

**Chemistry 1120 – Elementary Bioorganic Chemistry
Spring 2013**

Instructor: John Heemstra Jr. Gauss Haus 1473. johnheemstra@chem.utah.edu

Office hours: MW 10:30-11:30 am and by appointment

Secretary: Mrs. TanDee Shaw. 3270 N-HEB, tshaw@chem.utah.edu

Graduate Teaching Assistants:

Class #	Section	Discussion: time and location	Laboratory: time and location	Teaching Assistant	TA email address
1612	002	Monday 7:30 – 8:20 am LS 111	Tuesday 8:35 – 11:35 am HEB 1345	Joseph Morrison	jmorrison@chem.utah.edu
1613	003	Monday 12:55 – 1:45 pm AEB 306	Tuesday 12:55 – 3:55 pm HEB 1345	Joseph Morrison	jmorrison@chem.utah.edu
2878	004	Monday 12:55 – 1:45 pm LS 101	Monday 2:00 – 5:00 pm HEB 1335	Cima Ghaffarian	u0684038@utah.edu
2879	005	Monday 12:55 – 1:45 pm LS 102	Monday 2:00 – 5:00 pm HEB 1336	Samin Panahi	samin.panahi@gmail.com
2880	006	Monday 12:55 – 1:45 pm ST 215	Monday 2:00 – 5:00 pm HEB 1344	Nathan Spahn	nspahn@chem.utah.edu
5584	007	Tuesday 5:00 – 5:50 pm HEB 2002	Tuesday 6:00 – 9:00 pm HEB 1345	Nathan Spahn	nspahn@chem.utah.edu

Course time and location: 9:40-10:30 AM, Monday, Wednesday, and Friday; HEB 2008

Required Course Materials:

- *General, Organic, and Biological Chemistry*, 2nd edition, Smith (McGraw Hill, 2013). It's best to purchase this at the campus bookstore (yes, really!). At the bookstore, the book comes with access to *Connect* (see below); if you get it elsewhere, *Connect* will not be included, and you'll have to purchase *Connect* online (\$40).
- *Chemistry 1120 Laboratory Manual*. This manual has been prepared specifically for the University of Utah and MUST be purchased from the University bookstore. All of the labs we will perform this semester are contained in this manual.
- *Connect*, an online homework system created by the publisher of our textbook. We will use this site to prepare for class and to practice working problems. Analysis reveals that students who diligently work the online homework problems score an average of 20 points (out of 100) higher than those who do not. You can access the *Connect* registration for our course using the following link:

http://connect.mcgraw-hill.com/class/j_heemstra_spring_2013_mwf_940_-1030_am

- A scientific calculator capable of log/exponential functions and scientific notation. PROGRAMMABLE CALCULATORS OR OTHER ELECTRONIC DEVICES CAPABLE OF STORING ALPHANUMERIC DATA ARE NOT ALLOWED FOR USE ON EXAMS. TI-30 calculators which sell for ~ \$12 are appropriate and available in the University Bookstore.
- *TurningTechnologies clicker* (student response device), which are available for purchase at the campus bookstore. We will use this daily in class beginning *Wednesday, January 9th*. If you have purchased a TurningTechnologies clicker for a different course, you *should* be able to use it for this one. See me with any questions. You will register your remote via the website <http://webreg.turningtechnologies.com> and completing the following steps.
 - Enter your first name.
 - Enter your last name.
 - Enter your user ID (please use your uID).
 - Enter your email address (optional).
 - Enter your device ID (6-8 characters in length: A-F and 0-9).
 - Enter the Captcha.
 - Click on the green Register Device icon.
- Canvas gets you to our course website. Simply login with your UNID and password, and select CHEM 1120-001 Spring 2013. The site is one-stop shopping for our course, featuring folders of lecture notes, discussion pages and announcements, and a record of your grades. **Please make sure that the email address you have registered under your profile is one you check regularly as I will frequently post announcements on Canvas to disseminate important class information.**

Register a New Response Device

The highlighted fields are required.

First Name*

Last Name*

User Id* (This may be your student id, student name, username)

Email

Device Id* (6 or 8 characters 0-9, A-F)

ResponseCard keypads: Device ID can be found on the back of your device.
ResponseWare users: Your Device ID is at the bottom of the ResponseWare page after logging in and clicking on "Your Account."

