

CHEM 115
CHEMISTRY I SYLLABUS

Instructor

Office Telephone

E-mail

Time and Location of Course

Office Hours (via Zoom)

There are too many students in the course for there to be a fair way to offer appointments to be scheduled outside of office hours. However, if you would like assistance from me at a time other than office hours, I encourage you to email me and I will respond to emails in as timely a manner as possible. There are also many other opportunities for free additional help in this course, TA office hours and academic tutoring (available through Academic Support Programs, 617-287-6550, academic.support@umb.edu).

MATH Course Prerequisites/Corequisites

You must have completed one of the following: 1) Passed MATH 130, 2) Placed into MATH 140, or 3) Be concurrently enrolled in MATH 130.

Course Description and Learning Outcomes

This course sequence is intended for majors in any of the sciences, including pre-dental, pre-medical, and pre engineering students.

Chem 115: Introduction to the fundamental principles of chemistry including atomic structure, stoichiometry, the periodic table of the elements, chemical bonding, molecular structure, and states of matter based on kinetic theory. The CHEM 115 (with 117) course will satisfy a Natural Science Distribution requirement. The course develops the following capabilities: quantitative reasoning, verbal reasoning.

Note: Chem 115 (lecture + discussion) and Chem 117 (lab) are co-requisite courses, so you should be enrolled in both, unless you have already taken and passed Chem 117.

Required Materials

1. Top Hat access (see Blackboard for sign-up information)
 - There is a two-week free trial available if you cannot afford to purchase right away.
2. Talanquer & Pollard, *Chemical Thinking*.
 - This is an electronic textbook. It is available via your TopHat subscription.
3. Scientific calculator capable of calculating logarithms, square roots, and non-integer exponents.

Recommended Resources

1. Eubanks & Eubanks, *ACS General Chemistry Exam Official Study Guide*.
 - Available by direct purchase from the American Chemical Society (ACS) Exams Institute, or at the University Bookstore. If you would like to order it from ACS, the order form is located at <http://www.examsinstitute.com/> The price is usually around \$20. You may be able to acquire a used copy for less (there is only one edition of it).

2. Brown, Lemay, and Bursten. Chemistry: The Central Science. Any edition.

- The bookstore is selling used copies. Older editions of this book may be found inexpensively online. *A link to an online version of this text is available in Blackboard.*

3. OpenStax, Chemistry. 2019. Download for free online:

<https://openstax.org/details/books/chemistry> • OpenStax is an open source, web-based, free textbook. This textbook is available in HTML or PDF and can be viewed on a computer or tablet.



Blackboard

ALL INFORMATION CONCERN

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check your UMB e-mail and Bl
announcements.



On occasion, there may be a need to have lecture and/or discussion via Zoom at the scheduled class time. It is recommended that you download the Zoom desktop app before the first class meeting.

COURSE STRUCTURE

There are two components to the Chem 115 course: lecture and discussion. You are required to co-register for the lab (Chem 117) unless you have already taken and passed Chem 117 course or its equivalent. Chem 117 is a SEPARATE course. It is not taught or graded by the Chem 115 instructor. If you have a question about the lab course, you should contact the instructor of the lab course.

Lecture

Attendance is mandatory. You are encouraged to read the text before coming to class and try the online exercises (called “Think About It”) that are in the relevant chapter on Top Hat. It is your responsibility to keep up on doing this work. The problems that we work on during lecture will build from your preparation and will involve applying the basics you learned from the reading.

Lectures will be video-recorded and posted on Blackboard via the Echo360 application. These usually become available within an hour after the lecture concludes. If you miss a lecture, you should watch the video of that lecture and work through the problems as if you were in class, so that you will not fall behind. The solutions to the problems that we work on during lecture will only be available in the videos. Occasionally the video technology does not work. In case this occurs, it is a good idea to find a classmate from whom you can obtain the notes.

Discussion: The discussion sections are problem-solving sessions with a smaller group of students where you will integrate the ideas and skills you were introduced to the week before in lecture and practiced on the homework. Worksheets for the discussion sections are provided on Blackboard. Students are expected to bring printed or electronic versions of the worksheet with them to class.

Make sure your attendance at discussion is recorded by the instructor so you receive credit. You can only get credit for attending a unique discussion once. You may miss one discussion meeting without penalty over the course of the semester.

Answers to the worksheets will not be posted and discussions are not video-recorded. If you miss a discussion, you are responsible for getting notes from another student in the course. Office hours are not make-up discussion sections, but you are certainly welcome to attend office hours and supplemental instruction to get help working on problems on the discussion worksheets.

