CHEMISTRY 109

Lecture 2, Fall 2015

Read This Syllabus Today. Keep It for Future Reference.

Advanced General Chemistry:	5 credit hours
Lecture:	2:25 PM MWF 1351 Chemistry
Instructor Information:	Professor Ive Hermans hermans@chem.wisc.edu
Office Hours:	Monday & Friday 3:15 PM (after class) Study room B, room 1371, Chemistry or email for an appointment

Chemistry 109 is a one-semester, accelerated, first-year college course in chemistry. The goals of this course are: 1) to build your skills in problem solving, mathematical and analytical reasoning, and laboratory manipulation, and 2) to build your knowledge of the fundamental chemical principles of atomic and molecular structure, kinetics, and thermodynamics. In this class we will apply these principles to condensation-hydrolysis reactions, acid-base reactions, and oxidation-reduction reactions. We will emphasize applications in living organisms (for example in drug design), and in the industrial world (for example in fuel production and utilization).

Is Chemistry 109 the right course for me? It is, provided you can answer yes to all of these questions. 1) Does your potential major require chemistry beyond General Chemistry, or are you considering a major that would require more chemistry? 2) Did you qualify for placement into Calculus (Math 221) or a higher math course? 3) Have you taken one year of high school chemistry with a grade of A- or better and scored at least 29 on the ACT or at least 650 on the SAT math test, or have you taken two years of high school chemistry (AP is good) and scored at least 27 on the ACT or 620 on the SAT math test? 4) Do you enjoy science, feel reasonably well prepared, and have a strong work ethic?

Course Organization and Expectations

This course is designed to help you to learn chemistry. Prof. Hermans and your TA will do their best to guide you in mastering the material, but no course or instructor can learn for you. You will need to devote considerable outside-of-class time to studying chemistry. A good rule of thumb is that you should be spending approximately three hours outside of class for each hour you are in class. A recommended study strategy for this course is this: 1) read the assigned material in the textbook before each class session, 2) attend class and take your own notes, 3) as soon as possible after class, begin to work homework problems. When you encounter problems that you cannot solve, refer to the textbook, your notes, a tutorial, or your fellow students. Forming a study group to work through problems is an excellent way to learn chemistry. As you read, make notes about questions you have or points you don't understand; such questions can be entered in Piazza (see below) so that an instructor or a fellow student can help you gain insight.

Throughout this course emphasis will be placed on understanding chemistry and learning to think effectively in solving problems. Successful problem solving requires a basic knowledge of principles, facts, and terms: a vocabulary of chemistry. Some of this background and vocabulary should have been obtained from your high school chemistry course. From time to time you may need to review material you studied in high school in order to understand the new material presented in this course. To help you review there are three Review Homework assignments. The first of these must be completed Sunday, Sept. 6, and the second two weeks later. The third comes in early November. Chemistry is a cumulative subject; what you learn this semester will build upon background material that you learned earlier.

To help you to master the new material presented in this course, specific learning objectives are provided for each exam. These objectives will be available under the Exam Preparation Materials headings in Moodle (see below). Use the learning objectives to guide your work on the homework sets and to review for the exams. Study questions keyed to the learning objectives are also available in the same location to give you more problem-solving practice. Practice exams, and fully worked out answers, will be available for you to use in preparing for each exam. Some additional objectives will become available from time to time to cover material introduced for the first time this year.

This course is designed to help you to learn as much chemistry as possible and to perform at the highest possible level. I found this online post to be helpful in providing insights into what is needed if you want to be the best of the best: http://www.entrepreneur.com/article/247518?utm_source=MailingList&utm_medium=email&utm_campaign=150619

Required Texts & Materials

You will need to purchase each item listed below. These are the only required items for this course.

Textbook: *Chemistry: The Molecular Science* 5th ed. Moore, Stanitski + OWLv2 w/ 24 Months MindTap eReader (you can get either a hardbound book or 3-hole punched pages that you would put in a notebook).

Lab Manual: *Chemistry 109 Laboratory Manual, Fall 2015,* Chemistry Department, University of Wisconsin-Madison: available from Alpha Chi Sigma (the co-ed chemistry fraternity) in chemistry building lobby the first week of classes.

Lab Notebook: Carbonless laboratory notebook with duplicate pages: available from Alpha Chi Sigma or local bookstores (where it is more expensive).

Safety Goggles: Industrial quality eye protection—goggles that completely seal around the eyes and fit over regular glasses—is required at all times when you are in the lab. Purchase from Alpha Chi Sigma or local bookstores (~$10).

Calculator: An inexpensive calculator is required. It should have capabilities for square roots, logarithms and exponentiation (antilogarithms), and exponential (scientific) notation operations. The calculator will be used on homework assignments, pre-lab quizzes, exams, and in the lab. You may use programmable calculators in this course.