Device ID

Oops much

Type the two words:

no CAPTCHA™ stop spam, read books.

Register Device

Introduction: The two-semester Elementary Chemistry course, CHEM 1110 and 1120, is intended as a broad introduction to chemistry primarily for students planning a career in the allied health fields. Chemistry 1110 consists of an introduction to general chemistry and organic chemistry with an emphasis on the language of chemistry, quantitative problem solving, and visualizing atoms and molecules. Chemistry 1120 (offered Spring and Summer semesters) continues with organic chemistry and concludes with an introduction to biochemistry.

Prerequisites: Elementary Chemistry I (Chem 1110) and Intermediate Algebra (Math 1010) are prerequisites for this course, but more generally, actual competence in first-semester chemistry and in algebra is a prerequisite. It is generally a bad idea to take this course if you earned below a C in Chem 1110.

Objectives: Your main goal in this course is to gain familiarity with basic chemical principles, especially as they relate to biological systems. The knowledge you gain in this course will serve as a basis for understanding topics in biochemistry, physiology, and pharmacology, subjects that all allied health professionals study at some point.

Course content: We will study Chapters 12 - 24 from the text. Any excluded sections from these chapters will be announced. Otherwise, you are responsible for *everything*, and you are also responsible for everything mentioned in lecture, whether that material is covered by The Book or not. However, lectures will closely mirror the content of the textbook.

Course components:

- *Lecture format and clickers.* Guess what is *not* a good way to learn chemistry: sitting passively in a lecture hall and waiting for information to be poured into your head. [We won't even bother wondering what happens when you don't come to class at all.] For each chapter of material, I'll post on Canvas a lecture outline (found under Files in a folder labeled lecture outlines) that you'll want to bring with you to class. During the lecture, you and I will fill in the details. Simple. This will give you the best odds of staying engaged and thinking about chemistry during class, but having some stuff prepared in advance will prevent you from having to scribble furiously to keep up. In addition, beginning on January 9, I'll ask at least 4 clicker questions during every lecture. There likely will be one at the beginning of each class (moral #1: get to class on time), one or more in the middle, and one at the end (moral #2: stick around until the end). You get 4 points for a correct answer, and you get 3 points for an incorrect answer. You get 0 points for no answer. Therefore, if three clicker questions were asked during a lecture the maximum points earned for that day would be $3 \times 4 = 12$ points, and the minimum for that day would be $3 \times 3 = 9$ points. Allowing for answering incorrectly every now and then and missing class infrequently, I'll take your percentage for all the clicker points from the entire semester and add 15 (up to a maximum of 100%).

Question: "What if I forget my clicker?"

Answer: If you forget your clicker, you don't get points for that day.

- *Connect.* The best way to learn chemistry is to work lots of problems. *Connect*, an online homework system created by the publisher of our textbook, facilitates immediate feedback on your work, so you can know right away whether you are working the problems *correctly*. Additionally, these problems provide useful hints on how to solve the problem should you get stuck. There will be two types of *Connect* assignments throughout the semester.
 1. For each chapter we cover in class you will be required to complete **Homework type** questions (designated with a notebook symbol) associated with specific concepts or skills covered in lecture. You can work each problem up to 3 times, and if, on the 3rd attempt (or earlier), you get the correct answer, you get full credit for that problem. You will also have 5 chances to retry a problem with new values. The limit on the number of chances exists simply to prevent people from entering systematic answers to get the correct answer without understanding how to do the problem.
 2. For each chapter we cover in class I will also assign **Learnsmart models** (designated with a red brain) which are **extra credit problems** that you will need to complete by 7:30 am on May 1st for full credit. The goal of LearnSmart is to help you learn the topics presented in each assignment. To do this, LearnSmart will ask you a series of questions that will adapt to your strengths and weaknesses to guide you through the material you need to learn. By answering questions correctly, you work towards completing your assignment. However, you are not penalized for getting a question wrong. You will be given the opportunity to answer a question on the same topic later in your study session. If you are willing to put in the time, you can always achieve 100% completion on your assignments. **The extra credit points will only count toward your *Connect* grade and will replace any Homework type problems for which you did not earn full credit (meaning 100% is the highest grade you can earn for the *Connect* portion of your final grade).**