Homework: Homework will be assigned via the Top Hat platform. There will be one or more homework assignments every week. It is possible to earn partial credit on a homework assignment if you do some, but not all, of the problems.

The Top Hat login URL is <https://app.tophat.com/e/>. There is also a direct link to access to Top Hat on Blackboard. Follow the instructions that are in Blackboard to register for the online homework system and to obtain access to the Chemical Thinking textbook. Top Hat access is \$30, which includes the digital, interactive textbook and access to the homework. *Note: You are encouraged to sign up during the first week of the semester, even if you are unable to pay right away. There is a two-week free trial available so that you can keep up with the assignments.*

Exams: There will be three in-class exams. Make every effort to arrive on time to each exam. If you arrive late, you will not be given extra time. No one arriving late to an exam will be allowed to take the exam after the first paper has been handed in.

The exam format will typically be short response questions (e.g., multiple choice, true/false, fill-in-the-blank) and multi-part problems. Exam questions will be based on homework, discussion, and in-class problems, and will often require you to integrate the knowledge and skills that you've gained up to that point in the semester (i.e., exams are always cumulative).

Exams should be taken in pencil. During exams, you are allowed to have pencils, erasers, and your calculator* (with extra batteries, if needed) – nothing else (no headphones, cell phones, tablets, computers, etc.). A periodic table and scrap paper will be supplied with each exam. You are not allowed notes or other resources. You are not allowed to bring your own scrap paper to the exam. You are not allowed to store course information in your calculator to use as an electronic “cheat sheet.” Where indicated (i.e., on problems), you must show work that leads to the answers you give. This means that the correct answer with no work, or work that does not logically lead to it, receives zero credit. Your work must be your own, with no assistance received from anyone else. You should also take reasonable precautions to ensure that no one copies from you. Academic dishonesty will not be tolerated and may result in your failing the exam or failing the course, depending on the circumstances.

The lowest exam will be dropped for each individual, on the condition that you take every exam. That is, in order to have this privilege, you must take every exam, unless there are extenuating circumstances or a religious observance that you have informed the instructor about in advance. There are no make-up exams. If you miss an exam, it will be your dropped exam only if you have a university approved absence that you can verify. If you miss more than one exam, then you will take a zero for at least one of your exams.

FINAL EXAM: The final exam is comprehensive and will be the ACS “General Chemistry I” exam. The final exam will be entirely multiple-choice. It will be given at the scheduled final exam time.

*During an exam you may not use any calculator or device that is capable of communicating with any other calculator or device (e.g., some graphing calculators, cell phones, tablets, laptops, smart watches). Anyone found using such a device during an exam will receive a zero for the exam and may be brought before the dean. It is your responsibility to bring a functioning calculator to the exam. I do not provide calculators and calculator sharing during exams is not allowed.

GRADING POLICIES

There are five graded course components:

- Homework (Top Hat): 20%
- Attendance/participation 10%
- Discussion attendance..... 10%
- Exams 40%
- Final exam 20%

Grades will be based on the percentages below (rounded to the nearest tenth integer percentage point). Grades are not curved (including exams), but occasional opportunities for extra credit will be available.

Percentage range Grade	Percentage range Grade
93.0 and higher A	73.0-76.9 C
90.0-92.9 A-	70.0-72.9 C
87.0-89.9 B+	67.0-69.9 D+
83.0-86.9 B	63.0-66.9 D
80.0-82.9 B-	60.0-62.9 D
77.0-79.9 C+	0-59.9 F

No student receiving less than 60% of the possible points should expect a passing grade. Grades of INC (incomplete) will only be awarded if (a) a student is passing the course at the time of the INC request, *and* (b) the reason the student cannot complete the course is beyond the student’s control.

ACCOMMODATIONS AND ACADEMIC DISHONESTY

UMass Boston is committed to creating learning environments that are inclusive and accessible. If you have a personal circumstance that will impact your learning and performance in this class, please let me know as soon as possible, so we can discuss the best ways to meet your needs and the requirements of the course. If you have a documented disability, or would like guidance about navigating support services, contact the Ross Center for Disability Services by email (ross.center@umb.edu), phone (617-287-7430), or in person (Campus Center, UL Room 211). To receive accommodations, students must be registered with the Ross Center and must request accommodations each semester that they are in attendance at UMass Boston. For more information visit: www.rosscenter.umb.edu. Please note that the Ross Center will provide a letter for your instructor with information about your accommodation only and not about your specific disability.

