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 A student missing a prerequisite may be withdrawn at any time.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 12:35 PM – 1:25 PM Cuneo Hall 210
Discussions: You must attend the section for which you registered:

- 1:40 PM - 2:30 PM FH 007
- 2:45 PM - 3:35 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: Dr. Willetta Greene Johnson

Instructor Contact Information

Office: Cudahy Science Hall 322
Email: wgreene@luc.edu

Office Hours Policy: Mask required.

Office Hours Schedule: Wednesday 1:45 PM – 3:00 PM;
additional sessions specific to midterms will be announced; also 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
- Additional OpenStax sources may be used to supplement the primary textbook.
- 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 Entry code XVWDBD).
- Additional software may be used. These may include applications that convert photos to PDFs, and collaboration materials for group work.

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.

Class Attendance & Course Coverage
You will have the chance to introduce yourself to multiple classmates early in the course. Our actual pace may vary from this schedule: if you miss a class for any reason, it is your responsibility to work through the content, and I also suggest you contact a classmate for further discussion of the topics as you are still responsible for all material covered and assigned. "Live" lectures & discussions will sometimes be supplemented by pre-recorded content to be viewed on Panopto (via Sakai). Slides/handouts/links/animations and other additional resources will be shared on Sakai. We are covering the course topics in a more traditional (structure-first) order compared to how topics are listed in OpenStax. To help you stay on track, pre-lecture readings will be posted and continually updated on the Sakai overview page for this course. Homework objectives are assigned and are continually updated. Post-lecture highly recommended problems for additional daily practice will be continually updated online. We will not cover every topic in every chapter of the textbook this semester. Focus first on the material that was 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. You will write expectations/guidelines for your group work this semester: this will be an essential part of the course.

Student and Faculty Expectations
I expect you to take ownership of your learning, utilizing office and SI sessions as learning resources to help you reach your desired level of achievement in the course. For this course, it is anticipated that the average independent working time (outside of class) required to learn the material to achieve a minimal passing grade of C- is 90 minutes to 2 hours per day, every day. Be aware that this timespan can also vary depending on your prior knowledge and ability to master cumulative concepts in the course as the semester progresses.
In return, my primary objective is to provide you with the tools, environment, encouragement, and support to learn chemistry. To achieve this outcome my teaching style includes the use of preparatory homework, active learning and metacognition, to help you maximize your learning. I expect that 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 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 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 who will decide what the next steps may be. College policies dictate that the instructor also report incidents of academic misconduct to the Assistant Dean for Student Academic Affairs. 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 that may include failure in the course.

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.
- Additional resources, advice, and suggestions for success (from multiple sources) will be posted/updated on Sakai.

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, 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 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:

- One assignment will be automatically 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.
- Free-response Tests: a missed in-class test due to absence for any reason is already accommodated in the course grading system. Given that only the higher scores on these tests are included in this calculation, a missed test would be the one not included in this calculation, as it would be the lowest score (0%) of the tests.

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

Three basic principles are employed to design the grading system for this course so that you may:

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	10%
Group Work**	15%
FO Mastery	25%
Midterms***	30%
Final Exam*	20%
Total score	100%

*The final exam is mandatory to earn a passing grade.
**This may include in-class work as well.
***Short Response problems on the midterms. Detail on following page

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. Scores for all other required components will be made available on Sakai. 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:

Homework: Homework should be completed by the end of the week. To assess student's progress and process, representative assignments that emphasize key concepts will be disseminated and graded via the Assignments Platform. You may consult with other students, but ultimately achieve your own understanding of topics. Copying from others will not prepare students for the probing enquiry on a topic that they may expect on exams. You are invited to explore unassigned questions to deepen your understanding and to satisfy your scientific curiosity.

Group Work

During discussions: A group will consist of at most 4 students who will work together throughout the semester. Group members will decide their expectations for the group. They will also elect one member responsible for turning in the group's work to the instructor at the end of the session. On average, there is 1 group assignment per week. Some assignments will be given during lecture. 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. Group assignments will include test questions from previous semesters. You will get as much benefit from this component as you choose to put forth in your effort and you are expected to correct your work after receiving feedback. Each group assignment will contribute equally toward this category in your course grade. Refer to the Universal Absence Accommodation Policy for missed group work.

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. Specific FO dates and timing will be announced at least one week in advance. Tentative test dates are Sept 15, Oct 6, Oct 27, Nov. 20, and Dec.6 with an additional round scheduled during the final exam period. 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 Midterms

The purpose of free-response problems on exams is to allow you to demonstrate your higher-level skills of applying and analyzing, that goes beyond memorization of facts and processes and transfer your understanding of essential course concepts to new scenarios. The topics for the free-response problems are all related to the Course Content & Learning Outcomes listed earlier in this syllabus. A list of learning goals will be updated for each unit as we progress through the material. Rounds of testing are scheduled for Sept 15, Oct 6, Oct 27, and Nov. 20. Refer to the Universal Absence Accommodation Policy for missed tests. To reward improvement and to accommodate an exam absence, your tests percentage will be automatically calculated to drop your lowest midterm score.

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. The final is cumulative and comprehensive, completed on paper, as scheduled by the University. Questions may include all material assigned for the semester.

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.***