Chem031C: General Chemistry I, 4.0 credits

Fall 2021 Lecture
MWF 12:00 – 12:50, Innovation E102

Fall 2021 Laboratory
Each of you should have a 3 hour lab section scheduled, please check your schedule.

Instructor
Prof. Matt Liptak
Innovation E336
(802) 656 – 0161
matthew.liptak@uvm.edu

Instructor Office Hours
M, 7-8 pm, Microsoft Teams
T, 1-2 pm Innovation E336
R, 11am-12 pm, Innovation E336
All other times by appointment only (matthew.liptak@uvm.edu). If you are requesting an appointment, it should be because you have a scheduling conflict with office hours.

Teaching Assistant Office Hours
Every teaching assistant for every laboratory section of Chem031 has one hour of office hours per lab section per week. These office hours are open to all Chem031 students, not just those in a particular lab section.

General Education Requirements
This course does not satisfy any general education requirements
Chem031 does partially satisfy the College of Arts and Sciences Natural Sciences distribution requirement.
Chem031 is part of the “general chemistry first” tracks of the Chemistry and Biochemistry majors.

Course Description
First semester of a two-semester sequence. Topics include matter, stoichiometry, gas laws, thermochemistry, quantum theory, atomic structure, electronic configurations, bonding and intermolecular forces.

Course Learning Objectives
Upon completion of Chemistry 031, it is anticipated that you will:
1. Understand how to use the scientific method to solve a problem.
2. Employ the periodic table to predict chemical properties.
3. Balance a comprehensive range of chemical reactions.
4. Use thermodynamics and quantum mechanics to formulate reasonable hypotheses.
5. Describe chemical bonding using molecular orbitals.

The instructor reserves the right to change everything, with notice
Textbook


*Mastering Chemistry*, Online resource, Pearson.

There are four options to purchase the textbook and Mastering Chemistry online access.
1) Online bookstore (~$300; text and mastering).
2) At the UVM bookstore (~$160; text, solutions manual, and mastering).
3) Digital access (~$120; etext and mastering).
4) Purchase a used textbook and MasteringChemistry (~$75 mastering separately).

In my opinion, the best deal is the UVM bookstore package (option 2). The same textbook and online resource will also be used for Chem032: General Chemistry II.

Web Content

Homework problems and weekly quizzes will be available through the *Mastering Chemistry* portal. Lecture notes will be available through *Blackboard* (bb.uvm.edu). You must purchase *Mastering Chemistry* to have access to the homework and quizzes. The Blackboard materials are available for all current, UVM-affiliated, students, but they may not be shared off-campus without permission of the instructor.

Attendance Policy

I do not take attendance in Chem031, but you are responsible for all material covered in lecture. If you miss lecture for any reason, it is your responsibility to catch-up on missed material either through reviewing lecture notes posted to Blackboard or by meeting with another student in the course.

Grading

Your grade will be based upon three mid-semester exams (37.5%), a final exam (25%), laboratory (25%), and quizzes (12.5%). If one of your mid-semester exam grades is lower than your final exam grade, I will replace that mid-semester exam grade with your final exam grade. Details regarding the exam and quiz grades can be found in this syllabus. For laboratory grading, you should refer to your laboratory syllabus.

Quizzes

A total of 12 open-book, open-notes quizzes will be administered via *Mastering Chemistry* throughout the semester. In general, quizzes will become available on the *Mastering Chemistry* website at 1 pm on the days when we complete a lecture in class, they will be due at 12 pm on the day of our next lecture, and the answers will become available at 1 pm on the same day as they are due. Thus, no extensions will be granted for the quizzes, but your lowest two grades out of the 12 quizzes will be dropped to accommodate excused and unexcused absences. The lecture calendar notes the day when a quiz will become available. A more detailed table is available here:

