transfer (replication, transcription, and translation) and the biomolecules involved.
- Demonstrate increased knowledge and experience that will support future studies in fields that require a familiarity with organic and biochemistry.

COURSE INFORMATION:

- **Lectures**: M W Th F, 9:30 – 10:20 am
  - Locations:
    - **In-class learning**: Bitterroot College (BC) – 119
    - **Remote learning**: Live-streaming on Zoom
      - Meeting URL: https://umontana.zoom.us/j/99123673000
      - Zoom Meeting ID#: 991 2367 3000
      - **Be sure to download, print, and read the "Zoom Instructions" from the Zoom Information topic on Moodle and KEEP IT NEAR YOUR COMPUTER DURING LECTURE SESSIONS**
- **Course website**: http://moodle.umt.edu
- **Office Hours**: By appointment, in person at BC-103C or on Zoom
  - If on Zoom, meeting URL: https://umontana.zoom.us/j/4947995148
    - Meeting ID#: 494 799 5148

- **For remote learning, you can join a meeting by (use one of the following options):**
  - Click on the meeting link of interest (lecture or office hours) in the Zoom Information topic on our Moodle site. For lectures, you will have to sign in using your NetID@umconnect.umt.edu and password.
  - Click on or copy and paste the URL of interest (lecture or office hours) into your browser to be directly connected to a meeting. For lectures, you will have to sign in using your NetID@umconnect.umt.edu and password.
  - Log in to Zoom, click on Join a Meeting, and type in the Zoom Meeting ID#. Sign in using your NetID@umconnect.umt.edu and password.
- **Pre-requisites and Co-requisites**: A grade of "C-" or better in CHMY121N. CHMY124 is the Lab course that accompanies CHMY123. Most majors that require CHMY123 also require CHMY124 Lab, which is why CHMY124 Lab is listed as a co-requisite, but check with your advisor.

CONTACT INFORMATION:

- Instructor: Jennifer Johnson
- Email: jennifer.johnson@mso.umt.edu
- Office: BC – 101C or on Zoom
- 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
- 9/16 (5pm) – Last Date to Drop course with refund and without "W"
- 10/31 (5pm) – Last Date to Drop course with "W"

REQUIRED MATERIALS:

Textbook

- **Fundamentals of General, Organic, and Biological Chemistry, 8th Edition**
  - Authors: McMurray, Ballantine, Hoeger, and Peterson
  - Pearson Education, Inc., 2017
    - The bookstore's First Day Inclusive Access Program gives you access to required digital course materials ***on the first day of class*** (including an electronic copy of the textbook) at a discounted rate that the University of Montana Bookstore has negotiated on your behalf; see Homework and Worksheets topic on Moodle to register for your textbook and access code to the online learning system (see Online Learning System below)
      - ***Your specially discounted price is included with your course fee***, but you have the option to opt out of the program to have that cost refunded to your student account (see link in Homework and Worksheets topic on course website). However, if you decide to opt out of this program, you must do so by 5:00PM MDT on the add/drop deadline date (see Important Dates section). You will receive the refund later in the term, and you must purchase your online course materials elsewhere, including access to Mastering Chemistry (online homework module).
        - ***To opt out:***
          - Click the RedShelf link in Moodle (Homework and Worksheets topic)
          - Click View Course Materials
          - Scroll down to the gray opt-out button and follow the prompts

- For any questions about billing, please contact Caleb Rehbein at crehbein@bncollege.com
- For any questions about using your eBook, please reference RedShelf Solve.

