
Introductory Chemistry

Kenyon College - Chem 121.02

Fall of 2017

Prof. M. Rouhier

Chemistry 121 Syllabus

Fall 2017

OVERVIEW

This course provides a thorough introduction to the fundamental concepts, theories, and methodologies of chemistry. Topics may include stoichiometry, theories of molecular structure and bonding, the periodic table, acid-base chemistry, chemical equilibria, and thermodynamics. This course provides a basis for further study of chemistry.

EXPECTATIONS

From the course – to be amazed, challenged, and learn a lot about chemistry. Students can expect to improve their problem-solving skills, apply and extend their chemical knowledge to other areas of science, and enhance their written and oral communication skills. We will be spending 3-5 class periods on each topic and it is expected that you will have read the associated material before class. In class we will work more challenging problems, analyze demonstrations, and discuss various applications of chemistry.

From the instructor – to treat each person with respect, be enthusiastic and knowledgeable about the subject, arrive to class on time and prepared, return graded and assessed items in a timely manner, reply to emails in a timely manner (within 24-48 hours), and be available outside of class for questions or further discussion.

Of the students – to respect others, be on time (when arriving to class, turning in assignments, etc.), be prepared for class (have read related course material before class, be alert, etc.), and participate during class (participate in small group activities, answer/ask questions, etc.). Outside of class, you are expected to make consistent progress towards completing course objectives on ALEKS.

RESOURCES

Instructor:	Prof. Matthew Rouhier (“Roo-yer”)
email:	rouhierm@kenyon.edu
Office:	208 Tomisch Hall
Office hours:	M (1-2 pm), W (1-2 pm), R (10-11 am), or by appointment
Class location:	Tomsich 101
Class time:	11:10-12:00 PM; M-W-F
Required materials:	Chemistry, 11th Ed. by Raymond Chang (although any general chemistry textbook is acceptable); ALEKS (Assessment and LEarning in Knowledge Spaces) Online course-companion; basic scientific calculator (bring to every class)
Course websites:	moodle.kenyon.edu (CHEM 121.02) and https://www.aleks.com
Lead tutor:	Haofan Li (will be available at MSSC)

POLICIES

Attendance – Your attendance at every lecture is expected. Excessive absences will lead to a lower grade and may lead to expulsion from the course. As stated in the Course of Study 2015-2016 regarding absence due to illnesses:

“Absences for reasons of illness are not ordinarily excused: only when a student is declared by the College physician to be infirm (in a hospital or at home) will a health report be sent from the Health and Counseling Center to the dean of students, giving the days when each patient is judged infirm and recommending that the student's class absences be excused. When released from confinement, the student is expected to resume regular required attendances unless otherwise advised.”

Athletics and Extracurricular Activities – If your participation in athletics or extracurricular activities conflicts with a class, scheduled exam time or project due date, please let me know as soon as possible, at least two weeks in advance. Typically you will be expected to complete your work before (not after) the deadline for the rest of the class. Note: only the Dean of Students offers an Excused Absence (see Course of Study 2015-2016 for details).

Accommodations – Students who anticipate they may need accommodations in this course because of the impact of a learning, physical, or psychological disability are encouraged to meet with me privately early in the semester to discuss your concerns. In addition, students must contact Erin Salva, Director of Student Accessibility and Support Services (740-427-5453 or salvae@kenyon.edu), as soon as possible, to verify their eligibility for reasonable academic accommodations. Early contact will help to avoid unnecessary inconvenience and delays.

Academic Honesty – Kenyon College is, at the core, an intellectual community of scholars – students and faculty – engaged in the free and open exchange of ideas. Critical to this lively exchange and deep engagement with ideas is the academic integrity of our work, both inside and outside the classroom.

At Kenyon we expect all students, at all times, to submit work that represents these standards of academic integrity. It is the responsibility of each student to learn and practice the proper ways of documenting and acknowledging those whose ideas and words you have drawn upon (see Academic Honesty and Questions of Plagiarism in the Course Catalog). Ignorance and carelessness are not excuses for academic dishonesty. If you are uncertain about the expectations for academic honesty in this class, please ask for clarification. Note: this class encourages collaborative work; however your work must still be your own.

Technology use – Please refrain from using laptops, tablet devices, cell phones, and recording devices in class without the prior approval of the instructor. All phones should be set to silent. Please bring a calculator to every class.

Title IX – As a faculty member, I am deeply invested in the well-being of each student I teach. I am here to assist you with your work in this course. If you come to me with other non-course-related concerns, I will do my best to help. It is important for you to know that all faculty members are mandated reporters of any incidents of sexual misconduct. That means that I cannot keep information about sexual misconduct confidential if you share that information with me. The Health and Counseling Center, Sexual Misconduct Advisors (SMAs), College chaplain, and the College chaplains are confidential resources.