Web-Based Course Materials and Class Emails

To access Web-based materials, you must activate your UW-Madison NetID so you have an ID and password. You probably did this at SOAR during the summer. If not, activate your NetID by going to https://mynetid.wisc.edu/activate, and following the directions. You may change your NetID password at https://www.mynetid.wisc.edu/modify.

Much information about this course will be transmitted via email, using an automated email list based on registration in the course. An email was sent to everyone on this list on August 24. If you did not receive such an email, either you were not yet enrolled or you are not reading your @wisc.edu emails. It is best to use your @wisc.edu email for UW-Madison communications. You can tell your other email accounts to forward to your @wisc.edu email account, or *vice versa*.

Technology Enhanced Learning: Moodle Web Site; OWLv2

Much of Chem 109 is only available via a course management system called **Moodle**. You automatically have access if you are enrolled in this course. You can use Moodle on your own computer, a friend's computer, or any other computer on campus. Direct your Web browser to https://ay15-16.moodle.wisc.edu. Click Login at the upper right on the screen; enter your NetID and Password. Choose Fall 2015 and click Chem 109-2 (Hermans).

Part of your grade this semester will be based on your skill in thinking of and writing questions. Each week you will write a question based on the readings listed in the course schedule for the lectures that week. Questions will be entered into Moodle where they will be evaluated by your TA and/or Prof. Hermans. More information is provided later in this syllabus.

Homework in this course is provided online via **OWLv2**, a system associated with your textbook for which an access code usually purchased with your textbook. In Moodle you will find directions for registering for OWLv2. View the Registration Video as soon as possible and then use the link in Moodle that corresponds with your discussion section number (541, 542, etc.) to login to OWLv2 and get to know the system. **When you register for the first time in OWLv2, use your @wisc email for your email address and use your NetID as your Student ID.**

Each week a set of OWLv2 problems will be assigned for homework and there will be optional assignments as well. There are five OWLv2 Prep Assignments (1 pt each) that you should do before you start any other OWLv2 assignment: (1) Intro: System Setup; (2) Intro: Assignment Types; (3) Intro: Answering Questions; (4); Intro: ChemDoodle Sketcher and (5) Math Review. Complete these as soon as possible. Then begin to work on **Review Homework 1**, which is **due at 11:55 PM Sunday, Sept. 6** and on **Homework 1**, which is **due at 11:55 PM on Sunday, Sept. 13.**

Safety Quiz and Academic Honesty Quiz

Before your first lab period you must achieve a perfect score on a Safety Quiz and an Academic Honesty Quiz in Moodle. The quizzes are listed under the second week's assignment. *If you carefully read the safety pages (pp xix to xxii) in your lab manual before taking the Safety Quiz, you should have no difficulty getting a perfect score.*

Health or Disability Concerns

All students at UW are entitled to an accessible, accommodating, and supportive teaching and learning environment. The provision of reasonable accommodation for students with disabilities is a shared faculty and student responsibility. Students are expected to inform their professor of their need for accommodation; the professor and TA are expected to make the reasonable arrangements. If you have special needs, please contact Prof. Hermans and your TA at your earliest convenience. If you have a condition that might result in a seizure, loss of consciousness, or other situation that might endanger your safety or the safety of others in the laboratory, please inform your TA.

The rest of this syllabus and the course schedule are in Moodle. Log in, go to Chem 109, and use the Course Info and other panels on the right to view and download the Syllabus, Assignment Schedule, and other resources. The full syllabus contains information about how your final grade will be calculated, among other things.

Learning Activities in Chemistry 109

Chemistry 109 has different learning activities to meet the needs of the many types of students in our class. Many of these activities are assigned point values and must be done. Others are optional: you can sample the different types of materials offered and to select those activities that most effectively support your learning. In the lecture, Prof. Hermans will lecture, do demonstrations, or lead problem solving. In discussion section, your TA will engage a smaller group of students in problem solving, answer specific questions on the course material, and discuss the laboratory exercises. In lab you will explore chemical principles through hands-on experimentation. To supplement these activities, tutorials are provided to aid your mastery of the material. Attendance at the lectures and the discussion sections is strongly encouraged, but not required; students who consistently attend outperform those who do not. Laboratory attendance is mandatory; students who do not attend will not pass this course.

Lecture

In class Prof. Hermans will provide an organizational framework, discuss principles, and present illustrations and demonstrations. He will not describe or explain everything you should learn; rather, he will indicate what topics you should study and provide insights into those topics. Lectures will also give you an opportunity to think about these topics and see whether you understand them. You should take notes during lecture; note taking should be an active, thinking process. Your notes should reflect your understanding of what you heard and saw. Prof. Hermans will provide opportunities for you to test your understanding of particular concepts through in class questions. If there are particular concepts or ideas that are not clear to you, feel free to ask Prof. Hermans or your TA about them during class, after class using Piazza, or in office hours. Sample lecture notes taken by a Teaching Assistant (TA) will be posted in Moodle shortly after each lecture; don't rely on these notes in place of your own, but, if you need to miss a class, they are an acceptable substitute. Please do not expect to learn everything you need to know in the classroom; you will learn far better by working problems on your own or with a group of other students outside of class. As soon as possible after lecture practice your problem solving skills by working the related online homework questions.

