

Chemistry 1081, Section 001
Chemistry for the Life Sciences 1
Fall 2017
MWF 10:10-11:00am, 100 Smith Hall

Instructor: Dr. Angela Perkins

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General Course Information: Chemistry 1081 (3-credits) with accompanying 1065 (1-credit) lab is the first semester in a three-semester sequence of courses designed to provide a strong chemistry background for students pursuing degrees and careers in the life sciences. Upon completion of these courses, the desired outcome is that the student (1) can identify, define and solve problems; (2) can locate and critically evaluate information; (3) has mastered a body of knowledge and a mode of inquiry; (4) can communicate effectively; and (5) has acquired the skills for effective and life-long learning.

Liberal Education: This lecture/lab pair fulfills the core physical science requirement of the liberal education requirement. A student may ask, "Why is this course considered an important component to my liberal education?" A liberal educated person is one who can understand complex issues, find credible information, analyze that information, problem-solve, and draw reasonable conclusions based on facts. In this course, these objectives are met, in part, by highlighting the experimental basis for physical theories. For example, kinetic molecular theory can be tested via experimental methods, including the measurement of pressure, volume, and temperature. The hydrogen atom emission spectrum will be used to test predictions made by atomic theory. Moreover, in the co-requisite laboratory course, open-ended experiments provide you the opportunity to practice the scientific method yourself, as you will formulate, test, and refine hypotheses pertinent to the problems you are studying. This course along with the 1065 laboratory will help to develop these skills and to prepare you to be an informed citizen and life-long learner.

Website: All class information will be posted on the course website - access through <https://moodle2.umn.edu/>

Office Hours: See Moodle Site as dates/times will be set after the first week of the semester.

If office hours don't work for you or you want to be sure to chat one-on-one, please email to set up an appointment.

Materials: *Chemistry: An Atoms First Approach*, by Zumdahl & Zumdahl, 2nd ed, Cengage Publishing. (Required); Access to Online Homework (OWLv2, Required); Molecular Model kit (very highly recommended); Non-programmable scientific calculator (see below for specifics, Required); iClicker2 – ISBN 9781429290471 (Required)

Prerequisite Material: To register/remained registered in this course, you must meet all of the following criteria:

1. Registration in both 1081 (lecture) and 1065 (lab) during the same semester is required
2. Passed the chemistry placement exam (and been advised to take this course) or Completed CHEM 1015 or an equivalent course with a grade of a C- or better

If you do not meet these criteria, you should report your situation to the staff in Smith 115 (624-0026) immediately. They handle all registration issues pertaining to this course.

Calculating Final Grades: Your final grades will be calculated based on the three hour exams, the final exam, the online assignments and in class participation as described below.

Final Grade:	Three exams (100 points each)	300
	OWL Homework	70
	Class Participation (iClicker Questions)	30
	Final exam points	<u>200</u>
	Total Points possible	600

Letter grades (A-F) will be assigned based on the cumulative points received during the semester. The B-/C+ borderline will be set close to the class median.

Exams: Three exams (60 minutes each) will be given on the dates provided. The final exam is 2 hours. All exams will start promptly at the time listed so do not be late as you will not be granted additional time. **You must have your student ID (or other form of ID) with you to take the exams.** All exams will be closed book and closed notes and no other study aids are permitted. You will be allowed to use a non-programmable scientific calculator (see below for specifics).

Exam I	Saturday, October 7 th @ 10:00am (1 hour)
Exam II	Saturday, November 4 th @ 10:00am (1 hour)
Exam III	Saturday, December 9 th @ 10:00am (1 hour)
Final Exam:	Thursday, December 21st @ 8:00am (2 hour)

All examinations must be taken at the times indicated above. Absolutely NO late make-up exams will be given. See below on policy for exam absences.

In the case of a University sponsored activity that will require the student to be out of town, it may be possible to take the exam with the coach, team academic advisor, or another instructor as the proctor. Please see the instructor about such conflicts *as soon as possible* so that arrangements can be made.

Calculators: The presence or use of graphing and/or programmable calculators is FORBIDDEN on exams, this includes the calculator on your cell phone or smart phone. Their presence or use during an exam will be considered cheating. Only non-programmable calculators with limited memory will be allowed for use during exams. The **TI-30Xa** is the suggested calculator for this and all CHEM 1xxx courses, and for most intro Physics courses. The bookstore stocks this calculator for around \$10. The **TI-30X IIS** is an acceptable two-line calculator. Many other two-line calculators are programmable and therefore not allowed. To make it easy for proctors on exam days, these are the only two calculators that are allowed for exams. Calculators may not be shared during exams. *If you are concerned about battery failure during an exam, bring a second calculator or extra batteries with you.*

Online Assignments: There will be online due over the course of the semester. These assignments will be related to material that we are covering in class. You will need to activate your OWLv2 Account by registering using the link for our class, which can be found on the course Moodle site. All graded assignments will be listed and submitted on this website. **No late homework will be accepted (no exceptions).** There will also be assignments that you can use for practice; no points will be awarded for their completion. If you need computer access, there is a computer lab on first floor **Walter Library (RM 103)** that is for UMN student use. I recommend not waiting till the last minute to complete your homework, as it will take some time to become familiar with the online homework program. There will be no extensions given for failure to complete your homework on time. These assignments are for your benefit and are designed to help you to keep pace with the material that we are covering in lecture.