- *To use the eBook:*
  - Click the RedShelf link in Click the RedShelf link in Moodle (Homework and Worksheets topic)
  - Click View Course Materials.
  - Click Start Reading
- A loose-leaf paper "hard" copy of the textbook is also available at the UM Official Bookstore for a *discounted rate or directly through Pearson (with free shipping).*

Online Learning System

- **Mastering Chemistry (modified)** for Fundamentals of General, Organic, and Biological Chemistry; cost is *included with your tuition* through the bookstore's First Day Inclusive Access Program.
  - **Course ID: johnson48156 (**https://www.pearsonmylabandmastering.com/northamerica/masteringchemistry/)
  - **Course Name:** CHMY123 – Fall 2022
    - If you HAVE used a Pearson product previously, you can sign in using your former login ID and password.
    - If you HAVE NOT used a Pearson product before, you will need to register as a student to access the homework for my course. For instructions, read the Registration Info handout in the Homework and Worksheets topic on Moodle.
    - Everyone registered in the class has access to Mastering Chemistry AT NO ADDITIONAL CHARGE unless you opt out of the bookstore's First Day Inclusive Access Program; only students who opt out will need to purchase an access code through Pearson to register for Mastering Chemistry access. Students who are repeating CHMY123 from last semester can use their access code from last semester to enroll.

Technology Requirements

- All CHMY123 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.

Notebook or Recycled paper in 3-ring binder

- Consistently practicing by doing homework is key to success in this course. Bring your work in your 3-ring binder when you attend office hours.

A pack of 40 or more 3×5 index cards

- You can use these to summarize concepts, reactions, structures, nomenclatures, etcetera. Use them in active practice to prepare for quizzes and exams.

Technology Requirements

RECOMMENDED MATERIALS:

Organic Molecular Model Kit

- **CHMY123 model kit** is available in UM bookstore

COURSE EXPECTATIONS:

All lectures will be delivered live (synchronously) in both face-to-face and remote modalities. Remote learners will be attending lectures using Zoom during regularly scheduled times and you are expected to attend and participate. If you know you will be absent, let me know beforehand so we can arrange for you to submit in-class activities prior to your absence. If you are absent, *you are responsible* for catching up but there are no make-up activities for those missed. All lectures will be recorded and will be made available on Moodle.

You can expect to attend lectures, to work on practice problems and activities synchronously and asynchronously and to attend office hours. All students expecting to receive a grade in my course must be enrolled. The course content is cumulative throughout the semester; you will have more fun if you master the fundamentals!

Certain student performance standards are expected and unconditional.

- **Stay home if you feel sick**; do NOT come to class.
  - If you are sick or displaying COVID-19 symptoms, contact your primary care physician or you can get tested at the Curry Health Center; (406) 243-4330.
  - If you are required to isolate or quarantine, you will receive support in the course to ensure continued academic progress. I will be recording all lectures to which you will have access during quarantine.
- **Get vaccinated as soon as possible**. UM recommends students get the COVID-19 vaccine. Please direct your questions or concerns about vaccines to Curry Health Center.
- **Stay up to date with COVID-19 information** from the University of Montana Coronavirus Website: https://www.umt.edu/coronavirus.
- **Be prepared *BEFORE* each lecture**. Preparation includes bringing and going over lecture notes, bringing applicable worksheets, and reading the assigned text.
- **Bring to lecture/recitation your solutions to all "Let's Practice" problems** (viewable in posted lecture notes). "Let's Practice" problems will stimulate generative learning, which has been shown to accelerate the brain's encoding process to promote long-term learning. Limited time will be given during lecture to answer these in-class problems, so be sure to attempt to answer them *before coming to lecture*.
- **Actively question your understanding** of the topics and prepare yourself to encounter unfamiliar problems; this will increase your learning through spaced retrieval of concepts. The textbook will NOT be reiterated in lecture; it will be clarified, often expanded, and applied to local, global, historic, and current issues.
- **Budget enough time** in your life for homework and other forms of active practice.
- **Be punctual**, arriving on-time to lecture, and to **actively participate**.
- **Be professional and polite** *to everyone in the course and at the Bitterroot College UM.*
  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 course leader, I am responsible to present course materials to you in a way as clear and organized as I am able and to support you should you ask. Among various issues, I can help you with learning strategies, getting focused on pertinent ideas, and sorting through hazy concepts and misconceptions. My goal is to show you how to think autonomously through a problem and reason out choices for 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 lecture (see Course Objectives and Course Expectations sections). Most importantly, ***you alone are responsible for understanding what I am teaching and mastering learned skills***. In other words, you will need to make the connections between what you hear and see in lecture 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.