Textbook.

We recommend that you read the assigned sections of the textbook prior to each lecture; the sections to read are listed in the course schedule for the date of each lecture. Try to make your reading an active process; read with pencil, paper, and calculator at hand and work through each Problem-Solving Practice problem and each Exercise in the textbook. Keep track of concepts that are confusing and write down questions that occur to you about the material. (If further reading does not provide answers to your questions, submit them through Piazza; your TA, Prof. Hermans, and other students will be reading those questions and providing answers.) The questions you write should suggest topics for you to pay especially close attention to in class.

Moodle Question-Writing Assignments.

Perhaps the most important thing a scientist does is to ask good questions about nature. However, most science courses involve students in answering questions rather than asking them. This weekly assignment is designed to improve your skills in thinking critically about the chemistry you are studying and asking questions to learn more about the chemistry.

By noon on Wednesday of each week you must submit a question about that week's chemistry content (textbook reading, lecture material, lab material, online homework, etc.) in Moodle. To obtain credit for the Moodle Question-Writing assignment you must submit your question before the deadline each week. Questions that are asked by several students or questions that show unusually good thought about the course material will be transferred to Piazza, where they may be answered by another student, a TA, or Prof. Hermans.

Your question will also be evaluated based on the degree of thought that went into constructing the question:

0 points—no question submitted
1 point—question submitted but no significant thought in its construction
2 points—question submitted that shows evidence of significant thought

Here are some examples of higher and lower quality questions. Note that the higher quality questions indicate that the writer has thought about the subject and tried to figure out an answer before writing the question.

Example 1, Chapter 5:
1 point—Why is the ionization energy of nitrogen larger than the ionization energy of oxygen?
2 points—I understand that the general trend is that ionization energies increase from left to right in the same row of the periodic table; however, I noticed in Figure 5.30 in the textbook that the ionization energy of nitrogen is larger than the ionization energy of oxygen. Why is the general trend not followed in this case?

Example 2: Chapter 5:
1 point—On the homework I gave the wrong answer for the electron configuration of Ni^{2+}. The 3*d* electrons are the last added when the electron configuration of Ni is written so why aren't any 3*d* electrons lost when a Ni^{2+} ion forms?
2 points—According to the textbook (p 224) electrons in the outermost shell of a transition-metal atom are the first ones lost when a positive ion is formed. I am trying to understand this for Ni and Ni^{2+} in terms of the idea of effective nuclear

charge (Sec. 5-9c). If the 4*s* electrons are lost first they must have lower ionization energy than 3*d* electrons, which means they experience less effective nuclear charge, but I don't quite see why. Is it because the 3*d* electron cloud is mostly closer to the nucleus than the 4*s* and therefore screens the nuclear charge better?

Laboratory

Laboratory work is important to understanding and appreciating chemistry, and for those of us who love chemistry, lab work is really fun. The laboratory exercises are designed to illustrate the principles described in class, and the exams will include questions based upon the laboratory material. **To receive a passing grade in Chem 109, you must successfully complete *all* laboratory assignments and achieve an overall lab score of at least 60%**. *Coming to laboratory well prepared and strictly following all safety instructions given by your TA is an important prerequisite to safely complete this mandatory laboratory assignment. When in the laboratory you must act in a professional manner.*

During the lab period you will carry out the experiment, take notes, and complete your data analysis. You will be evaluated on your pre-lab preparation, your in-lab experimental technique and data analysis, and on your ability to observe chemical phenomena and record your observations in your notebook. Each laboratory experiment will have its own criteria for grading and your TA will apply those criteria to evaluating your work.

Pre-lab Quizzes. Pre-laboratory Quizzes are available via Moodle. You can take each Pre-lab Quiz twice and your higher score will count. Pre-lab Quizzes must be completed an hour before you go to your scheduled laboratory class; that is, if you have lab at 7:45 am on Tuesday, you must take the Pre-lab Quiz for that week before 6:45 am on Tuesday.

ChemPages Laboratory Resource ChemPages is an interactive, Web-based encyclopedia of laboratory techniques. You will be able to access ChemPages from any computer on the campus network either from the General Chemistry web page, http://genchem.chem.wisc.edu/ under Materials for Lab, or from the Moodle course homepage under Lab Stuff. ChemPages contains multimedia demonstrations of the laboratory techniques that you will use in this course. For almost every laboratory one or two ChemPages sections will be assigned—see your lab manual to find out which they are. You should view these pages before taking the Pre-lab Quiz that must be completed an hour before your lab starts.

