Syllabus – Chemical Structure & Properties

The purpose of this syllabus is to describe the course, resources, and policies. It is meant to help all students understand the expectations and requirements for the course, and it should be used as a reference for questions about policies. When updates to the syllabus are made during the term, a new version will be posted electronically, and all students will be notified.

Course Information

Course: Chemistry 160 – Chemical Structure and Properties (3 credits: Lecture & Discussion)
Prerequisites: Math 117 with a grade of C- or better, or the equivalent. A student missing a prerequisite may be withdrawn at any time.
Time Zone: This syllabus lists dates/times using Chicago local time (U.S. Central Time Zone)
Lectures: TuTh, 1:00-2:15 pm, FH-133
Discussions: You must attend the section for which you registered:

- Th, 2:30-3:20 pm, FH 007
- Th, 4:15-5:05 pm, FH 007

Course Coordinator: Dr. Sandra Helquist (shelquist@luc.edu)
Chemistry 160 is a multi-section lecture & discussion course with common content and common outcomes across all sections. This includes the Common Final Exam during the Common Final Exam Period as scheduled by the University. The Course Coordinator is responsible for consultation and coordination with instructors regarding policies, exam writing, and grading. Your Section Instructor is responsible for communicating with you regarding all course content and policies and is the first and primary person you should contact with questions about all aspects of the course. As needed, all Section Instructors will consult with the Course Coordinator throughout the semester.

Section Instructor: Patrick L. Daubenmire, Ph. D.

Instructor Contact Information

Office: FH 409
Email: pdauben@luc.edu

Office Hours Schedule: Wed., 1-3 pm, STEM Center, St. Joseph's Cafeteria, Room 102
Th, 3:20-4:15 pm, FH 007,
Others possible by appointment

SI information
There are Supplemental Instruction (SI) study sessions available for this course. SI sessions are led by an SI leader, who is a student that has recently excelled in the course. Session attendance is open to all, and while it is voluntary, it is extremely beneficial for those who attend weekly. Times and locations for the SI session can be found here: www.luc.edu/tutoring. Students who attend these interactive sessions find themselves working with peers as they compare notes, demonstrate and discuss pertinent problems and concepts, and share study and test-taking strategies. Research shows students whom regularly attend sessions have higher grades at the end-of-the-semester and more deeply understand course concepts than those who do not. Students are asked to arrive with their Loyola ID number, lecture notes, and textbook.

Required Course Materials

- Textbook: OpenStax Chemistry, Atoms First 2e. Web-only, digital, or printed version. https://openstax.org/details/books/chemistry-atoms-first-2e?Book%20details
- Additional OpenStax sources may be used to supplement the primary textbook.
- Moog, R.S. & Farrell, J.J. (2022). *Chemistry: A Guided Inquiry, part 1, 8th Edition*. ISBN : 9781792490699. Digital or hard copy is acceptable.
- Online homework: ALEKS, see Sakai for additional information and recommendations. Course code for this course on ALEKS is **DJ9P4-RF39H**.
- Molecular Model Kit (Duluth Labs MM-005 or equivalent)
- Scientific Calculator (non-programmable, non-graphing, and independent of another device such as a phone or tablet)

- Loyola Sakai course management site: sakai.luc.edu/portal/ and tools integrated into the site.
- Loyola email: messages are sent to the entire class via Sakai, linked to your Loyola email account
- Additional web-based systems will be used for uploading your work and facilitating feedback and evaluation. Registration will be free but required. These may include Gradescope and other sites.

Copyright/Intellectual Property reminder: Course materials provided by your instructors at Loyola, including my materials, may not be shared outside any course without the instructor's **written permission**. Content posted without permission will be in violation of Copyright/Intellectual Property laws.

Course Description

This course is the first in a sequence of multiple chemistry courses designed to create foundational knowledge and proficiency in essential chemistry concepts and skills. It includes the following topics: atomic structure, periodic properties, characteristics of bonding and properties of molecules, solid states, interactions and connections of light and matter, quantum and molecular mechanics models of atoms and molecules. Historical and current developments in chemistry as well as real-world problems that chemists address are incorporated into the course.

Alongside specific content, these themes will cycle through each of the foundational courses. They include:

- Structure-Activity Relationships
- The culture and practice of science.
- Energy.
- Polymers, proteins, and macromolecules.
- Sustainability.
- Chemical synthesis, purification, characterization, and analysis.