Education at UMass Boston is sustained by academic integrity. Academic integrity requires that all

members of the campus community are honest, trustworthy, responsible, respectful, and fair in academic work at the university. As part of being educated here, students learn, exercise, increase, and uphold academic integrity. Academic integrity is essential within all classrooms, in the many spaces where academic work is carried out by all members of the UMass Boston community, and in our local and global communities where the value of this education fulfills its role as a public good. Students are expected to adhere to the Student Code of Conduct, including policies about academic integrity, delineated in the University of Massachusetts Boston Graduate Studies Bulletin, Undergraduate Catalog, and relevant program student handbook(s), linked at www.umb.edu/academics/academic_integrity.

HEALTH, WELLBEING, AND SUCCESS

We are still coming through the COVID-19 pandemic. Due to the emerging COVID-19 variants, all members of the UMass Boston community — students, faculty, and staff — as well as contractors and visitors are required to wear face coverings in public indoor spaces on the UMass Boston campus. The requirement applies to vaccinated and non-vaccinated individuals. Wearing a face covering is important for the health and safety of our community, and each of us has a responsibility to do our part. While on campus, if you notice someone without a face covering indoors, you should feel free to distance yourself to the extent possible or, if you are comfortable doing so, politely remind them of the university policy requiring face coverings for all individuals indoors. As an instructor, for classes on campus, I will remind all students about the indoor masking policy. I will ask students to leave class if they do not comply and I may also refer students to the Dean of Students. If a student refuses to wear a face covering and does not heed requests to comply with the policy, the UMass Boston Police Department may be called to assist. To safeguard your own health and safety as well as that of all students, staff, and faculty, you are reminded that vaccinations are required for all faculty, staff, and students, with limited exceptions (see www.umb.edu/healthservices). Following current public health guidance from the CDC and given the protection flowing from a highly vaccinated population, enhanced HVAC and air filtration systems, and the indoor face covering mandate, we have lifted the social distancing requirement. However, if you have symptoms of COVID-19, you should not come to campus. Flexibility and support will be provided for students in such situations and are addressed in this syllabus.

This syllabus is subject to change. Instructions given in class supersede syllabus content.

This calendar is subject to change

Wk	Dates	Textbook Module	Tuesday	Thursday	Discussion
1	Jan 24-28	U1M1	Differentiating Characteristics	Phase Transitions	NO DISCUSSION
2	Jan 31-Feb 4	U1M2	Particulate Model of Matter Modeling Gases	Modeling Phase Transitions	D1: Separation of Compounds
3	Feb 7-11	U1M3	Atomic Model of Substances Relative Masses	Number of Particles Quantification	D2: Particulate Model of Matter
4	Feb 14-18	U1M4	Subatomic Model Atomic Diversity	Mass Spectroscopy Elemental Analysis	D3: Analyzing Particulate Representations
5	Feb 21-25	U1M4/U4M1	Elemental Analysis Chemical Change	EXAM 1	NO DISCUSSION
6	Feb 28-Mar 4	U4M2	Tracking Atoms Types of Chemical Reactions	Amounts of Substance	D4: Chemical Change
7	Mar 7-11	U2M1	Spectroscopy Quantization	Molecular Transitions	D5: Amounts of Substance
8	Mar 14-18				NO DISCUSSION
9	Mar 21-25	U2M2	Covalent Bonding Bonding Patterns	Atomic Patterns Understanding Bonding	D6: Spectroscopy
10	Mar 28-Apr 1	U2M3	Lewis Structures Molecular Ions and Radicals	Molecular Geometry Molecular Ions and Radicals	D7: Determining Chemical Structures
11	Apr 4-8	U2M4	Inferring Charge Distribution	EXAM 2	D8: From Composition to Structure
12	Apr 11-15	U3M1	Molecular Compounds Intermolecular Forces	Carbon Compounds Interactions in Mixtures	D9: Charge Distributions and IMFs

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Wk	Dates	Textbook Module	Tuesday	Thursday	Discussion
13	Apr 18-22	U3M1	Oxygen Compounds	Electron Transfer Ionic Networks	D10: A World of Compounds
14	Apr 25-29	U3M3/U4M1	Water Solubility Polyatomic Ions	The Energy of Chemical Change	D11: Naming Ionic Compounds/Pigments and Paints
15	May 2-6	U4M3	Bond Energy Heat of Reaction	EXAM 3	D12: Nitrogen Compounds
16	May 9-13		Final Exam Review		