Discussion Section

Discussion sections are led by your Teaching Assistant for a group of 22 students. The discussion periods are for questions, help, review, and problem solving relevant to recent lectures, homework, laboratory experiments, computer exercises, and other assigned material. Discussion sections will be most helpful if you are prepared when you come to the class. You should have at least tried to work out the online homework problems or the objective-keyed study questions from the text. Bring specific questions to ask; be sure you understand the questions asked by others and the answers given by your TA and fellow students. Your active participation in discussion will help you and your fellow students learn.

Pre-Discussion Worksheets. For each discussion section (except the first week of classes and Thanksgiving week) there is a Pre-Discussion Worksheet available in Moodle. You must turn in your completed worksheet at the beginning of the discussion section class period. Your TA will grade the worksheet on this basis: no worksheet or worksheet turned in late, 0 points; some questions answered correctly, 1 point; all questions answered correctly or only one question incorrect, 2 points.

Exams

There will be three evening midterm exams of approximately 75 minutes each and a 2-hour final exam. Each midterm exam will cover the classroom, special-assignment, and laboratory material up to that point in the course and since the previous exam. The final exam will be divided approximately equally between the material since the third exam and comprehensive coverage of the entire semester.

An early exam will be given before each midterm at 3:30 PM for students who have conflicts with the assigned time. Please note the exam dates on your calendar and avoid scheduling anything at those times. If you have an unavoidable conflict, contact your professor well in advance. (We are aware of a recurring conflict with certain sections of engineering courses: if you have this conflict, please notify your TA and professor.)

Midterm Exams:	Monday, Sept. 21	5:40 PM to 7:00 PM
	Monday, Oct. 19	5:40 PM to 7:00 PM
	Monday, Nov. 16	5:40 PM to 7:00 PM
Final Exam:	**Thursday, Dec. 17**	**7:25 PM – 9:25 PM**

The room in which you will take each exam will be announced later. A review session will be held in lecture class before each exam. ***No make-up exams will be given, but appropriate accommodation will be made for all students to be fairly evaluated.*** **If you have any type of special need, options are available to take the exam at an alternate time or place; please contact Prof. Hermans as soon as possible to make the arrangements.**

Learning Objectives, Study Questions and Practice Exams Learning objectives for each exam, and a selected set of study questions keyed to the learning objectives, can be found in the Exam Preparation Materials panel on the

course homepage in Moodle. Exams given in Chemistry 109 in a prior year are available in the same location. The study questions are typical of those you should master and you should use them for extra practice in problem solving. If you do not understand how to solve one or more study questions, ask your TA in discussion section or during office hours.

How To Prepare For Exams A recommended strategy is: 1) review the learning objectives for the exam referring to your notes or the text if necessary, 2) work the study questions associated with each objective, spending more time on topics you find more challenging, 3) simulate the test taking situation by working the practice exam in 75 minutes in a quiet place, 4) have a partner "grade" your own test using the answer key as your guide while you "grade" the partner's work, 5) review those areas that you identify as weak.

Online Homework

Each week you will have an online homework assignment in OWLv2. Online Homework is due every Sunday at 11:55 PM; you can attempt each question up to three times and your highest score will count. There are also three Review Homework assignments to help you review material that will not be explicitly discussed in Chem 109 and should have been learned in your high school chemistry course. Two of them are due during the first and third weeks of classes; the third one is due in November. Online homework can be done from any computer with internet access. For online homework you are encouraged to form a study group and work with the group to learn the principles needed to answer the questions; however, the work you submit must be your own.

There are several useful things to know about online homework. 1) You will not get the same questions as other students do, although most of the questions on your homework will be on the same topics as those for other students. The second time you do the homework, you almost certainly will get different questions, but similar to the first time, so you should read each question carefully and make certain you answer the questions you get the second time, not the ones you remember from the first time. 2) You are strongly encouraged to ask other students, Prof. Hermans, or your TA to help you to *learn how to solve the types of problems* found on the homework, but you must submit your own answers to your specific questions. 3) Things that puzzle you about the homework can be entered as Piazza Questions at any time. 4) It is possible to save your homework assignment and come back to it later. Use the "Save and Exit button to do this. If you are interrupted and can't finish an assignment, be sure to save it so as not to lose your work. 4) Each question in an assignment has a Submit Answer button. You have not completed a question until you click Submit Answer. 5) Until you click Finish Assignment you have not completed an assignment; don't forget to click Finish Assignment before you close your browser. 6) Don't wait until the last minute before the deadline.

