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 A student missing a prerequisite may be withdrawn at any time.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: MWF 8:15-9:05 am, FH Auditorium
Discussions: You must attend the section for which you registered:

- Section 026: Wednesday 9:20-10:10 am, FH 007
- Section 027: Wednesday 10:25-11:15 am, FH 105

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: Dr. Amy M. Balija

Instructor Contact Information

Office: FH 104
Email: abalija@luc.edu
Email timing: In most cases, I will respond within 24-48 hours Monday-Friday when classes are in session. You are encouraged to use Office Hours to get immediate answers to your questions, and to use your classmates as resources for help.
Office Hours Policy: Office hours (student hours) are a time set aside by the instructor for students to ask questions in a smaller setting. Students are encouraged to come to office hours. No appointment is necessary during the times listed under the Office Hours Schedule.
Office Hours Schedule:
Wednesday 2-3 pm, STEM Center, St. Joseph's Hall Cafeteria
Thursday 8-9 pm (Zoom): https://luc.zoom.us/j/89452562788
Friday 9:30-11:00 am, STEM Center, St. Joseph's Hall Cafeteria
Or 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 who 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
- Textbook: OpenStax Organic Chemistry, A Tenth Edition, Web-only. https://openstax.org/details/books/organic-chemistry
- ALEKS: (https://www.aleks.com/) Class Code: **RM9DA-LJD6L**
- 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.
- Additional software may be used. These may include applications that convert photos to PDFs (examples: CanScanner, Scannable, GeniusScan, Adobe Scan), and collaboration materials for group work (example: OneNote).

Recommended Course Materials: Solutions Manual

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

Course Content & 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.

Class Attendance & Course Coverage
Material comprehension and attendance is obtained via Plicker. Keep your Plicker card safe and bring it to every class.

Early in the course, you will be given an opportunity to provide contact information to other people and to introduce yourself to multiple classmates. If you miss a class for any reason, it is your responsibility to work through the content. Contact a classmate for further discussion of the topics as you are still responsible for all material covered and assigned.

An outline will be shown at the beginning of each class and uncompleted lecture notes/handouts/ links/animations will be posted on Sakai. We will not cover every topic in every chapter of the textbook this semester. Focus first on the material that is directly covered in lecture and assigned or recommended. Explore the additional material in the textbook for your own interest and enrichment.

Classroom & Group Work Guidelines
The classroom is a space designed for learning. My expectations are that all voices will be heard and appreciated in the classroom, and that we will invite each other to engage while recognizing that contributions can take multiple forms.

Student and Faculty Expectations
Expectations of Students: I expect students to take ownership of their learning and to use office hours and SI sessions as learning resources. It is anticipated that the average independent working time (outside of class) required to learn the material in order to achieve a minimal passing grade of C- is 1-2 hours per day, every day, but your needs will also vary depending on your prior knowledge and ability to master cumulative concepts in the course material as the semester progresses.

Expectations of Instructor: I will provide you with the tools, environment, encouragement, and support to learn Chemistry. Because the course objectives are based on what students learn, my teaching techniques include homework, groupwork, and active learning. I expect all of us will work together!

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 to discuss their accommodations. All information will remain confidential. Please note that in this class, software may be used to audio record class lectures 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.

Any 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. Evidence of cheating in this course will result in, at a minimum, a score of zero (which cannot be dropped from grade calculations) and penalty up to failure of the course. College policies include that instructors will report incidents of academic misconduct to their chairperson as well as to the Assistant Dean for Student Academic Affairs in the CAS Dean's Office. I will report incidents to the Chemistry & Biochemistry Department for further action(s).

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.
• 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, 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.

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 fairness in grading for students who attend and complete all in-class graded assignments. We believe that 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:

- Students missing the Plicker question or a discussion section assignment must provide acceptable documentation for the grade of 0 not to be counted. The lowest group discussion grade will be dropped.

- 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 must provide documentation for an absence. This accommodation is 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

Homework	15%
Participation	10% (Plicker 2%, Discussion Questions 8%)
FO Mastery	25%
CO Mastery	30%
Final Exam*	20%
Total score	100%

*the final exam is mandatory to earn a passing grade

These grade cutoffs are firm at the end of the semester. No rounding or extra credit will be considered.

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. Each student will see an estimated midterm grade in LOCUS before the withdraw deadline.

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

PowerPoint Slides/Lecture Notes
PowerPoint slides will be posted on Sakai prior to the beginning of each new chapter. Other miscellaneous items (answer keys to select problems, Voice Over Videos) will be posted on Sakai as appropriate. It is the responsibility of the student to check Sakai regularly for new information.

Homework
On-line homework will be assigned through ALEKS and will be due at 11:59 pm on the corresponding due date. Look on the ALEKS website (https://www.aleks.com/) Class Code: **RM9DA-LJD6L** to determine the dates when the assignments will be due. **No** extensions will be given. You are allowed to work others to complete the homework. However, remember that you will take the exam by yourself, so you must understand how to complete problems individually.

Plicker Question
Students will be provided with a Plicker card which they will keep for the entire semester. At the beginning of class, a problem will be placed on the slide which students should attempt to solve. The students will use the Plicker card to answer the question. Students will be graded on completeness, not correctness. **No** points will be given to students that come in late to class or to students that are missing their Plicker card.

Discussion
During Discussion, students will work in groups to solve problems. At the end of the discussion, each student will hand in through Gradescope a copy of the work completed. The work will be graded based on completeness, not correctness. The lowest discussion grade will be dropped.