Yet, avoid being lulled into a false sense of mastery by simply rereading the textbook; learning chemistry requires an investment of your time and energy. The only way to know what you know and to know what you do not know is by practice; so do homework, take practice exams, do lots of varied practice online and space out your practice so you get a true idea if you've mastered what you are practicing.

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 chemistry by attending and participating in lecture, by varying your practice in doing homework, and by seeking out help when needed, you can expect to be successful in my course. In contrast, procrastination of your study time, not doing your homework, or cramming for exams will not help you understand the course material or be a proficient thinker, and your grade will likely reflect your lack of understanding. If your usual approach to coursework is to procrastinate your way through, you will find my course daunting, unsatisfying, and unsuccessful, and I do not recommend you take my course until you are ready to commit to it.

CLASS ACTIVITIES AND COURSE CONTENT:

This course consists of three (3) lectures and one (1) recitation session per week in which we will be engaged in discussions, simulations, and individual and group activities. You should expect us to cover various topics in Chapter 12 through 28 of your textbook (see Schedule for details).

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 lecture notes and other relevant course materials.

HOMEWORK:

Homework will be done online through the Mastering Chemistry platform. Depending on your level of understanding, you may choose to do more problems to master specific material. I encourage you to work within groups, in-person or on Zoom to practice and understand concepts from the homework. However, bear in mind that exam questions will be based on homework and you will be taking the exams alone, so it is critical that you understand HOW to solve problems *alone*. Thus, not doing homework or having another student solve your problems for you will not help you master concepts and problem solving and will likely negatively affect your exam scores. To adequately prepare for taking exams, you must first practice solving problems, paying special attention to those problems that are especially difficult for you. If you have questions, feel free to see me during office hours.

- **Mastering Chemistry (MC) homework** (online)
  - MC homework will be assigned each week and each assignment will be worth 20 points. To increase your proficiency (and your score), you will have up to 5 attempts to correctly answer each problem *while the chapter homework is available*. However, to discourage random answering, a 10% to 25% deduction will be assessed for each incorrect answer, depending on the type of question asked (Multiple Choice / Fill-in-the-Blank). Thus, it will be to your benefit to figure out why any answer is incorrect before you attempt it again, even possibly leaving it to solve later.

- You will reap the greatest benefits from practicing with Chapter homework while the specific chapter is being covered in lecture and redoing that homework before the exam (called spaced practice); this will help you better integrate information and to be able to discuss with me any problem-solving issues that arise.
  - A "How to Use Mastering Chemistry" review on Mastering Chemistry is currently available for you to practice using Mastering Chemistry for some extra credit.
- As much as possible, I will have homework for this course accessible on the first day of class. Most online homework assignments are due by ***11:59pm on Fridays with some assignments being due the night before the exam*** covering that material; however, I recommend checking the updated Schedule to verify due dates. After a chapter homework is due, you may continue to practice it as much as you want; however, any late homework submitted will receive a 5% reduction in net score.
- If you are using the solutions manual corresponding to our textbook, keep in mind that solutions manuals should always be used as a way of checking your answers *ONLY AFTER completing the problem. In other words, NEVER TRY TO COMPLETE A PROBLEM WITH THE SOLUTION IN FRONT OF YOU*; this practice will only give you a false sense of understanding and mastery. For you to gain confidence in your ability to solve problems correctly, you must allow yourself the chance to discover ways of solving them and yes, even make mistakes! Further, visits with me in office hours will increase your ability to solve problems, so come see me if you do know where to start.
- I have also added Dynamic Study Modules as study tools, which will help you assess your mastery of a given subject; these are not for credit and listed after assigned homework in Mastering Chemistry. Read the titles carefully to determine which module would be best for you to use; they are definitely helpful!