Computer Assignments

Each of the three computer assignments (Excel Assignment; Window on the Solid State; four Biomolecules Tutorials, each with online quiz) has its own set of directions that will be mentioned in lecture and posted on the course Web site. It is your responsibility to obtain the directions from the course Web site, follow them, and turn in each Computer Assignment on time. The Computer Assignments are to be turned in to your TA at the time indicated on the assignment and in the Course Schedule. The third Computer Assignment is a set of four Biomolecules Tutorials, each worth 5 points, that you will need to work through. Three Biomolecules Tutorials are due the same week and the fourth is due two weeks later; this is indicated in the course schedule. Each Biomolecules Tutorial has an accompanying quiz that you must complete successfully to receive credit for the tutorial. The score on the quiz is your score for the tutorial.

Student Advisory Board

The Student Advisory Board helps Prof. Hermans to run the course and provides feedback from students on how the course is going. The board consists of one representative from each discussion/lab section, chosen from the students in that section. The board will meet nearly every Wednesday after class to discuss course policies, structure, and content. Meetings will take from half an hour to an hour depending on how much we have to discuss. Your TA will solicit volunteers for this role in your first discussion. If you are interested in serving as your class representative, send Prof. Hermans an email (hermans@chem.wisc.edu) as soon as possible explaining why you would like to be a member of the board. Include your name, your email address, and your discussion section number (541, 542, 543, 544, etc.) in your message; if possible, include your TA's name.

Communicating with Your Professor

There are two types of communications: individual questions/comments that are intended to be seen only by you and your instructor (such as the reason you need to miss a class) and questions about chemistry content where the responses will be useful to everyone in the class.

Individual Questions about Course Organization. For the first type of communication we strongly recommend that you use your @wisc.edu email address to send and receive email and forward your other email accounts to the @wisc.edu account. You are encouraged to contact Prof. Hermans by email if you have questions about anything to do with the operation of the course. Prof. Hermans' email address is hermans@chem.wisc.edu. Whenever you send an email to Prof. Hermans, please begin the subject line with "chem109:". This can be followed by whatever the subject of the message is, such as "Conflict with Exam 2 time" or "Grade on first exam". Using chem109 in the header will

differentiate course emails from the many other emails that Prof. Hermans receives. *As a reminder, a professional email contains a proper salutation, a concise description of the background and a well-articulated question. Emails that do not follow these criteria may not be answered.*

Questions about Chemistry Topics. For this type of communication use Piazza. To access Piazza, use the link in Moodle. Piazza is a wiki-like question-and-answer system in which you can enter your chemistry question and it can be answered by another student in the class, by a TA, or by Prof. Hermans. In Piazza you will find a set of categories. Choose the one that best fits your question and enter your question there. The Piazza system makes it possible for anyone lese in the course to answer your question, so you can expect a response fairly soon no matter when you enter your question. Please use Piazza for all chemistry questions.

What to Do If You Are Sick, Or Otherwise Unable to Attend an Exam or Lab

If you are unable to attend a specific lab session because of an unavoidable schedule conflict (such as a religious observance, an athletic activity, or a family obligation), contact your TA as soon as possible to reschedule. Make-up lab times can be accommodated only during the week when the entire class is doing a lab exercise, so planning ahead is important. If you find that you are unable to attend lab because you are ill, contact your TA as soon as possible. He or she will discuss your situation and decide what to do. **If circumstances arise unexpectedly that preclude your taking an exam, please contact your TA and professor before the scheduled exam time.** We recognize that in an emergency situation, you may not be able to contact us in a timely way.

Chemistry Resource Facilities: Computer Room, Study Room, Undergrad Chemistry Office

Computers are available for use in room 1375 Chemistry. Room 1371 is a study room for chemistry students. The staff in the Undergraduate Chemistry Office, room 1328, can assist you with enrollment, advising, and many other things.

Cell Phone Policy

If you bring a cell phone to class or lab, please turn it off for the duration of the class or lab period. If circumstances require that you be able to answer your cell phone during a class, please inform your instructor before the class.

Academic Misconduct

Academic misconduct includes and is not limited to acts in which a student seeks to claim credit for the work or efforts of another without authorization or citation, uses unauthorized materials or fabricated data in any academic exercise, forges or falsifies academic documents or records, intentionally impedes or damages the academic work of others, engages in conduct aimed at making false representation of a student's academic performance, or assists other students in any of these acts. Examples include but are not limited to: cutting and pasting text from the web without quotation marks or proper citation; paraphrasing from the web without crediting the source; using notes when such use is not allowed; using another person's ideas, words, or research and presenting it as one's own by not properly crediting the originator; stealing examinations or course materials; changing or creating data in a lab experiment; altering a transcript; hiding a book knowing that another student needs it to prepare an assignment; collaboration that is contrary to the stated rules of the course, or tampering with a lab experiment or computer program of another student (read the UW-Madison statement here). Each student in this course is expected to work entirely on her/his own while taking any exam, to complete assignments on her/his own effort without the assistance of others unless directed otherwise by the instructor or teaching assistant. If you have any questions about an assignment, please ask. Academic misconduct either in lab or lecture can result in assignment of "F" by the course instructors as the final grade for the student and any additional actions mandated by University policy.