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 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 **9/15**, **10/6**, **10/27**, **11/17**, and **12/8**, 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 memorizing facts and processes to transfer your understanding of

essential course concepts to new scenarios. The COs are related to the Course Content & Learning Outcomes. 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. A score of Mastered is earned for correctness and completeness of the problem(s). Note that the standards for earning Mastery will be high: there is no partial credit, but you will learn the standards from examples in class activities. Each round of testing on COs will be followed by an opportunity to resubmit work to earn a score of Proficient for an 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. 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 will count only as being Mastered. Rounds of testing are scheduled for **9/15**, **10/6**, **10/27**, **11/17**, and **12/8**. Specific CO dates and timing will be announced as we proceed through the course material each week. 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.***

Foundational Objectives (FOs):

Unit	Objective #	Foundational Objective (FO)
Atomic Structure	1	List the names and symbols of common elements
	2	Identify and draw particle-level depictions of pure substances and mixtures. This may include presentations of physical and chemical changes.
	3	Relate mass, volume, and density using quantitative and qualitative descriptions.
	4	Convert between symbols and number of subatomic particles for atoms and atomic ions.
	5	Identify and classify elements accordingly to the organization of the Periodic Table.
	6	Convert among mass, moles, and number of particles including the use of Avogadro's number.
	7	Convert among wavelength, frequency, and energy of photons.
	8	Apply quantum mechanics to explain atomic emission and absorption spectra.
	9	Describe and identify numbers, types, and properties of atomic orbitals (size, shape, orientation).
	10	Use the Periodic Table to write and interpret electron configurations.
Chemical Bonding, Structure, and Properties	11	Correlate atomic and ionic properties with electron configurations and position on the periodic table.
	12	Write names and formulas for ionic and molecular compounds.
	13	Identify and describe ionic, metallic, and covalent bonding.
	14	Draw Lewis structures from chemical formulas.
	15	Identify formal charges in structures.
	16	Convert between condensed and Lewis structures.
	17	Convert between bond-line and Lewis structures.
Molecular Structure and Properties	18	Identify resonance contributors.
	19	Determine sigma and pi bonds for a structure.
	20	Identify hybridization, geometry, and approximate bond angles.
	21	Identify and draw structural isomers.
	22	Identify and draw E-Z isomers.
	23	Identify and draw conformers.
	24	Convert between bond-line and Newman projections.

	25	Identify chiral centers.

Comprehensive Objectives (COs):

Objective Number	Comprehensive Objective (CO)
1	Describe samples of matter according to their masses and dimensions. This may include a combination of quantitative and qualitative descriptions.
2	Use a particle-level understanding of matter to differentiate among masses of individual atoms and molecules, atomic and formula weights. This includes mass spectral data.
3	Use the periodic table and the wave behavior of matter to predict, draw, list and interpret the arrangements of electrons in atoms. This includes energies and magnetic properties.
4	Write electron configurations of ions. Explain the attractive forces between nuclei and valence electrons.
5	Predict, identify, and differentiate substances based on ionic, covalent, and metallic bonding. This includes using names formulas, and Lewis dot representations to describe matter on the particle-level.
6	Draw Lewis, bond-line, and condensed structures from names.
7	Draw and interpret Lewis structures, including the use of resonance contributors, to predict properties of covalently bonded species. This includes bond length, bond strength, and charges on atoms.
8	Use Valence Bond Theory to describe orbital overlap, resonance structures, and geometry.
9	Use models and dash-wedge perspective drawings to draw, interpret, and identify three-dimensional shapes. This includes chiral and achiral structures.
10	Identify, interpret, and draw representations of isomers and conformers.
11	Describe and interpret the three-dimensional shape and polarity of covalently bonded structures.
12	Predict and correlate physical properties to type and strength of interparticle forces (intermolecular/non-covalent forces) for pure substances and mixtures.

Tentative CHEM 160 Lecture Schedule*

Dates	Topic	Chapter(s)
08/28-09/01	Introduction, Physical/Chemical Properties of Matter, Types of Matter, Measurements	1
09/06-09/11	History of Atom, Atomic Structure, Periodic Table, Nuclear Chemistry	2, 6, 20
09/13-9/22	Electromagnetic Radiation, Quantum Numbers, Electron Configuration	3
09/15	**EXAM 1** FO: 1-6 (1st time) CO: 1-2 (1st time)	
09/25-10/4	Lewis Dot Structures, Resonance Structures, Nomenclature	3, 4
10/06	**EXAM 2** FO: 7-13 (1st time), 1-6 (2nd time) CO: 3-6 (1st time), 1-2 (2nd time)	
10/11-10/20	Valence Bond Theory, Geometry	5
10/23-10/25	Coordination Complexes	19
10/27	**EXAM 3** FO: 14-18 (1st time), 7-13 (2nd time), 1-6 (3rd time) CO: 7-8 (1st time), 3-6 (2nd time)	
10/30-11/10	3D Representation	McMurry
11/13-11/27	Interparticle Properties and Forces	10
11/17	**EXAM 4** FO: 19-25 (1st time), 14-18 (2nd time), 7-11 (3rd time) CO: 9-11 (1st time), 7-8 (2nd time)	
11/29-12/6	Solutions	11
12/8	**EXAM 5** FO: 19-25 (2nd time) CO: 12, 9-11 (2nd time)	
12/14	**FINAL**, 7 pm FO: 12-25 (3rd time) Free-Response Exam	

*Subject to change as necessary