Class Participation: During lecture almost everyday we will work problems. You will be encouraged to work with those around you to discuss solutions. Your responses to some of these problems will be monitored using the iClicker2 system and will be part of your grade. You will receive credit for participation (0.3 pts) during the in-class problems, as well as for correct answers (0.2 pts). These questions will help me to gauge student understanding of the course material and to reinforce information as needed. You must correctly register your iClicker device to receive credit. You can find information about iClicker2 registration on the course Moodle site. If you do not wish to purchase an iClicker, you may alternatively use Reef Polling, which will allow the usage of an Internet capable mobile device, laptop or tablet for participation. Please see the Moodle site for instructions on setting up Reef Polling and comments about wireless network. It is your responsibility to make sure that you bring your device every day and that it is connected. I will not go in and manually give points to anyone for any reason, including excused absences. If for any reason you miss class, you cannot make up iClicker participation points, however,

over the course of the semester, there will be ~35-40 points possible, but you will only be awarded a maximum of 30 points.

Policy on Exam Absences: A student can be excused from one midterm exam for a true emergency, serious illness, or University sponsored activity. The student should contact the instructor as soon as circumstances allow and appropriate documentation **must** be provided (Dr's note, note from coach, etc). If the circumstances are deemed as appropriate for missing the exam, the unweighted average score of all other midterm exams and of the final exam in the course will be used in place of the missed exam. If circumstances lead to a student missing more than one midterm exam, the student should immediately schedule a meeting with the instructor to discuss any available options. **There will be no late makeup exams given – NO EXCEPTIONS!!**

The final exam can only be missed due to illness or family emergency and documentation again must be provided. However, in cases where the final exam is missed an incomplete ("I") final grade will be assigned according to the policy outlined below.

Policy on an Incomplete (I) Grade: An incomplete grade will be assigned only when the final exam is not taken **AND** the work completed to that date is satisfactory (C- or better). An incomplete grade can only be corrected by taking a regularly scheduled 1081 final exam in the next available semester. If the final exam is not taken and/or the work completed to that date is not satisfactory, and **F** grad or an **N** grade will be given depending on whether the course is taken under the A-F or S-N grading system. **The "Agreement for Making Up and I Grade" form must be completed and signed by the Instructor, student, and a third party within 48 hours of the final exam date.**

Exam Regrade Policy: Regrade requests must be submitted in writing directly to the instructor by 1 week following the posting of exam results. **Altering an exam and submitting it for a regrade is an act of scholastic dishonesty and will result in a "0" for the entire exam.**

Scholastic Dishonesty Policy: "Scholastic dishonesty is any act that violates the rights of another student with respect to academic work or that involves misrepresentation of a student's own work. Scholastic dishonesty includes (but is not limited to) cheating on assignments or examinations, plagiarizing (misrepresenting as one's own, anything done by another), submitting the same or substantially similar papers (or creative work) for more than one course without consent of all instructors concerned, depriving another of necessary course materials, and sabotaging another's work." – *Classroom Grading and Examination Procedures*. College of Liberal Arts.

A student guilty of scholastic dishonesty will be awarded a grade of zero (0) for the exam involved. Additionally, the incident will be reported to the Office for Student Academic Integrity and to the college in which the student is enrolled.

As a student at the University you are expected to adhere to the Board of Regents Policy: Student Conduct Code. To review this policy see: http://regents.umn.edu/sites/regents.umn.edu/files/policies/Code_of_Conduct.pdf

How to do well in this course:

- **Be prepared for lecture.** Briefly scan the material that is going to be covered in the lectures before you come to class. It helps to have a basic knowledge of what is being discussed in class and can help you tailor questions for material you don't understand.
- **Participate in Class.** Ask questions if there is something that you don't understand.
- **Study the material covered in class.** It is helpful to reread the material covered in class while the lecture is still fresh in your mind. If there is something you do not understand, you should ask for help as soon as possible.
- **Work out the assigned problems.** Chemistry can only be mastered by applying concepts learned and the best way to do this is to work problems. Make sure you understand the concepts presented in the chapter and

then attempt the problems related to these concepts. The best way to work the problems is without the aid of the solutions manual.