Learning Outcomes

The emphasis of this course is on understanding, prediction, investigation, explanation and evaluation over memorization. This means that students must foster their problem solving skills, ability to make claims based on evidence, use and understanding of models and their limitations, and skills of effective communication of scientific results. It is not enough to know *what* happens in chemistry, the student must also be able to explain *why* it happens. When successful, a student will be able to:

- Differentiate types of matter based on their chemical and physical properties (for example, pure substances vs. mixtures, metals vs. nonmetals, ionic vs. covalent vs. metallic, electrolyte vs. nonelectrolyte).
- Use multiple perspectives of matter (macroscopic, particle, symbolic levels) to qualitatively describe and explain characteristics, properties, and relationships of the following: atomic structure, periodicity, molecular structure, chemical bonding, gases, liquids and solids, solutions.
- Draw and interpret multiple representations of structures depicting connectivity, configuration, and conformations.
- Quantify relationships between variables controlling chemical systems.
- Differentiate among closely related factors, categorize problem types, and select appropriate tools to solve these problems.

Connection to the "Hungers" of Loyola University's Transformative Education

This course seeks to assist each student in fostering hungers associated with the University's model of transformative education[1]. The study of introductory chemistry can assist in development of the specific hungers below:

- A *Hunger for Integrated Knowledge* – by building an understanding of a variety of chemical concepts and applying them to problems in many contexts.
- A *Hunger for a Moral Compass* – by examining the variables, benefits, and detriments that exist at the interface of applied science, technology, environment, and society.
- A *Hunger for a Global Paradigm* – by understanding that chemistry is a human endeavor and it resides in the tension between helping and harming life.

[1]http://www.luc.edu/transformativeed/

Practices for Success
Supporting claims with evidence, making applications, solving and analyzing problems, and using chemical principles to explain phenomena are critical skills in the field of chemistry. The development of these skills is not without some frustration, but it carries the reward of deepening one's ability to think critically and solve problems in any field. To do this, one may have to assess, evaluate, and possibly revise approaches to learning. The use of targeted, guiding questions, regularly scheduled work, and strategic study plans can greatly assist the learning of chemistry. With such a focus, hopefully any frustration will quickly turn to appreciation and fascination for the relevance and connectedness of chemistry in your life and within the world around you. Solving and analyzing problems is the most important feature of this work. If, at any time, you need assistance framing such plans for your work in chemistry, please do not hesitate to ask the instructor.

Norms of Course Proceedings
The classroom is to be a safe place to question and explore ideas. Student and teacher voices are important to this work. Collegial disagreement can be a healthy part of this process, but must always include respect for all members of the class.

Course activities will be designed to help students reach the goal of learning chemistry content and developing thinking skills. This will more often driven by the use of data and reasoning to discover concepts and solutions rather than the identification and exchange of chemical facts and algorithms.

Class sessions will begin and end on time. All students should attend class regularly and participate in class discussions. Multiple absences could affect one's ability to learn chemistry during this semester. Anticipated absences should be discussed with the instructor two class days before the absence. Proper documents may be requested to verify the reason for any absence. This is particularly relevant to days missed that include an in-class assessment for which a student is asking for a make-up.

Cell phones and the use of texting devices should be used in appropriate and professional manner. These devices should not distract other participants in the course.

Email messages among students in the course should also be respectful, appropriate, and professional. Response time to email messages is acceptable within 48 hours.

Instructional Strategy – Process Oriented Guided Inquiry Learning (POGIL)
This course will not always follow a traditional lecture format for delivery of course content and skill development. Coupled with lecture presentations, this course will capitalize on students' current prevailing ideas and thoughts about sets of data or presented models. Then, through guided questions about the presented information, students, working in small groups, discuss ideas and come to consensus about answers to questions. These ideas are further developed in questions that force application of the agreed upon concepts. The instructor is the guide on this journey, pointing out areas that are particularly relevant or that may need attention, and redirecting students when necessary. This format is designed based on the idea that knowledge cannot be directly transmitted from one person to another. Instead, knowledge must be built by the learner his or herself based on their own experiences and in dialog and discussion with others.

Four key ideas about learning have emerged from current research about how people learn. These include:
1. Constructing our own understanding based on our prior knowledge, experiences, skills, attitudes, and beliefs.
2. Following a learning cycle of exploration, concept formation, and application.
3. Discussing and interacting with others.
4. Reflecting on progress and assessing performance.