WORKSHEETS AND QUIZZES:

- Worksheets will be completed during class and are due to be submitted on Moodle by ***11:59pm the day after completion in class***. For example, if a worksheet is completed in class on a Monday, it is due to be submitted on Moodle by Tuesday before 11:59pm.
- Once your completed worksheet is submitted, you will be granted access to the Moodle quiz corresponding to that worksheet. NOTICE: Incomplete worksheets submitted will result in a zero score on the corresponding quiz, so if you have difficulty submitting a worksheet, call me immediately. A quiz must be completed on Moodle by ***11:59pm the day after submission of its corresponding worksheet***. For example, if Worksheet 5 is submitted on a Tuesday, Quiz 5 must be completed by Wednesday before 11:59pm.
  - **Quizzes are closed book and closed note and have time limits**. Your lowest two (2) quiz scores will be dropped.

***There are no make-up homework assignments or quizzes*.** **It is *your* responsibility to know when homework, worksheets, and quizzes are due and how to complete and submit them for grading**. Due dates for work are *tentatively* listed in Mastering Chemistry and on Moodle; however, we may be able to cover certain topics more quickly or some topics may take longer to cover than scheduled, so attend lecture to know when assignments are due. If you have questions about an individual online question or assignment, feel free to email me or make an office-hour appointment.

EXAMS:

- During the semester, **four (4) examinations** will be given that will consist of two (2) parts: Part 1 will be a Moodle "quiz" and Part 2 will be a written part.
  - **Part 1 will be closed book / closed note** Moodle quiz where the use of help sheets, periodic tables, calculators, and other electronic devices *is strictly prohibited*. You will have one (1) attempt to

complete Part 1 within a time limit, and you will not be given feedback or know your score until the exam closes for all students. However, once you complete Part 1, you will be given access to Part 2 of the exam.

- **Part 2 will be open book / open note** where you may access any materials available to you during the exam. Part 2 will be a written exam in which you are expected to demonstrate how you solve various problems using methods learned in class. You must submit Part 2 of your exam on Moodle ***before 11:59pm on the Friday in the week Part 1 was due***. For example, if Part 1 of an exam was due on Wednesday, Part 2 would be due that Friday (2 days later).
- NOTICE: If you do not write your name on an exam submitted in Moodle, **you will lose 1 point for each name (first and last)**. Moodle does not assign names on any exams and having to write names on submitted work extends my grading time.

- Each exam will be worth 100 points total with exam questions taken from material covered in lecture, homework, and worksheets.
- There are no make-up exams.
- **Final Exam –** The final exam for this course is cumulative, worth 160 points, and cannot be dropped. Like other exams, the Final Exam will be administered as two (2) parts: a timed Moodle quiz and a written portion to be submitted electronically. **Unlike other exams, the Final Exam is entirely closed book.**
  - There is no make-up final exam, which means it is your responsibility to be present to take the Final Exam during Finals week. Your final exam percentage (if higher) will be used to replace your lowest exam percentage.

Exam Disputes

You are welcome to contest questions or grading on exams. Disputes must be emailed to me within 1 week after the exam.

Preparing for exams

- If you are a remote learner, use Google Hangouts, Facetime, Skype, Zoom, or your favorite video communication application to study in a group and quiz each other. If you are an in-class learner, get together at the Student Success Center at the Bitterroot College or at another location convenient for your study group – you will know if you know something well when you can teach it! But beware; rereading does not constitute understanding, just regurgitation. You must practice to know if you know something!
- Come see me in office hours.
- Redo online homework problems. Spaced practice helps cement how to solve problems.
- Sleep well the night before, get up at least 2 hours before, and shower before starting your exam.
- Eat a healthy breakfast containing a balanced combination of complex carbohydrates, fats, and protein; your brain needs quality fuel!
- Breathe; if you are overly stressed during your exam, your problem-solving ability slows down. Take a deep, cleansing breath if you feel yourself getting stressed and remind yourself that this exam is not a contest with other students . . . you are just revealing to yourself what you know and what you don't know; it's a gift for learning!

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 giving or receiving assistance on any exam. 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 exam will receive a zero on the assignment, and an Academic Dishonesty Report will be filed with the Director of Bitterroot College UM and the UM Office of Community Standards. A zero on an exam resulting from cheating will not be replaced.

- 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 CHMY123 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.