- **Participate in a study group.** Study groups are an effective way of succeeding in this class. Forming a group of 2-3 other students from the class can be a great tool for understanding what you have learned and discover with which concepts you are still struggling. Do not go to the study group hoping to learn the material you have not studied, rather complete your studying and take questions to the study group.
- **Get help early.** This class moves very quickly and we cover a lot of material each week, so if you get lost you need to be proactive about getting the help that you need, whether that means going to the tutor room or coming to office hours with questions.

Tutor Hours: Tutor hours are held in 124 Smith Hall throughout the semester from 8:00am – 5:00pm, see link for more detailed schedule on the course Moodle site. These hours are limited so come prepared with direct questions. A reminder that the purpose of a tutor is to help you learn, not simply give you answers to questions or problems. The tutors are instructed, in fact, to ask YOU questions that will help you understand what concept you are missing that is preventing you from solving a particular problem. Self-discovery will enhance the depth and retention of your knowledge.

Private Tutors: The department also maintains a list of people who are available for private tutoring. This list can be obtained from 115 Smith Hall during business hours or you can find it on the course website. The cost/hour for a private tutor is negotiated between you (the student) and the tutor.

Problems: For each chapter a series of problems have been chosen from within and at the end of each chapter. These problems can be found on the course website. These problems will be similar in concept and difficulty to the ones that you will see on the exams. These problems **will not be** collected but are to help you understand the concepts and practice the material, so feel free to do as many or few as needed to understand the concepts presented in the chapters and in class. I generally choose a large number of problems because the best way to learn and understand the concepts is to work problems and also because some students appreciate a lot of examples. Again, do as many or as few as you need to understand the concepts.

Policy Statements:**Grade Definitions:**

<https://policy.umn.edu/education/gradingtranscripts>

Overlapping and Back-to-Back Courses: Enrolling in overlapping or back-to-back courses that do not allow for enough travel time to arrive at our class meetings on time is prohibited. For more information see:

<http://policy.umn.edu/Policies/Education/Education/Overlappingclasses.html>

Student Mental Health and Stress Management: As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce a student's ability to participate in daily activities. University of Minnesota services are available to assist you with addressing these and other concerns you may be experiencing. You can learn more about the broad range of confidential mental health services available on campus via <http://www.mentalhealth.umn.edu/>.

Teaching and Learning: The materials provided in this course are intended only for the students officially enrolled in this section and are to be used to learn and practice the course material. Disseminating class notes, videos, exams, etc.... beyond the classroom community or accepting compensation (in the form of cash or trade, such as access to study website) undermines instructor interests in their intellectual property while not substantially furthering instructor and student interests in effective learning. Such actions violate shared norms and standards of the academic community and are not allowed. For additional information please see <http://policy.umn.edu/Policies/Education/Education/Studentresp.html>

Disability Resource Center: Students with special needs should contact the Disability Resource Center (<https://diversity.umn.edu/disability/>), which will provide a letter to share with the instructor on how those needs shall be accommodated.

Sexual Harassment:

<http://regents.umn.edu/sites/regents.umn.edu/files/policies/SexHarassment.pdf>

Academic Freedom and Responsibility:

https://regents.umn.edu/sites/regents.umn.edu/files/policies/Academic_Freedom.pdf

Equity, Diversity, and Equal Opportunity:

http://regents.umn.edu/sites/regents.umn.edu/files/policies/Equity_Diversity_EO_AA.pdf

Lecture Schedule: This class will start with the understanding that you already have basic knowledge of the following topics and they will not be covered in this class. These topics were completed on the ALEKS assessment or were learned in CHEM 1015 (a prerequisite to take this class if you didn't pass the placement exam). The list below shows the lecture topics with the corresponding chapters and sections in your textbooks (Zumdahl). Below you will also find a **TENTATIVE** lecture schedule with topics for each day. It is suggested that you look over this material before you come to class each day to have a basic understanding of what we are going to discuss.