<table>
<thead>
<tr>
<th>Chapter Quiz</th>
<th>Available (1 pm)</th>
<th>Due (12 pm)</th>
<th>Answers (1 pm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>E</td>
<td>Wed. Sep. 1</td>
<td>Fri. Sep. 3</td>
<td>Fri. Sep. 3</td>
</tr>
<tr>
<td>1</td>
<td>Fri. Sep. 10</td>
<td>Mon. Sep. 13</td>
<td>Mon. Sep. 13</td>
</tr>
<tr>
<td>2</td>
<td>Fri. Sep. 17</td>
<td>Mon. Sep. 20</td>
<td>Mon. Sep. 20</td>
</tr>
<tr>
<td>3</td>
<td>Mon. Sep. 27</td>
<td>Wed. Sep. 29</td>
<td>Wed. Sep. 29</td>
</tr>
</tbody>
</table>

The instructor reserves the right to change everything, with notice
The instructor reserves the right to change everything, with notice

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Fri. Oct. 29</td>
<td>Mon. Nov. 1</td>
<td>Mon. Nov. 1</td>
</tr>
<tr>
<td>8</td>
<td>Fri. Nov. 5</td>
<td>Mon. Nov. 8</td>
<td>Mon. Nov. 8</td>
</tr>
<tr>
<td>9</td>
<td>Fri. Nov. 12</td>
<td>Mon. Nov. 15</td>
<td>Mon. Nov. 15</td>
</tr>
<tr>
<td>11</td>
<td>Mon. Dec. 6</td>
<td>Wed. Dec. 8</td>
<td>Wed. Dec. 8</td>
</tr>
</tbody>
</table>

Exams

Four exams are schedule for Chem 031 on September 20, October 18, November 15, and December 16. The first three, mid-semester, exams are not cumulative. The final exam is cumulative and worth twice as many points as one of the mid-semester exams. All examination times were blocked off in your schedule when you registered, so there are no scheduled make-up dates. The mid-semester Exams are written to take 1.5 hours to complete, but every student has a full 3 hours to take the exam. Since double time is already built into the exam schedule, ACCESS accommodations for extended time do not apply. Only non-programmable, non-graphing calculators are permitted for these exams. You will not be allowed to use cell phones, laptops, tablets, or any programmable devices on exams. Students caught with any other electronic devices will receive a grade of zero for the exam.

The first three mid-semester exams will take place from 6:40 – 9:40 pm on September 20, October 18, and November 15. The location will depend upon your laboratory section (all six lecture sections will take the same mid-semester exams):

L01-L11 Innovation E102  L44-L50 Fleming 101  LZ24-LZ31 Rowell 103
L12-L23 Billings 1101  L51-L54 Lafayette L108  LZ32-LZ37 Williams 301
L24-L31 Rowell 103  LZO1-LZO4 Innovation E105  LZ38-LZ43 Votey 105
L32-L37 Williams 301  LZO5-LZ11 Innovation E102  LZ44-LZ50 Fleming 101
L38-L43 Votey 105  LZ12-LZ23 Billings 1101  LZ51-LZ52 Lafayette 108

The final exam will take place from 10:30 am – 1:15 pm on December 16 in Innovation E102 for all students in this lecture section.

Diversity and Inclusion

I strive to create a classroom environment that supports students from a diverse set of backgrounds. Our society is composed of individuals from diverse ethnic, socioeconomic, and educational backgrounds. Half of our society are women. I strongly believe that our best path forward to a stronger and more equitable society is to promote inclusiveness.

It is my expectation that every member of this class will also support diversity and inclusion. As a community, we should strive to uphold the ideals of Our Common Ground: https://www.uvm.edu/president/our-common-ground

I welcome any suggestions as to how I can promote a diverse and inclusive classroom.

The instructor reserves the right to change everything, with notice
Intellectual Property Statement/Prohibition on Sharing Academic Materials:
Students are prohibited from publicly sharing or selling academic materials that they did not author (for example: class syllabus, outlines or class presentations authored by the professor, practice questions, text from the textbook or other copyrighted class materials, etc.); and students are prohibited from sharing assessments (for example homework or a take-home examination). Violations will be handled under UVM's Intellectual Property policy and Code of Academic Integrity.