All of these ideas are incorporated into the design of POGIL in order to help students learn both discipline content and key process skills simultaneously, POGIL is built on this research base with the principles that most students learn best when they are:
1. Engaged and thinking in the classroom and laboratory.
2. Drawing conclusions by analyzing data, models, or examples and by discussing Ideas.
3. Working together in self-managed teams to understand concepts and to solve problems.

4. Reflecting on what they have learned and on improving their performance.
5. Interacting with an instructor as a facilitator of learning and peer as collaborating in building understanding of the chemistry content.

To support this research-based learning environment, POGIL uses learning teams, guided-inquiry activities to develop understanding, questions to promote critical and analytical thinking, problem solving, reporting, metacognition, and individual responsibility. These components are the tools for developing process skills and the mastery of discipline content and will use a blend of venues between face-to-face and online environments.

You will work together in learning teams through a series of ChemActivities (CA) modules. The modules are designed to help you acquire knowledge and develop understanding through guided inquiry - examining data, models, or examples followed by responding to critical thinking questions (CTQ). Generally, data are presented before a theoretical explanation, whereby the CTQ lead the student through the thought processes which results in the building of a certain theoretical model. This is what makes these modules guided-inquiry. Exercises & Problems are included to reinforce the concepts being presented.

For the ChemActivities (CA) modules, you will be placed into groups of 3 or 4 students with the following designations within each group: Manager, Recorder, Technician, & Presenter. These roles you may have throughout the semester when working in groups include:

- *Manager*: The student in this role ensures that the group is functioning efficiently and progressing within the time frame set by the instructor. This student is not a supervisor, but a full participant. Additionally, this student monitors the participation of all group members to make sure all ideas have been heard.

- *Recorder*: The student in this role transcribes the agreed upon responses of the group to questions and problems. The recorder is not solely responsible for doing the work, but is responsible for accurately recording the results of the group's work. There will be times during the semester when the group's answer(s) to certain questions will be collected. The recorder submits these responses.

- *Technician*: The student in this role primarily handles calculations and the management of equipment for the group. If special operating instructions are needed for an instrument during an activity, the technician is the point person for these applications and will be trained as necessary.

- *Presenter*: The student in this role represents the group during all class discussions or during inter-group interactions. Similarly to the recorder, the presenter's responses should accurately reflect the results of the work of the group.

Student Accommodations
Loyola University Chicago provides reasonable accommodations for students with disabilities. Any student requesting accommodations related to a disability or other condition is required to register with the Student Accessibility Center (SAC). Professors will receive an accommodation notification from SAC, preferably within the first two weeks of class. Students are encouraged to meet with their professor individually in order to discuss their accommodations. All information will remain confidential. Please note that in this class, software may be used to audio record class lectures in order to provide equitable access to students with disabilities. Students approved for this accommodation use recordings for their personal study only and recordings may not be shared with other people or used in any way against the faculty member, other lecturers, or students whose classroom comments are recorded as part of the class activity. Recordings are deleted at the end of the semester. For more information about registering with SAC or questions about accommodations, please contact SAC at 773-508-3700 or SAC@luc.edu.

Course Repeat Rule
Effective with the Fall 2017 semester, students are allowed only THREE attempts to pass Chemistry courses with a C- or better grade. The three attempts include withdrawals (W). The Department advises that it is preferable to complete a course with a grade of C or C-, and to demonstrate growth in future coursework, than to withdraw from a course.

After the second attempt, the student must secure approval for a third attempt. Students must come to the Chemistry Department, fill out a permission to register form or print it from the Department of Chemistry & Biochemistry website: https://www.luc.edu/chemistry/forms/ and personally meet and obtain a signature from either the Undergraduate Program Director, Assistant Chairperson, or Chairperson in Chemistry. A copy of this form is then taken to your Academic Advisor in Sullivan to secure final permission for the attempt.

Academic Integrity

All students in this course are expected to have read and to abide by the demanding standard of personal honesty, drafted by the College of Arts & Sciences, which can be viewed at:

https://www.luc.edu/cas/advising/academicintegritystatement/

A basic mission of a university is to search for and to communicate the truth as it is honestly perceived. A genuine learning community cannot exist unless this demanding standard is a fundamental tenet of the intellectual life of the community. Students of Loyola University Chicago are expected to know, to respect, and to practice this standard of personal honesty.

Academic dishonesty can take several forms, including, but not limited to cheating, plagiarism, copying another student's work, submitting false documents, and deliberately disrupting the performance of other class members. Standards apply to both individual and group assignments.