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. Remote learning is especially distractive and requires the utmost focus to stay alert and on course during lectures. **Disruptive behaviors are not limited to but include texting, tweeting, talking or using a computer, a cell phone or another handheld device for non-CHMY123 activities during lecture. While I am lecturing, these behaviors are VERY disturbing.** If I consider your behavior as disruptive, you may be asked to leave the classroom (in-person or remote), and such behavior will be grounds for disciplinary action through the UM Office of Community Standards office.

GRADING POLICY:

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

Grade Distribution	Percent Allocated (Weight)
LP (polling) points and Online Homework	10%
Quizzes	20%
Exams (4 Exams)	50%
Final Exam	20%
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 on Moodle as current as possible; however, knowing your grade is your responsibility. 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 grade ranges guarantees your grade for the course:

Grade	Percentage Range	Grade	Percentage Range
A	93.0 and higher	B–	82.9 – 80.0
A–	92.9 – 90.0	C+	79.9 – 77.0
B+	89.9 – 87.0	C	76.9 – 73.0
B	86.9 – 83.0	C–	72.9 – 70.0

Grade	Percentage Range	Grade	Percentage Range
D+	69.9 – 67.0	D–	62.9 – 60.0
D	66.9 – 63.0	F	below 60.0

For students registered as an auditor or those listening to the course without earning credit, a grade of audit (AUD) will be issued. If an auditor, you may listen to the entire course or any part thereof at your discretion.

Grade Rubric:

- An "A" student can solve homework-like problems of moderate or harder difficulty under exam conditions 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 homework-like problems of moderate or harder difficulty under exam conditions, 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 homework-like problems of easy to moderate difficulty under exam conditions, 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 homework-like problems of easy difficulty but needs significant guidance to demonstrate understanding of the major concepts of the course, which includes the ability to solve more difficult homework-like problems or use reasoning on exams, 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.

OFFICE OF DISABILITY EQUITY (ODE):

- Students experiencing course-related anxiety (due to testing, etcetera) 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.

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.

LIMITING COVID-19 TRANSMISSION

We will be learning a bit about the structure of the SARS-COV-2 virus. **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 in groups:

- I encourage you to work in groups both in and out of class; most students find working in groups to be the most helpful way of learning chemistry! If you are not comfortable meeting face to face, there are alternatives: use Google Hangouts, Facetime, Skype, set up a Zoom meeting, or use another favorite video communication application to study in a group and quiz each other – you will know if you know something well when you can teach it! It is completely appropriate to seek help from other students while completing course assignments. However, letting someone else solve your homework problems or copying and submitting identical worksheets are all unacceptable practices; they are considered cheating and should be avoided (see Academic Integrity).

Work with a tutor:

- Schedules of tutors are listed on our course website. However, if you hire non-UM tutors as you pursue your educational goals, please be aware that UM faculty are prohibited by federal regulations from interacting with non-UM employees while working with students enrolled in this course.

Office hours:

- Setting up an office-hour meeting is an opportunity for you to discuss with me difficulties you are having with any CHMY123 material. I enjoy interacting with students and encourage questions, so please make the effort to come see me.

Dynamic Study Modules in Mastering Chemistry:

- Dynamic Study Modules can give you a window into your mastery of organic and biochemistry topics. You can find them in Mastering Chemistry just under the assigned homework. Choose a module based on its title that will help serve you best!

Tutorials and Simulations:

- I have posted links to a wide variety of chemistry-related games, simulations, and tutorials on our Moodle site in the "Tutorials, Simulations, and other Helpfuls!" topic. These activities are designed to help you learn organic chemistry concepts in an interactive and fun way, so dork out! 😊

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

Tutors:

- Weekly "Study Jam" UM Tutor (https://www.umt.edu/study-jam/tutoring) sessions
- Private tutors can be found through the Office of Student Success: Office for Student Success Site

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 3 hours of outside study time for each hour spent in class. We will be together over 10 hours each week, which translates to 30 hours of effective study time you should be doing outside of class each week. Combining the time inside and outside of class, this course is like having a full-time job . . . treat it as such! Regular study time for chemistry needs to be scheduled into your day; course material can be mastered sequentially in manageable chunks, but cramming is not effective for learning it. Consider this time commitment as you choose your employment hours.