Course Evaluations
All students are expected to complete course evaluations in-class on December 10. The evaluations will be anonymous and confidential. The information gained from these evaluations will be used to iteratively improve Chem031 for future UVM students.
The lecture schedule may change, any changes from this schedule will be posted to Blackboard and noted during lecture.

<table>
<thead>
<tr>
<th>Lecture Schedule</th>
<th>Monday</th>
<th>Wednesday</th>
<th>Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aug. 30</td>
<td>Units (E.1-2,E.5-6)</td>
<td>Measurement (E.3-4,E.7-9)</td>
<td>Scientific Method (1.1-1.5)</td>
</tr>
<tr>
<td>Sep. 6</td>
<td>Labor Day</td>
<td>Atomic Structure (1.6-1.8)</td>
<td>Molar Mass (1.9-1.11)</td>
</tr>
<tr>
<td>Sep. 13</td>
<td>No Class</td>
<td>Nature of Electrons (2.3-2.4)</td>
<td>Hydrogen Atom (2.5-2.6)</td>
</tr>
<tr>
<td>Sep. 20</td>
<td>Exam #1 Review</td>
<td>Aufbau Principle (3.1,3.3-4)</td>
<td>Atomic Size (3.2,3.5-6)</td>
</tr>
<tr>
<td>Sep. 27</td>
<td>Ionization (3.7-3.9)</td>
<td>Ionic Bonding (4.1-4.6)</td>
<td>Covalent Bonding (4.7-4.8)</td>
</tr>
<tr>
<td>Oct. 4</td>
<td>Chemical Formulas (4.9-4.12)</td>
<td>Polyatomic Molecules (5.1-5.3)</td>
<td>Fall Recess</td>
</tr>
<tr>
<td>Oct. 11</td>
<td>Resonance (5.4-5.6)</td>
<td>VSEPR (5.7-5.8)</td>
<td>Molecular Geometry (5.9-5.10)</td>
</tr>
<tr>
<td>Oct. 18</td>
<td>Exam #2 Review</td>
<td>Valence Bond Theory (6.1-6.3)</td>
<td>MO Theory (6.4-6.5)</td>
</tr>
<tr>
<td>Oct. 25</td>
<td>Intermolecular Force (11.1-11.4)</td>
<td>Stoichiometry (7.1-7.4)</td>
<td>Combustion Reactions (7.5-7.6)</td>
</tr>
<tr>
<td>Nov. 1</td>
<td>Precipitation Reactions (8.1-8.5)</td>
<td>Acid-Base Reactions (8.6-8.7)</td>
<td>Redox Reactions (8.8-8.9)</td>
</tr>
<tr>
<td>Nov. 8</td>
<td>Thermodynamics (9.1-9.4)</td>
<td>Enthalpy (9.5-9.7)</td>
<td>Hess’s Law (9.8-9.11)</td>
</tr>
<tr>
<td>Nov. 15</td>
<td>Exam #3 Review</td>
<td>Pressure (10.1-10.3)</td>
<td>Gas Laws (10.4-10.6)</td>
</tr>
<tr>
<td>Nov. 22</td>
<td>Thanksgiving Recess</td>
<td>Thanksgiving Recess</td>
<td>Thanksgiving Recess</td>
</tr>
<tr>
<td>Nov. 29</td>
<td>Partial Pressure (10.7-10.9)</td>
<td>Real Gases (10.10-10.11)</td>
<td>Phase Changes (11.5-11.7)</td>
</tr>
<tr>
<td>Dec. 6</td>
<td>Phase Diagrams (11.8-11.9)</td>
<td>Crystalline Solids (12.1-12.4)</td>
<td>Exam #4 Review</td>
</tr>
<tr>
<td>Dec. 13</td>
<td>Thursday, December 16</td>
<td>Course Evaluations</td>
<td></td>
</tr>
</tbody>
</table>

The instructor reserves the right to change everything, with notice
Laboratory

Laboratory Safety
OSHA-approved safety glasses or goggles, which can be obtained at the UVM bookstore, must be worn at all times when in the laboratory. Contact lenses are not permitted in the laboratory, but prescription glasses will fit underneath safety goggles. Open-toed shoes are not permitted in the laboratory at any time. Any violation of these polices will result in a grade of zero for the experiment.