Regarding the use of Artificial Intelligence: our Provost has expressed to "Let us all make sure we are learning and sharing best practices and not allowing AI to do the learning for us." In this course, any work you submit for credit must represent your own ideas and understanding of the assigned material. If you are uncertain about any case where your use of AI may be in conflict with University or course standards, please see me to discuss your concerns.

An instance of academic misconduct (including those detailed on the website provided above or in this syllabus) will be reported to the Department Chair and the academic Dean's office. Any sanctions will be assigned accordingly and following Loyola policy. The minimum sanction is a score of zero on the assignment which cannot be dropped from the grade calculation.

Loyola University Absence Policy for Students in Co-Curricular Activities (including ROTC):

Students missing classes while representing Loyola University Chicago in an official capacity (e.g., intercollegiate athletics, debate team, model government organization) shall be allowed by the faculty member of record to make up any assignments and to receive notes or other written information distributed in the missed classes.

Students should discuss with faculty the potential consequences of missing lectures and the ways in which they can be remedied. Students must provide their instructors with proper documentation i.e., "Athletic Competition & Travel Letter" describing the reason for and date of the absence.

This documentation must be signed by an appropriate faculty or staff member and it must be provided to the professor in the first week of a semester. It is the responsibility of the student to make up any assignments. If the student misses an examination, the instructor is required to allow the student to take the examination at another time.

(https://www.luc.edu/athleteadvising/attendance.shtml)

Students who will miss class for an academic competition or conference must provide proper documentation to their instructor as early in the semester as possible.

Accommodations for Religious Reasons

If you have observances of religious holidays that will cause you to miss class or otherwise effect your performance in the class you must alert the instructor ***within 10 calendar days of the first class meeting of the semester*** to request special accommodations, which will be handled on a case by case basis.

Other Items

- A link to the official Loyola calendar can be found here: https://www.luc.edu/academics/schedules/
- The Withdraw deadline for the semester is on Friday, November 3, 2023.
- Loyola is using SmartEvals to provide instructor & course feedback. OIE will send emails near the end of the term.

Class Recording & Content Information

In general lecture, meetings may be recorded. The following is a mandatory statement for all courses in the College of Arts & Sciences (CAS). We will discuss class norms and standards during the first week and continue the discussion as needed throughout the semester.

Privacy Statement

Assuring privacy among faculty and students engaged in online and face-to-face instructional activities helps promote open and robust conversations and mitigates concerns that comments made within the context of the class will be shared beyond the classroom. As such, recordings of instructional activities occurring in online or face-to-face classes may be used solely for internal class purposes by the faculty member and students registered for the course, and only during the period in which the course is offered.

Students will be informed of such recordings by a statement in the syllabus for the course in which they will be recorded. Instructors who wish to make subsequent use of recordings that include student activity may do so **only** with informed written consent of the students involved or if all student activity is removed from the recording. Recordings including student activity that have been initiated by the instructor may be retained by the instructor only for individual use.

Additional Content, Copyright & Intellectual Property Statement

By default, students may not share any course content outside the class without the informed written consent of the owner of that content. This includes any additional recordings posted by students, materials provided by the instructor, and publisher-provided materials. For example, lectures, quiz/exam questions, book figures/slides, and videos may not be shared online outside the class. In some cases, copyright/IP violations may overlap with breaches of academic integrity. Remember that obtaining consent to share materials is an active process.

Pass/Fail Conversion Deadlines and Audit Policy

A student may request to convert a course into or out of the "Pass/No-Pass" or "Audit" status only within the first two weeks of the semester. For the Fall 2023 semester, students can convert a class to "Pass/No-Pass" or "Audit" through Monday, September 11th. Students must submit a request for Pass/No-Pass or Audit to their Academic Advisor.

Final Exam

The University sets the schedule for all final exams. The final will be held on:

Thursday, December 14th, 2023 7:00 PM

You will have exactly 2 hours to complete the exam. Additional time will not be granted, even if you start late. There will be no make-up final exams given under any circumstance, and the exam will not be given early, either.

Instructors may not reschedule final exams for a class for another day and/or time during the final exam period. There can be no divergence from the posted schedule of dates for final exams. Individual students who have four (4) final examinations scheduled for the same date may request to have one of those exams rescheduled. If a student reports having four final examinations scheduled for the same date, students should be directed to e-mail a petition to Adam Patricoski, Assistant Dean for Student Academic Affairs, CAS Dean's Office (apatricoski@luc.edu).