Academic misconduct applies to laboratory work as well. In your lab manual, be sure to read pages xxiii-xxiv, which deal explicitly with situations you may encounter in laboratory. Before you can work in the laboratory you need to pass a quiz on academic honesty with a perfect score.

Grades

Your grade will be based on a maximum of 1000 points divided as follows:

Five OWLv2 Prep Assignments @ 1 point each (1) Intro: Answering Questions; (2) Intro: Assignment Types; (3) Intro: ChemDoodle Sketcher; (4) Intro: System Setup; (5) Math Review *(due Sun. September 6 at 11:55 PM)*	5 points
Sixteen OWLv2 Online Homeworks @ 8 points each *(see Course Assignment Schedule for due dates; includes both weekly and review homework assignments)*	128 points
Ten Chem109 Moodle Question-Writing assignments @ 2 points each *(see Course Assignment Schedule for due dates)*	20 points
Thirteen Pre-Discussion Worksheets @ 2 points each *(due at start of discussion section each week)*	26 points
Safety Quiz and **Academic Honesty Quiz** two Moodle quizzes @ 4 points each (*must be completed with a perfect score before your first lab*)	8 points
Twelve Laboratories will make up 24% of the course grade* *(each week's experiment is listed in the schedule; point total includes Pre-Lab Quizzes in Moodle; you must score 60% in lab to pass the course.)*	240 points
Three Computer Assignments *(directions for each available in Moodle)* Window on the Solid State (5 points) Excel Assignment (5 points) Biomolecules Tutorials and Quizzes (four @ 5 points each; total 20 points) *(due dates are listed in the schedule)*	30 points
Beginning Assessment and **Ending Survey** @ 5 points each (*see Course Assignment Schedule for due dates)*	10 points
TA Personal Evaluation (*based on discussion and lab work*)	33 points
Three midterm exams @ 100 points each *(dates and times are listed in the course schedule)*	300 points
Final Exam *(date and time are listed in the course schedule)*	200 points
Total	1000 points

*Each lab exercise will be graded as described in the laboratory manual. At the end of the semester we will scale the total number of lab points to obtain your final lab point total. If necessary, some grades may be normalized upward to a common scale at the end of the semester to minimize differences in grading practices among discussion/lab sections.

Letter Grades.

Final grades will be based upon the absolute scale shown below. If you score the number of points indicated, then you will receive the letter grade indicated, regardless of how many other students achieve the same grade. There is no curve. Therefore it is to your benefit (and to your friends' benefit) that you help other students learn and they help you learn. After each midterm exam you will be able to determine your probable grade by totaling your earned points, dividing by the total points possible at that time, multiplying by 1000, and comparing with this list.

A	900 points or more
AB	870 to 899 points
B	810 to 869 points
BC	780 to 809 points
C	650 to 779 points
D	600 to 649 points

If necessary some adjustments will be made at the end of the semester, but these adjustments will never lower your final letter grade, only raise it. Past experience in Chem 109 is that the class average is about 3.1 on a four-point scale—above a B average.

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Chemistry 109, Lecture 1, Professor John Moore

Class, Laboratory, and Examination Schedule, Fall 2015

Date	Subject	Reading (Moore)	Online Work: Moodle / OWL	Laboratory / Moodle Pre-Lab Quizzes
September				
W 2	Introduction; Relation of Chemistry and Biosciences	Review Ch. 1 Sec. 1-15; Ch. 2, Sec. 1-3, 7-8, 10-12; Ch. 3 all Secs.; App A, B	Begin working on OWL Prep Assignments, Review Homework 1 and Homework 1 (see due dates below).	**No lab** this week. **Attend discussion section this week**. **Beginning assessment** in lab next week (5 pts)
F 4	Atomic Electronic Structure; Electron Configurations;	Ch. 5, Sec. 1-7 **Do reading before coming to lecture.**	**OWL Prep Assgts** (5) **and OWL Review Homework 1** due **Sunday, Sep 6,** at 11:55 PM. Work on Moodle online quizzes: **Safety, Acad. Honesty,** and **Zinc and Iodine** Pre-lab.	
M 7	Labor Day (no class)		Work on **Pre-Discussion Worksheet 01** which is due at start of discussion section	**Come to lab starting Tuesday, Sept. 8.**
W 9	Ion Electron Configs; Paramagnetism	Ch. 5, Sec. 8	**Moodle Question-Writing Assgt. 1** (Chap 5 Sec 1-8 or other material covered so far) due **today at noon**.	Citizenship in the Lab talk. Complete **Beginning Assessment** during lab. Purchase lab manual, notebook, goggles; prepare for lab next week.
F 11	Periodicity of Atomic Prop.; Ionic Bonding;	Ch. 5, Sec 9-13; Ch. 2, Sec. 4-6	**OWL Homework 1 (HW#1)** due **Sunday, Sep 13** at 11:55 PM	
		OWL Online Homework is *due Sunday by 11:55 PM each week.*		
M 14	Solid-State Structures; Prop. Ionic Cpds.	Ch. 9, Sec. 4 (up to part c),6-7;	Work on **Pre-Discussion Worksheet 02** which is due at start of discussion	Check In; **Zinc and Iodine** experiment (pre-lab quiz due 1 hour before lab). Complete **Safety, Acad. Honesty** quizzes *with perfect score* before lab (2 quizzes)
W 16	Covalent Bonding; Lewis Structures	Ch. 6, Sec. 1-5	**Moodle Question-Writing Assgt. 2** due **today at noon**. Work on **Homework 2** and **Review Homework 2** (due Sun.)	
F 18	Review for Exam 1		**Online Homework 2** and **Review Homework 2** due **Sunday, Sep 20** at 11:55 PM	**Window on the Solid State, Parts 1-4** (access tutorial through Moodle); **due week of Sept. 21 at start of your lab**