2) Focus on understanding the material, not memorizing it.

- Even though some of organic and biochemistry requires a bit of memorization, your comfort level and your course grade will directly reflect your understanding of the course material, not whether you can memorize it.

3) ***<u>Before</u> attending lecture,* go over lecture notes, do Let's Practice problems, and use the textbook or online resources to get more information, if you need it.**

- After reading a section, try some homework problems for that section, even if you don't fully understand the material yet . . . it will not hurt you to try them, and you might be surprised at how much you learned just by preparing for lecture. Return later to complete online homework problems; this "time away" will allow you to forget some things, relearn or recall them, and make your learning even stronger!
- Briefly go over your notes before coming to lecture. Focus on key concepts to get a sense of new words and phrases that are going to be used.

4) **Keep your course materials together in a binder.**

- Studies have shown that simply being organized helps you succeed. I used to call my organic chemistry binders my "O-Chem Books of Knowledge" ☺

5) **Attempt all chapter homework before the end of the lectures corresponding to that chapter.**

- Yet, avoid spending hours on any single problem. Notate questions as "easy," "medium," and "challenging", so you can prepare for exams by redoing the "medium" and "challenging" questions. Great learning comes from spaced practice! Do your homework under exam-like conditions (quiet room, time your problem-solving, etcetera).
- Metacognition is understanding how your think, which is important to know about, particularly when practicing (i.e., completing homework). After each question you complete, check your answer, and evaluate if you have learned to solve that type of problem or demonstrate understanding of that concept. Use the Dynamic Study Modules in Mastering Chemistry to help you assess where you are challenged the most and to correct misconceptions.
    - Homework is not to be used to get a "right answer"; it is designed to help you learn principles and practice applying them, so that you ultimately will be able to apply them to future unfamiliar problems. Thus, it is useful to ask yourself (especially if you made mistakes), "What did I learn doing that problem, that is, what did it teach me?" and "Did I show mastery of that concept?" before moving to the next problem. Avoid mindlessly doing homework problems repeatedly for hours with the hope that the concepts will magically stick; they will not. Use study to achieve comprehension, not memorization. And feel free to check your solutions with me.

6) **Look at and assess all returned materials (homework, worksheets).**

- Compare your work to the given solution or answer 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. 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 page.
- This learning technique is called the **Feedback Loop**. You match the question you're assessing to its corresponding homework question and then trying to figure out why your answer wasn't correct. Were you able to answer the question correctly when it was homework but not when it was on the quiz or exam? Did you answer the question incorrectly on the quiz and repeated the same error on the exam? Did you make a "simple" error? And keep notes about what you learned as you go over your returned work; then, you can work on reducing the occurrences of those types of mistakes on the next quiz or exam. 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 a breakdown is occurring and act to improve it.

7) **Avoid looking at the answer key or solution before solving a problem.**

- There are answers in the book and in solutions manuals. When solving problems, I recommend that you do NOT solve any problems with the answers or solutions manual open. Until you can solve a problem without looking at the solution, you have not yet mastered that material. For you to gain confidence in

your ability to solve problems, you must give yourself the chance to find ways of solving them by making mistakes! If you cannot solve a problem, look back over the appropriate section in your textbook, look at your lecture notes, etcetera. Remember, the point of solving problems 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 a "solutions manual".

8) Bring the lecture notes to lecture in either paper or electronic format (laptop, tablet, etcetera).

- Lecture notes will be available on the course website for downloading and/or printing; use these notes to write down personal notes, information, and problem-solving logic discussed in lecture.
- As soon as possible after lecture, go over your lecture notes, preferably with one or two other students and work on correcting any missing knowledge or problem-solving methods; this will help you clear up any misconceptions. If it helps, summarize the main points of the lecture on a 3×5 card.

9) Actively participate in Lecture.