Universal Absence Accommodation Policy

The purpose of a universal absence accommodation policy is to account for emergency circumstances (e.g., serious illness, caring for a family member, car accident) that require you to be absent from class, while maintaining integrity in grading for students who attend and complete all in-class graded assignments. Class attendance and participation are essential for your success in this class, and that your health is important to us and our shared community. Please use good judgement and stay home if necessary/prudent for your circumstances.

This is the universal accommodation policy for in-class graded assignments:

- Groupwork and ALEKS assignments are posted online, and so, are available to you even in an absence from class. Up to two assignments may be submitted individually if you are absent from the class session.
- FOs: multiple attempts at Mastery are automatically provided during the term, so a missed FO assessment due to absence for any reason is already accommodated in the course grading system.

- COs: you are eligible to submit for Proficiency after the first attempt at an CO whether you complete the problems or not, and reattempts at Mastery are available during the term, therefore, a missed CO assessment due to absence for any reason is already accommodated in the course grading system.

You may provide documentation for an absence, but it is not required. These accommodations are automatically available to all students.

Course Topics

We will not cover every topic in every chapter of the textbook this semester, but the material will usually come from the Chapters listed below. Focus first on the material that is directly covered in classes and assigned or recommended. Explore the additional material in the textbook for your own interest and enrichment.

Chapter 1: Essential Ideas
Chapter 2: Atoms, Molecules, and Ions
Chapter 3: Electronic Structure and Periodic Properties of Elements
Chapter 4: Chemical Bonding and Molecular Geometry
Chapter 5: Advanced Theories of Bonding
Chapter 6: Composition of Substances and Solutions
Chapter 10: Liquids and Solids
Chapter 11: Solutions and Colloids
Chapter 19: Transition Metals and Coordination Chemistry
Chapter 21: Organic Chemistry

Course Grading System

Design

There are three basic principles that I have used to design the grading system for this course. These are for you to:

1. Understand what the standards and requirements are for each letter grade so that you can choose what level of academic achievement to pursue in this course. I encourage each of you to strive for high achievement because I believe in the potential of all students to learn and improve their abilities in Chemistry.
2. Expect a challenging but flexible learning environment. The standards for demonstrating your Mastery of the course material are high in each area, but the methods for meeting the standards are designed to give you chances to revise and improve the quality of your work throughout the semester.
3. Learn from mistakes. Deep, connected learning involves hard work and reflection on your progress. Chemistry is a cumulative subject where the new topics build on prior knowledge and this system is designed for cycles of learning.

Standards

The standard for each letter grade is listed here according to all required course components. You must meet or exceed the standard listed to earn the corresponding letter grade: percentages are not rounded up at the end of the term. Grades are only based on the criteria listed in the syllabus: no substitutions, and no additions. Descriptions of graded components can be found on the next pages.

Grading Scheme

ALEKS	10%
Group Quizzes**	15%
FO Mastery	25%
CO Mastery	30%
Final Exam*	20%
Total score	100%

*the final exam is mandatory to earn a passing grade

Letter Grade Cutoffs*:

A	92.0%	C+	72.0%
A-	88.0%	C	68.0%
B+	84.0%	C-	64.0%
B	80.0%	D	50.0%
B-	77.0%	F	< 50.0%

Posting of Grades

Final course grades at the end of the semester are posted only LOCUS. Grades are never sent via email. ALEKS scores are automatically recorded in the ALEKS Gradebook for that system. Scores for all other required components will be made available on Gradescope and Sakai. Each student will see an estimated midterm grade in LOCUS before the withdraw deadline.

All of the following are required components of your course grade, no additions, no substitutions:

ALEKS: Required Homework

Online, at www.aleks.com, with additional information and tips posted on Sakai. At the end of the semester, your Overall ALEKS grade is calculated from: 50% Modules + 5% Final Knowledge Check + 45% Pie Progress. Regular work (Learning topics in Modules) is due 2-3 times per week at 11:59pm as a combination of pre- and post-lecture work. Assessments or "Knowledge Checks" are also included to help you retain course content throughout the entire semester. Chemistry is a complex and challenging subject, so we have chosen ALEKS to make sure you master the basic, fundamental concepts in the course to fully advance your personal educational and career goals. We have solid data that show this service can improve mastery and retention, particularly for students who would otherwise have difficulty passing. What you must do is decide to trust the system when it assigns you work: trust that this is indeed the work you should be doing now, and that doing it diligently will build the essential mastery you need to succeed in chemistry as fast as possible. ALEKS will help you by finding out YOUR individual state of knowledge, and then tutoring you in only the topics on which YOU need to work. The list of topics to be mastered has been set for the course, and it is the same for everybody. But YOUR individual path is going to be unique to you. We will drop your lowest 2 Module scores from the overall grade calculation at the end of the semester to account for the instances when you may not be able to finish an assignment by the deadline.