M Sept. 21 **Exam 1 (5:40 – 7:00 PM, location to be announced); Ch. 5 (all); Ch. 6 (Sec. 6.1-6.5); Ch. 9 (Sec. 9.4(up to part c), 9.6-9.7); Labs: Zn + I_2. Review material from two review homeworks and Ch. 1-3.**

Date	Subject	Reading	Online Work: Moodle / OWL	Laboratory
September				
M 21	Structures of Hydrocarbons; Isomerism	Ch.2, Sec. 9	Start Excel Assgt. (directions in Moodle) due next week.	**Modeling Solid Structures/Alum Crystals. (Window on Solid State** due at start of lab this week.)
W 23	Covalent Bonding; Bond Properties	Ch.6, Sec. 6-7	**Pre-Discussion Worksheet 03** this week	
F 25	Formal Charge; Resonance; Exceptions to Octet Rule; Aromatic Compounds	Ch. 6, Sec. 8-11	**Online Homework 3** due **Sunday** at 11:55 PM	
M 28	Molecular Shapes; VSEPR, Hybridization	Ch.7, Sec. 1-3	**Pre-Discussion Worksheet 04** this week; Work on **Online Homework 4 (**due Sun).	**Hydroxyapatite** **Excel Assignment, Part 1** due this week at start of discussion section
W 30	Structure and Polarity; Noncovalent Interactions	Ch. 7, Sec. 4-6	**Moodle Question-Writing Assgt. 3** due **today at noon**.	
October				
F 2	Organic Chemistry; Fuels; Structure and Properties	Ch. 10, Sec. 1-3	**Online Homework 4** due **Sunday** at 11:55 PM	
M 5	Functional Groups: Alcohols; Carboxylic Acids	Ch. 10, Sec. 4-5	**Pre-Discussion Worksheet 05** this week; Work on **Online Homework 5 (**due Sun.)	**Molecular Structures**
W 7	Condensation reactions;	Ch. 10, Sec. 5	**Moodle Question-Writing Assgt. 4** due **today at noon**.	
F 9	Addition Polymers; Condensation Polymers	Ch. 10, Sec. 6,	**Online Homework 5** due **Sunday** at 11:55 PM	
M 12	Structures of Biomolecules and Biopolymers	Ch. 1, Sec. 14; Ch.10, Sec. 7; Ch. 7, Sec. 7	**Pre-Discussion Worksheet 06** this week	**Biomolecules.** Biomolecules tutorials and quizzes **Proteins 1, Proteins 2, DNA 1** (in Moodle) due at start of lab this week.
W 14	Rates of Reactions Measuring Rates	Ch. 11, Sec. 1-2	**Moodle Question-Writing Assgt. 5** due **today at noon**.	
F 16	Review for Exam 2		**Online Homework 6** due **Sunday** at 11:55 PM	

M Oct. 19 **Exam 2 (5:40 – 7:00 PM, location TBA); Covers Ch. 1 (Sec. 1.14), Ch. 2 (Sec. 2.9);Ch. 6 (Sec. 6.6-6.11), Ch. 7 (all), Ch. 7 Sec. 7, Ch. 10 (all), Ch. 11 (Sec. 11.1-11.2). Labs: Solid Structures/Alum Crystals, Window on Solid State, Hydroxyapatite, Molecular Structures, Biomolecules**