Laboratory Preparation
Prior to each laboratory, you should: print out and read a copy the experiment, watch the laboratory demonstration video, prepare your laboratory notebook, and complete the Pre-lab quiz. You must bring the following items with you to each laboratory meeting: safety glasses, laboratory notebook, and print out of the laboratory experiment.

Attendance/Make-up Policy
Laboratory attendance is mandatory, missing more than two laboratories for any reason will result in an F for Chem031. Make-up labs will be offered for documented, UVM-approved reasons. Make-up labs will only be available during the same week as your lab section if space permits. If you need to request a make-up laboratory, you should contact the laboratory supervisor, Christine Cardillo (Christine.cardillo@uvm.edu) at least one week in advance of your laboratory section meeting time.

Laboratory Schedule
Laboratories will begin during the third week of classes. During the first week you must: purchase safety glasses from the UVM bookstore or Discovery Hall stockroom, and pass the online safety quiz posted to Blackboard.

Aug. 30 – Sep. 3: NO LABORATORY
Sep. 6 – Sep. 10: Labor Day – NO LABORATORY
Sep. 13 – Sep. 17: Check In
Sep. 20 – Sep. 24: Density Determination
Sep. 27 – Oct. 1: Flame Emission Spectra
Oct. 4 – Oct. 8: Periodic Trends
Oct. 11 – Oct. 15: Determination of a Chemical Formula
Oct. 18 – Oct. 22: Molecular Models
Oct. 25 – Oct. 29: Evaporation and Intermolecular Forces
Nov. 1 – Nov. 5: Chemical Reactions
Nov. 8 – Nov. 12: Acid Content of a Food Product
Nov. 15 – Nov. 19: Heat Capacity and Enthalpy
Nov. 22 – Nov. 26: Thanksgiving – NO LABORATORY
Nov. 29 – Dec. 3: Gas Law Determination of Molecular Weight
Dec. 6 – Dec. 10: Check Out

The instructor reserves the right to change everything, with notice
Tips for Success

For those of you that are first-year students, you will find that the learning format in college is significantly different from that of high school. Whereas a course in high school meets every day for nine months, a course in college meets 2-3 times per week for three months. Also, where you probably spent 35-40 hours per week in class at the high school level, you will only spend 15-20 in class at UVM. These differences mean that the expectations on your outside of class effort are much higher at UVM as compared to high school. As a general rule of thumb, the expectation is that you will put in a minimum of two hours per week per lecture credit hour of effort into studying outside of class. This adds up to a minimum of 100 hours throughout the semester, and I assure you that this effort will be most effective if distributed throughout the semester rather than crammed into the time periods immediately prior to exams. What should you be doing to most effectively utilize your study time?

Reading: It is highly recommended that you reference the lecture schedule and stay ahead of me by reading the text. This will allow you to focus on mastering the most important/challenging concepts during lecture.

Practice Problems: I will post practice problems to the Mastering Chemistry site for each chapter. Working through these problems will not only help you master the important concepts, but also prepare you for the quiz format. In addition, there are many valuable practice exercises, problems, and quizzes (with answers!) in the text book.

Review Notes: I will post all of my lecture notes to Blackboard immediately following lecture. I strongly suggest that you review these notes shortly after class to ensure that you master the material.

I need help! If you are struggling with any concept presented in class, you should not hesitate to seek out additional help sooner rather than later. Fortunately, you have many options:

Instructor Office Hours: My office hours are your drop-in time for Chem031 assistance. These three hours per week are fully dedicated to Chem031 students.