Group Quizzes

On average, 1 quiz per week, usually completed in assigned groups. Most assignments will be completed in class and submitted to Gradescope. The purpose of participation is to improve your learning by: 1) cooperation, communication and support among your classmates as you practice the skills required for success in the course; and 2) providing feedback on your progress to encourage reflection and improvement. Quizzes will include test questions from previous semesters. You will get as much benefit from these quizzes as you choose to put forth in your effort and you are expected to correct your work after receiving feedback. Each quiz will contribute equally toward this category in your course grade. Refer to the Universal Absence Accommodation Policy for missed quizzes.

Foundational Objectives (FOs): Mastery Testing

The purpose of testing is to align your course grade with your level of learning, based on your mastery of Foundational Objectives (FOs). The FOs are all related to the Course Content & Learning Outcomes listed earlier in this syllabus. A list of FOs will be updated for each unit as we progress through the material. There will be some overlap between chapters. FOs will be scored as Mastered or Not Mastered. A score of Mastered is earned for correctness and completeness of the problem(s), and each FO may only be counted once toward your FO Mastery score, which is calculated as 1% each for each Mastered FO (25% total). You will have multiple chances to demonstrate mastery of all of the FOs during the term: for example, if you receive a score of Not Mastered for any FO on the first test (or if you choose not to attempt an FO), you can try again to earn a score of Mastered for that FO on the second test. Revision of work that does not meet mastery standards is expected for your learning. Because you will have more than one chance to master the FOs, you will also be able to choose which FOs to work toward for the course. Note that the standards for earning Mastery will be high: by definition, there is no partial credit, but you will learn the standards from the examples for class activities. Tentative test dates are **Sept. 14, Oct. 05, Oct. 26, Nov. 21 & Dec. 07** with an additional round scheduled during the final exam period. Specific FO dates and timing will be announced at least one week in

advance. All procedures, allowed resources, and requirements will be posted before each round of testing. Refer to the Universal Absence Accommodation Policy for missed tests.

Comprehensive Objectives (COs): Mastery Testing & Proficiency Revisions
The purpose of testing is to align your course grade with your level of learning, based on your mastery of comprehensive topics. The purpose of COs is to allow you to demonstrate your higher-level skills of applying and analyzing, requiring you to go beyond memorization of facts and processes and transfer your understanding of essential course concepts to new scenarios. The COs are all related to the Course Content & Learning Outcomes earlier in this syllabus. A list of COs will be updated for each unit as we progress through the material. COs will be scored as Mastered or Not Mastered for each test. A score of Mastered is earned for correctness and completeness of the problem(s). Note that the standards for earning Mastery will be high: by definition there is no partial credit, but you will learn the standards from the examples for class activities. Each round of testing on COs will be followed by an opportunity to resubmit work to earn a score of Proficient for a CO that was Not Mastered in the first testing opportunity. Resubmissions for Proficiency will also earn reattempts of COs. Reattempts will take place with the next round of testing. There are 12 CO's for this course, with a maximum contribution of 30% to the course grade. At the end of the term, each Mastered CO is worth 2.5% and each Proficient CO is worth 1% toward the CO percentage. Note that your grade will not count both Mastery and Proficiency for the same item; a CO that is scored Proficient and then is subsequently Mastered on a re-attempt is worth 2.5%. Rounds of testing are scheduled for **Sept. 14, Oct. 05, Oct. 26, Nov. 21 & Dec. 07**. Specific CO dates and timing will be announced as we proceed through the course material. All procedures, allowed resources, and requirements will be posted before each round of testing. Refer to the Universal Absence Accommodation Policy for missed tests.

Free-response Final Exam
The final is cumulative and comprehensive, completed on paper, as scheduled by the University. The topics are all related to the Course Content & Learning Outcomes listed earlier in this syllabus. Additional information may be posted at the end of the semester. The final exam will not be returned, and a score will be posted on Sakai. Note that taking the final exam is mandatory to earn a passing course grade (C- or higher). The final exam, both written and graded by instructors, is common to all sections of CHEM 160.

Changes to Syllabus
There may be changes to the syllabus during the semester. ***You are responsible for all syllabus changes made in class whether or not you attend.***