Date	Subject	Reading	Online Work: Moodle / OWL	Laboratory
October				
M 19	Rate Laws; Elementary Reactions	Ch. 11, Sec. 3-4	Work on **Online Homework 7 (**due Sunday)	**Esters and Amides: Preparation of Acetaminophen and Select Flavoring Esters**
W 21	Effect of Temperature	Ch. 11, Sec. 5	**Pre-Discussion Worksheet 07** this week	**Excel Assignment, Part 2** due next week at start of lab
F 23	Rate Laws for Elem. Reactions; Mechanisms of Reactions	Ch. 11, Sec. 6-7	**Online Homework 7** due **Sunday** at 11:55 PM	
M 26	Multi-step mechanisms	Ch. 11, Sec. 8	**Pre-Discussion Worksheet 08** this week	**Kinetics of Crystal Violet** **Excel Assignment, Part 2** due at start of lab
W 28	Catalysis: Enzyme, Industrial	Ch. 11, Sec. 9-10	**Moodle Question-Writing Assgt. 6** due **today at noon**.	
F 30	Thermochemistry and calorimetry; Enthalpy and Hess's Law	Review Chapter 4	**Online Homework 8** due **Sunday** at 11:55 PM	Biomolecules tutorial Enzymes and quiz due at start of lab next week.
November				
M 2	Reactant/Product-Favored Processes	Ch. 16, Sec. 1-2	Biomolecules tutorial **Enzymes** and quiz due at start of lab this week.	**Enzyme Kinetics**
W 4	Entropy	Ch. 16, Sec. 3	**Pre-Discussion Worksheet 09** this week: **Moodle Question-Writing Assgt. 7** due **today at noon**.	
F 6	Entropy and the Direction of Change	Ch. 16, Sec. 4-5	**Online Homework 9** and **Review Homework 3** due **Sunday** at 11:55 PM	
M 9	Gibbs Free Energy	Ch. 16, Sec. 6	**Pre-Discussion Worksheet 10** this week	**Le Chatelier's Principle**
W 11	Chemical Equilibrium; Determining Equilib. Consts	Ch. 12, Sec.1-3	**Moodle Question-Writing Assgt. 8** due **today at noon**.	
F 13	Review for Exam 3		**Online Homework 10** due **Sunday** at 11:55 PM	

M Nov. 16 **Exam 3 (5:40 – 7:00 PM; location to be announced); Covers Chapter 4 (review), Chapter 11 (Sec. 11.5-11.10), Chapter 12 (except Sec. 12.7) and Chapter 16 (Sec. 16.1-16.6); Lab: Aspirin, Iodine Clock, Enzyme Kinetics, Le Chatelier's Principle**

Date	Subject	Reading	Online Work: Moodle / OWL	Laboratory
November				
M 16	Using Equilibrium Constants; Le Chatelier's Principle	Ch. 12, Sec. 4-6, 8	Work on **Online Homework 11** (due Sunday)	**Discovering Electrochemistry** (no pre-lab quiz)
W 18	Gibbs Free Energy and K_{eq}	Ch. 16, Sec. 7-8	**Pre-Discussion Worksheet 11** this week	
F 20	Gibbs Energy and Biological Systems; Thermodynamic and Kinetic Stability	Ch. 16, Sec. 9-11	**Online Homework 11** due **Sunday** at 11:55 PM	
M 23	Acids and Bases	Ch. 14, Sec. 1-3		Thanksgiving week—no lab
W 25	Acid-Base Equilibria	Ch. 14, Sec. 4-5, 7	Work on optional Acids and Bases Tutorials this week and next	
F 27	Thanksgiving Break, Nov. 26-Nov. 29		Thanksgiving Break	Thanksgiving Break
M 30	Acidity and Molecular Structure	Ch. 14, Sec. 6, 8	Work on **Online Homework 12** (due Sunday) **Pre-Discussion Worksheet 12** this week	**Chemical Equilibrium and Thermodynamics of a Ligand Substitution Reaction**
December				
W 2	Lewis Acids and Bases; Buffer Solutions	Ch. 14, Sec. 9-10; Ch. 15, Sec. 1	**Moodle Question-Writing Assgt.9** due **today at noon**.	
F 4	Titration; Titration Curves	Ch. 15, Sec. 2	**Online Homework 12** due **Sunday** at 11:55 PM	
M 7	Electrochemistry; Electrochemical Cells; Cell Voltage	Ch. 17, Sec. 1-4	Work on **Online Homework 13 (**due **Sunday**)	**Titrations;** Check out
W 9	Reduction Potentials; Reduction Potentials and ΔG	Ch. 17, Sec. 5-7	**Moodle Question-Writing Assgt. 10** due **today at noon**. **Pre-Discussion Worksheet 13** this week	
F 11	Practical cells; Electrolysis	Ch. 17, Sec. 8-11	**Online Homework 13** due Sunday, Dec. 13, at 11:55 PM	
M 14	**Special Summary Lecture**	Study for final exam	**Ending Survey** (5 pts) due **TODAY** at 11:55 PM	

FINAL EXAM: Thursday, Dec. 17, 7:25-9:25 PM. Rooms to be announced. Approximately half of the final exam covers all material in the course, and the other half covers material since the third midterm exam.