- Ask questions to clarify concepts that are not clear to you before, during, or after lecture or in office hours. You may judge your question as "basic" or "simple", but you are certainly not the only student who has that question, so help yourself and everyone else out and ask! During lecture, annotate the provided lecture notes by making your own notes on them.
- Actively work example problems. If you get stuck, make a note of why you are stuck, so you can learn from it later.

10) Work on homework each day and return to past problems already solved.

- Staying caught up on practicing is key to honing skills! Ensure your study environment is a quality one; that is, be sure to put your phone away and remove any other distractions. Return to problems already completed to ensure you are encoding those concepts and skills for later recall during exams. Use the Dynamic Study Modules to help you observe your strengths and weaknesses with respect to concepts and problem solving.

11) Form study groups with your classmates.

- Get to know your fellow classmates EARLY; use the Discussion topic on Moodle to meet at least two (2) students the first two class sessions and get their phone numbers or emails. Form a study group to work on problems and to study for exams.

12) Prepare for exams by redoing homework from corresponding chapters and Dynamic Study Modules on given subjects.

- Start with problems you have marked as "challenging", followed by "medium" and "easy" problems as time permits. Questions on exams will be randomized, so be sure you are able to do problems without the cue of knowing from where they came. One way of simulating this is to print out or photocopy homework questions, cut the copies into individual questions, put them in a container, and randomly pick them out and solve them.
- Look at and assess returned exams in the same way you assess returned homework and worksheets. Identify why your answer or solution was not adequate. If you are unsure, talk with your study group, your tutor, or come to office hours. Keep in mind, the best way to learn from mistakes is to correct them as they occur.

13) 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 in office hours, so make an appointment to see me.
- Go to the "Study Jam" UM Tutor (https://www.umt.edu/study-jam/tutoring) weekly

- Other CHMY123 students. Schedule regular study sessions in person or on Google Hangouts, Facetime, Skype, Zoom, or use another favorite video communication application to study in a group.
- 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've heard about "studying smarter, not harder"; how do I do that?

- As Thomas Edison said, "Genius is one percent inspiration and ninety-nine percent perspiration." Most improvements will be made by studying harder; there's no way around it. It takes work, sacrifice, and self-discipline to get good grades. However, one way of "studying smarter" is to set aside 2 hours each day (minimum) for this course. "Studying smarter" can also mean completing problems *before* checking answers and to learn from feedback given (see SOME TIPS FOR SUCCESS section).

3) I am going out of town because _____. Can I take the exam on a different day?

- Unfortunately, I cannot write separate make-up exams for each student with special circumstances. Even if I had an "extra" day to write an exam just for you, it wouldn't be fair because it would not be at an equivalent difficulty level. The cornerstones I use to guide my decisions in my courses are equity and fairness. A special favor for one student must translate to all students, and if I cannot do it for all students, I cannot do it for one student. Thus, you must take exams when they are scheduled. Keep in mind, your lowest exam percentage will be replaced (see EXAM section).

4) How do I prepare for the exams?

- Learn the fundamentals (concepts and problem-solving methods) and learn them well. If you don't know the fundamentals, you will have no ability to apply them to solve problems. Always include a review of the quiz questions in your exam preparation routine and check out the SOME TIPS FOR SUCCESS section, especially #5, #6, and #12.

5) Why don't you announce the class average or other statistics on exams?

- The average score on any exam has no bearing on any individual's grade. If you earn the points guaranteeing you an A, that will be your grade. If all students in the course earn the points guaranteeing an A, that will be all students' grades. If no student in the course earns the points guaranteeing an A, no student will earn a grade of A. The moral is to focus on your performance, not the performances of others. Besides, ever notice anytime you compare yourself to others, you always seem to lose?

6) 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 studying. Research shows that you initially make great gains in learning with very little studying, but then the gains become smaller and smaller per unit time as the work continues. In other words, you may need to study 6 hours a week outside of class to get a C, 50% more hours to get a B, and another 50% more hours to get an A. The C-to-B gap is smaller than the B-to-A gap. Talk with an "A" student about their study habits and get them to join your study group!

7) 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.

8) 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

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.