Prerequisite Knowledge:

- Measurements and Calculations in Chemistry (Review)
- Scientific Method (1-2)
- Atoms (1-3 – 1-7)
 - Early History
 - Subatomic particles and atomic structure
 - Atomic number, mass number and isotopes
- Period Table and Trends (2-10 – 2-13)
 - Classification of elements (metals, nonmetals, halogens, etc)
 - Periodic Table Trends (we will cover briefly)
- Stoichiometry (5-1 – 5-11)
 - Atomic Masses, the Mole, Molar Mass
 - Determining % composition, molecular formula, etc
 - Balancing Chemical Equations
 - Limiting Reactant
- Types of Chemical Reactions (6-4 – 6-10)
 - Precipitation Reactions
 - Acid-Base Reactions
 - Simple Redox (identifying loss/gain of electrons)

Date	Topic	Readings
9/6	Introduction	
	Energy, Atomic Structure	R-9, 1-7
9/8	Light, as a Wave, Light as a Particle	2-1 - 2-2
9/11	Atomic Spectrum of Hydrogen, Bohr Model, Quantum Mechanical Model	2-3 - 2-5
9/13	Quantum Numbers, Orbitals	2-6 - 2-8
9/15	Polyelectronic Atoms, Aufbau Principle, Periodic Trends	2-9 - 2-13, 3-3
9/18	More Periodic Trends	2-12, 3-3
9/20	Bonding: Covalent and Ionic, Electronegativity	3-1 - 3-2
9/22	Lattice Energy, Naming Binary Ionic Compounds	3-4 - 3-5, 3-12
9/25	Covalent Bonding & Molecules, Bond Energy	3-6 - 3-7
9/27	Lewis Structures, Octet Rule, Formal Charge, Resonance	3-8 - 3-12
9/29	Naming Polyatomic & Covalent Molecules	3-12
10/2	VSEPR Model, Molecular Shape, Bond Polarity, Dipoles	4-1 - 4-2
10/4	Hybridization	4-3
10/7	Q & A for EXAM I (Chapters: Review, 1 - 4)	
10/9	Representing Molecules	Handout
10/11	Chemical Energy, Enthalpy	7-1 - 7-2
10/13	Hess's Law, Standard Enthalpies of Formation	7-4 - 7-5

Date	Topic	Readings
10/16	Standard Enthalpies, Alternative Fuels	7-6 - 7-7
10/18	Pressure, Gas Laws	8-1 - 8-4
10/20	Partial Pressures, Kinetic Molecular Theory	8-5 - 8-6 (stop p. 349)
10/23	Effusion/Diffusion, Intermolecular Forces	8.7, 9.1
10/25	Properties of a Liquid, Solids	9.2 - 9.7
10/27	Vapor Pressure, Change of State, Phase Diagrams	9-8 - 9-10
10/30	Intermolecular Forces in Biological Molecules	
11/1	Aqueous Solutions, Solution Compositions	6-1 - 6-3, 10-1
11/3	Q & A for EXAM II (Handout & Chapters 4, 7 - 9)	
11/6	Energy of Solution Formation, Solubility	10-2 - 10-3
11/8	Vapor Pressure of Solutions, Bpt Elevation, Fpt depression	10-4 - 10-5
11/10	Osmotic Pressure, Electrolyte Solutions	10-6 - 10-7
11/13	Entropy and Free Energy, Spontaneous Processes	16-1 - 16-3
11/15	Free Energy, Entropy Changes in Chemical Reactions	16-4 - 16-5
11/17	Free Energy and Chemical Reactions, Thermodynamics in Living Systems	16-6
11/20	Equilibrium Constant, Equilibrium Expressions	12-1 - 12-3
11/22	Heterogeneous Equilibrium, Application of Equilibrium Expressions	12-4 - 12-5
11/24	No Class - Thanksgiving Break	
11/27	Equilibrium Problems,	12-6 - 12-7
11/29	Le Châtelier's Principle	12-7
12/1	Free Energy and Equilibrium	16-7 - 16-8
12/4	Organic Structures, Classification of Carbon, Isomers	21-1
12/6	Nomenclature	
12/8	Q & A for EXAM III (Ch 10, 16, & 12)	
12/11	Cycloalkane, Alkenes, Alkynes, Functional Groups	21-2 - 21-4
12/13	Aromatic Hydrocarbons and Additional Functional Groups	
12/21	FINAL EXAM 8:00 - 10:00am (Cumulative)	

OWL Homework (Completed Online) – Due at 11:59pm on the date indicated (mostly Thursdays)

Due Date	Assignment
9/14	Math Review #1
9/14	Quick Prep Assessment
9/21	Mastery: Ch. 2 – Atomic Structure
9/28	Mastery: Ch. 3 – Bonding
10/5	Mastery: Ch. 4 – Molecular Structure
10/12	Mastery: Handout – Drawing organic molecules
10/19	Mastery: Ch. 7 – Enthalpy
10/26	Mastery: Ch. 8 – Gas Laws
11/2	Mastery: Ch. 9 – Liquids and Solids
11/9	Math Review #2
11/16	Mastery: Ch. 10 – Properties of Solutions
11/30	Mastery: Ch. 16 – Entropy
11/30	Mastery: Ch. 12 – Chemical Equilibrium
12/13 (Wed)	Mastery: Handout – Organic Structure and Nomenclature