Course grade – your overall course grade will be based on your performance in the following areas:

Category	Percentage	Hypothetical Point Scheme
Quizzes/Snapshots	5.0 %	25 pts
Case Studies (Project) (Weekly)	5.0% 10.0%	25 pts 50 pts
Semester exams (1) (2) (3)	10.0% 15.0% 15.0%	50 pts 75 pts 75 pts
Final exam	20.0%	100 pts
ALEKS	20.0%	100 pts
Total	100 %	500 pts

Letter grades will be assigned no more strictly than the following scale:

A/A-: 90-100%; B(+/-): 80-89%; C(+/-): 70-79%; D(+/-): 60-69%; F: <59%

COURSE DETAILS

Moodle – All course-related information will be posted and available through the course Moodle site. This includes the current schedule, lecture slides, and a gradebook. The Moodle calendar includes due dates for ALEKS and exam dates. This calendar can be exported to your own personal calendar (see course Moodle site for details). Please check this site frequently for important class-related information.

Quizzes and Snapshots – In order to help you assess your understanding and recognize where it may be lacking, there will be weekly Monday quizzes or snapshots. They will start promptly at 11:10 AM and last no more than 5 minutes. Quizzes will be closed-note and will cover material since the last quiz. Snapshots are 2 to 3 sentence responses that provide timely feedback to the understanding of the material covered in the previous lectures. The snapshots points are awarded for satisfactory completion, not correctness. Because of the nature of the quizzes and snapshots, there will be no makeups; however, your lowest quiz/snapshot grade will be replaced by your highest quiz grade at the end of the semester.

Case Studies – Everyday interesting things are happening in our chemical world. Each week, we will dive into these events by discussing the context, impact, and outcomes of these chemical happenings. These Case Studies are designed to build conceptual understanding of the material covered in your reading, develop your problem-solving skills, and provide a forum to practice scientific communication. You will be asked to complete short assignments based on the problems or discussions generated in class. Case Studies are typically undertaken on Fridays with the associated questions collected at the end of class that Friday. The questions will be graded for completion and a select subset will be graded for correctness and thought-process. Later in the semester you will have the opportunity to develop your own Case Study.

Semester exams – There will be three fifty-minute exams during the semester. If you have a scheduling conflict, please notify the instructor in writing at least two weeks prior to the scheduled exam to set up an alternate exam time. The exams are scheduled for September 14th, October 5th, and November 2nd. There will be no makeup exams.

Final exam – The final exam will be Tuesday, Dec. 12 at 1:30 p.m. It will be cumulative for the semester and you will have two hours to complete the exam. Because of limited time, it is impossible to include every concept or skill covered in this class, therefore the exam will sample topics. You should expect that any topic covered during the semester may appear.

ALEKS online companion – As a supplement to the text, the instructor has asked that students purchase access to ALEKS (<https://www.aleks.com>). ALEKS (Assessment and LEarning in Knowledge Spaces) is a Web-based, adaptive questioning, CHEM 121-course specific, program that supports the material taught in the lecture.

For ALEKS, there are two modes in which you will work: Assessment Mode and Learning Mode. In assessment mode, ALEKS determines what you have and have not yet mastered. Each ALEKS assessment takes about 45 minutes, so please plan accordingly. ALEKS uses the assessment data to determine what topics you have not yet mastered. Then ALEKS has you work in Learning Mode where you work on objectives with tutorials and problems to build your understanding. Working in learning mode is best done in frequent, small blocks of time. For example, 7 30-minute periods with ALEKS in a week is much better than one 3.5-hour block. Your ALEKS grade in the course is determined by the percent mastery of objectives at each of the ALEKS due dates and at the end of the course. Due dates are posted on ALEKS and are synchronized with the content addressed in lecture. The purpose of this is to keep you working regularly on learning chemistry. It is human nature to procrastinate, and this part of the course structure rewards those who work regularly toward mastery!

The percent mastery you earn on each objective or set of objectives associated with each due date will be weighted equally and averaged. The “gradebook” section of ALEKS enables you and me to track these scores. In addition, you will earn an ALEKS score based on your overall level of mastery at the end of the class. The purpose is for you to earn credit for mastery achieved before the course ends, whether or not it is achieved by the deadline. It is also in place to motivate you to work on topics that you forgot, so that by the end of the course you can succeed on the final examination and leave the course with a strong command of general chemistry knowledge. The numerator on the fraction above your ALEKS pie tells you your overall mastery score.

Also note, ALEKS instructs you on the topics you are most ready to learn. As you work through the course, ALEKS periodically reassesses you to ensure that topics learned are also retained. The ALEKS course is very complete in its chemistry coverage and ALEKS avoids multiple-choice questions. Historically students who show a high level of mastery of an ALEKS course are successful in the accompanying lecture. Please remember that ALEKS is tailored to assist you therefore it is to be completed individually.

Student Research – The Chemistry department encourages students with interests in the sciences to consider an independent research experience at some point during your undergraduate education. If you are interested in doing research within the Chemistry department, first check the faculty websites (www.kenyon.edu/academics/departments-programs/chemistry/chemistry/) for an introduction to each person’s individual research. If you find one (or more) faculty with interests that pique your curiosity, contact those people to set up an appointment to talk further. Some research groups may be full when you initiate contact, but this status may change semester to semester.