- *Laboratory.* Contrary to popular belief, the lab experiments were not designed with maximum suffering in mind. Rather, they exist to give you some hands-on experience with chemistry and to reiterate the same concepts we discuss in the lectures. See the lab schedule on the last page of this syllabus for a list of whats and whens. Many of the experiments contain pre-lab questions which, curiously enough, you are required to complete before the lab experiment begins. Your TA will check these. The lab manual is written such that you can fill in your experimental data and complete most calculations within the pages for a given experiment, and in most cases, you will complete the write-up and submit your report at the end of the lab period.

There are no make-up experiments. I will count your nine best scores, so you can miss one experiment without penalty.

The laboratory can be a dangerous place, especially if you are not dressed appropriately. Acid burns on bare legs and feet are painful and can scar permanently, and Bunsen burners can ruin otherwise good hairstyles (and bad ones). *If you are dressed inappropriately for lab, you will not be allowed to do the experiment or to make it up.* Be responsible, plan, and don't let yourself be turned away at the door.

If you have taken this course before and have successfully completed the laboratory experiments with a good score, you need not repeat those experiments. Bring evidence of this, and you can be excused from labs this semester.

- *Midterm evaluations.* These are opportunities for you, not me, to find out what *you* know about chemistry independent of your book, the Internet, and your classmates. For each, you get to use a non-programmable scientific calculator (i.e. one with scientific notation, logarithms, and antilogarithms). Nothing else (e.g. cell phones, PDA's, laptops, electronic translators, whatever) will be permitted. You also will get a reference sheet containing constants and equations; this reference sheet will be made available to you before each midterm, so you'll know ahead of time what will be on it. You must bring a clearly legible form of identification with you to every exam. The ID must have a clearly recognizable picture of you on it. Acceptable forms of identification are: (1) UTAH ID Card, (2) Driver's license, (3) Passport, or (4) Military ID card.

Midterm exam dates are on Fridays: February 1, March 1, and April 5. No make-up or early exams will be given except in the case of a University-sanctioned absence or a certifiable emergency. Excuses must be accompanied with proper documentation. **Students that miss an exam due to illness must bring documentation from a physician stating that they were seen in the physician's office and that they were too ill to attend classes on that date.** Legitimate excuses must be documented within two days of the missed exam period. If you miss your exam period because of extenuating circumstances, it is your responsibility to inform your instructor in a timely fashion. Your instructor will then discuss with you appropriate measures to remedy the situation.

Midterms will be returned in discussion by your TA and will be available for two weeks. After this period, leftover midterms will be fed to the recycle bin. Any dispute over the grading of an exam must be brought to the attention of the professor within 15 days after the exams are returned to the class. Please fill out completely the re-grade submission form available on the course website under Files. In the case of student-perceived grading errors or point assignment, the entire exam will be re-graded, not just the problem in question. All midterms will be photocopied prior to return and any discrepancies between the copy of the original exam and the exam submitted for re-grading will constitute academic dishonesty and will be dealt with appropriately.

- *Final Exam.* The final exam will be given on Wednesday, May 1st, from 7:30 to 10:00 am in accordance with the University's final exam schedule. There is no opportunity for an early or late final except in the case of a University-sanctioned absence, a certifiable emergency or if a student has an exam conflict or three (3) exams in a single day. No other exceptions will be made.

Grading: What really matters through your taking this course is what you can add to your knowledge base and not on what you can add to your short-term memory. When we also consider that chemistry is a subject that very much builds on itself and that mastery comes only when one is able to tie together all the pieces, a comprehensive final exam is the most accurate measure of what one has truly *learned* in this course. There are two general ways in which one can prepare to take a comprehensive final exam: cram like a demon beginning a few days before and hope to put enough into short-term memory to survive, or pace your preparation throughout the semester and monitor it at a few checkpoints along the way.

The only mandatory graded components in this course are the lab experiments and the final exam. The lab is worth a total of 12% of your course grade, and the final exam can count for as much as 88%.