Instructor E-mail: I will respond to all e-mails within one working day (weekdays that are not official UVM administrative holidays). Please do not expect an immediate response to e-mail. In general, the fastest way to get in touch with me is to attend office hours.

Teaching Assistant Office Hours: Every teaching assistant for every section of Chem031 has one hour of office hours per lab section per week. These office hours are open to all Chem031 students, not just those in a particular lab section. Since there are 54 laboratory sections, this means that there are 54 additional hours throughout the week where you can get help!

Supplemental Instruction (SI): Yet more out of class help is available through the Supplemental Instruction program. There will be weekly review sessions and office hours available where you can get assistance from the Chem031 SI leader.

Learning Co-Op: If you prefer an individualized tutor, the Learning Co-Op organizes this relationship for students. Please contact the Learning Co-Op directly in order to be put in touch with a potential tutor.

The instructor reserves the right to change everything, with notice
University-wide Policies and Procedures

Student Learning Accommodations

In keeping with University policy, any student with a documented disability interested in utilizing accommodations should contact SAS, the office of Disability Services on campus. SAS works with students and faculty in an interactive process to explore reasonable and appropriate accommodations, which are communicated to faculty in an accommodation letter. All students are strongly encouraged to meet with their faculty to discuss the accommodations they plan to use in each course. A student's accommodation letter lists those accommodations that will not be implemented until the student meets with their faculty to create a plan.

Contact SAS:
A170 Living/Learning Center;
802-656-7753;
access@uvm.edu
www.uvm.edu/access

Religious Holidays

Students have the right to practice the religion of their choice. If you need to miss class to observe a religious holiday, please submit the dates of your absence to me in writing by the end of the second full week of classes. You will be permitted to make up work within a mutually agreed-upon time. https://www.uvm.edu/registrar/religious-holidays

Academic Integrity

The policy addresses plagiarism, fabrication, collusion, and cheating. https://www.uvm.edu/policies/student/acadintegrity.pdf

Grade Appeals

If you would like to contest a grade, please follow the procedures outlined in this policy: https://www.uvm.edu/policies/student/gradeappeals.pdf

Grading

For information on grading and GPA calculation, go to https://www.uvm.edu/registrar/grades

Code of Student Conduct

http://www.uvm.edu/policies/student/studentcode.pdf

FERPA Rights Disclosure

The purpose of this policy is to communicate the rights of students regarding access to, and privacy of their student educational records as provided for in the Family Educational Rights and Privacy Act (FERPA) of 1974.
http://catalogue.uvm.edu/undergraduate/academicinfo/ferparightsdisclosure/

Promoting Health & Safety

The University of Vermont's number one priority is to support a healthy and safe community:

The instructor reserves the right to change everything, with notice
Center for Health and Wellbeing  
https://www.uvm.edu/health

Counseling & Psychiatry Services (CAPS)  
Phone: (802) 656-3340

C.A.R.E.  
If you are concerned about a UVM community member or are concerned about a specific event, we encourage you to contact the Dean of Students Office (802-656-3380). If you would like to remain anonymous, you can report your concerns online by visiting the Dean of Students website at https://www.uvm.edu/studentaffairs

Final Exam Policy  
The University final exam policy outlines expectations during final exams and explains timing and process of examination period. https://www.uvm.edu/registrar/final-exams

Statement on Alcohol and Cannabis in the Academic Environment  
As a faculty member, I want you to get the most you can out of this course. You play a crucial role in your education and in your readiness to learn and fully engage with the course material. It is important to note that alcohol and cannabis have no place in an academic environment. They can seriously impair your ability to learn and retain information not only in the moment you may be using, but up to 48 hours or more afterwards. In addition, alcohol and cannabis can:

- Cause issues with attention, memory and concentration
- Negatively impact the quality of how information is processed and ultimately stored
- Affect sleep patterns, which interferes with long-term memory formation

It is my expectation that you will do everything you can to optimize your learning and to fully participate in this course.

The instructor reserves the right to change everything, with notice