Best practices for success in CHEM 121 – Found on the Moodle page is a document that includes several strategies for how to be successful in this course. There is also a link to an article on “Study smarter, learn better: 8 tips from memory researchers” that can be applied to all of your courses. It is encouraged that you look at these documents and put into practice these strategies early in the semester to maximize your success.

TENTATIVE SCHEDULE

Date	Topics	Case Studies	ALEKS
8/25 – F	Syllabus & ALEKS 2.1-2.3 Atomic Structure & Isotopes	CS - Neurogenesis	8/27 Initial Assessment Due SUN
8/28 – M	2.5-2.7 Atomic Formulas & Atomic Representations		
8/30 – W	3.1-3.3 Mole Concept		
9/1 – F	3.5-3.7 Molar Mass, & % Composition	CS - Onions	9/1 Obj. Prereq Due FRI
9/4 – M	3.8 Stoichiometry		9/5 Obj. 1 Due TUE
9/6 – W	3.9-3.10 Limiting Reagent, & % Yield		
9/8 – F	4.1-4.2 Ionic Substances In Water	CS - Ibuprofen	9/8 Obj. 2 Due FRI
9/11 – M	4.3 Common Aqueous Reactions & Acids and Bases		9/12 Obj. 3 Due TUE
9/13 – W	Exam 1		
9/15 – F	4.4 Redox Reactions	CS - Biofuel Cells	
9/18 – M	4.5 Solute Solvent Relationships		9/19 Obj. 4 Due TUE
9/20 – W	5.1-5.5 Gas Laws And Ideal Gas Law		
9/22 – F	5.8 Stoichiometry And Non-Ideal Gases	CS - Limnic Eruptions	9/22 Obj. 5 Due FRI
9/25 – M	6.1-6.3 Energy As Heat & 1 st Law Of Thermodynamics		9/26 Obj. 6 Due TUE
9/27 – W	6.4 State Functions And Enthalpy		
9/29 – F	6.6 Hess' Law & Energy Required-For/Evolved-By Rxns	CS - Thermosiphons	9/29 Obj. 7 Due FRI
10/2 – M	7.1-7.2 Properties Of Electromagnetic Radiation		10/1 Obj. 8 Due TUE
10/4 – W	Exam 2	CS - Atomic Models (Handout)	
10/6 – F	Fall Break – No Class		
10/9 – M	7.3-7.4 Bohr's Atom and the electron		10/10 Obj. 9 Due TUE
10/11 – W	7.5-7.7 Quantum Numbers		
10/13 – F	7.8-7.9 Electron Configurations	CS - Brass Pots	10/13 Obj. 10 Due FRI

10/16 – M	8.1-8.2, 8.4-8.5 Atomic Trends		10/17 Obj. 11 Due TUE
10/18 – W	9.1 Valence Electrons & Lewis Dot Structures		
10/20 – F	9.4-9.5 Covalent Bonds	<i>CS - Lewis Structures</i>	10/20 Obj. 12 Due FRI
10/23 – M	9.6-9.7 Covalent Bonds - Octet guidelines		10/24 Obj. 13 Due TUE
10/25 – W	9.8-9.10 Where Lewis Structures Break Down		
10/27 – F	10.1-10.2 Molecular Geometry and VSEPR	<i>CS - Ozone</i>	
10/30 – M	10.3 Valence Bond Theory - Hybrid Orbitals		
11/1 – W	Exam 3		
11/3 – F	10.5 Sigma and Pi Bonding	<i>CS - Retinol</i>	
11/6 – M	10.5 Atomic and Molecular Orbitals		11/7 Obj. 14 Due TUE
11/8 – W	10.6-10.7 Molecular Orbital Theory		
11/10 – F	10.8 Delocalized Orbitals	<i>CS - Decaffeinated</i>	11/10 Obj. 15 Due FRI
11/13 – M	14.1 What Is Chemical Equilibria		11/12 Obj. 16 Due TUE
11/15 – W	14.2-14.3 Equilibrium Constants And Rxn Quotient		
11/17 – F	14.4-14.5 Equilibrium Constants And Rxn Quotient & Using K	Your Case Study Due	
11/18 - 24	Thanksgiving Break – No Class		11/26 Open Pie Closes SUN
11/27 – M	15.1 Bronsted-Lowry Acids & Bases		
11/29 – W	15.2-15.3 Water And pH		
12/1 – F	15.4 Strength Of Acids & Bases	<i>CS - Atropine</i>	12/1 Obj. 17 Due FRI
12/4 – M	15.5-15.6 Weak Acid/Bases And Ionization Constants		
12/6 – W	15.7-15.8 Diprotic Acids, Structure & Strength Of Acids/Bases		
12/8 – F	Flex Day	<i>CS - e-cigarettes</i>	12/8 Open Pie Closes FRI
12/11 - 15	Final Exam (December 12th, 1:30 pm)		