Terrified of one exam counting for so much? Prepare for it and diminish its impact by coming to class and answering clicker questions, working online problems, and taking the midterm evaluations.

Can't complete a homework assignment on time? Not ready for a midterm evaluation? Not a huge deal -- the final exam can make up for any missed opportunities except labs. If you miss something, the weight of the final will go up to compensate. If you get a low score on a midterm evaluation, you can make it up with a good showing on the final. As long as it's higher, your final exam score can replace any or every other grade, again, except the laboratory grades.

Laboratory	12
Clicker questions	8
<i>Connect</i>	15
Midterm 1	12
Midterm 2	12
Midterm 3	12
Final exam	29

If you have taken the course before and are not repeating the lab experiments, add 2% to each midterm evaluation and 6% to the final.

Final grades will be assigned on the following basis: A = 100% to 93.00%, A- = 92.99% to 90.00%, B+ = 89.99% to 85.00%, B = 84.99% to 80.00%, B- = 79.99% to 75.00%, C+ = 74.99% to 70.00%, C = 69.99% to 65.00%, C- = 64.99% to 60.00%, D = 59.99% to 50.00%, E = 49.99% to 0.00%.

CDS. The University of Utah seeks to provide equal access to its programs, services and activities for people with disabilities. If you will need accommodations in the class, reasonable prior notice needs to be given to the Center for Disability Services, 162 Olpin Union Building, 581-5020 (V/TDD). CDS will work with you and the instructor to make arrangements for accommodations. All written information in this course can be made available in alternative format with prior notification to the Center for Disability Services.

Supplemental Instruction. The Supplemental Instruction Program, called SI for short, is offered in this course to provide organized study sessions. These sessions are free and open to all students in the course and are led by an undergraduate who has done well in this subject area. Your SI leader, Ms. Hilary Stevens (Chem1110si@gmail.com) will be attending classes, reading the material, and doing any relevant assignments to be prepared for the SI sessions. The purpose of SI is to see that each of you has the opportunity to do as well as you would like to in this course. **In SI sessions, we will review, organize, and**

clarify the material from lectures; teach you ways to develop effective study skills for this course; and help you prepare for exams. Hilary will schedule 3 meetings per week convenient to the majority of your schedules. Attendance is voluntary, and you may attend as many or as few sessions as you like.

Once the days, times and locations of the sessions are announced, you can enter this information on this chart.

Session 1	Session 2	Session 3

At the end of the semester, please complete the post-survey accessed at www.studentvoice.com/utah/si.html to provide us with feedback on your experience with SI. Your comments are valued and important to our ability to provide you with effective SI sessions that meet your needs. Let us know what worked well and what you would change!

Withdrawal Instructions. Subject to changes in the official University of Utah Calendar, students may drop (delete) any class without penalty during the first week of the term. The last day to drop a class without tuition penalties is Wednesday, January 16th. It is possible to withdraw from the course up to Friday, March 1st, but you will still have to pay tuition for the course and a “W” will appear on your transcript. You do NOT need the instructor's signature to withdraw. After March 1st, a student must petition for withdrawal to the Dean's office of their academic college. University policy states that withdrawals after this date should only be granted for "non-academic reasons beyond the student's control." "I want to avoid a bad grade" or similar does not qualify. Students must decide on or before Friday, October 19th if they wish to withdraw from CHEM 1120.

Academic Integrity. By submitting an assignment, you are representing that it is your own work and that you have followed the rules associated with the assignment. Incidents of academic misconduct (e.g. cheating, plagiarizing, research misconduct, misrepresenting one's work, and/or inappropriately collaborating on an assignment) will be dealt with severely in accordance with the Student Code (<http://www.regulations.utah.edu/academics/6-400.html>). With regard to clicker questions, you must respond with your own clicker and no one else's. Any instance of someone using more than one clicker will be treated as a case of academic dishonesty, and all parties involved will be dealt with. A single instance of academic misconduct may result in a failing grade for the course; however, multiple instances of misconduct may result in probation, suspension or dismissal from a program, suspension or dismissal from the University, or revocation of a degree or certificate. Incidents of academic dishonesty will be dealt with severely. Anyone caught cheating on an exam will be referred to the Dean for immediate disciplinary action and should expect to receive an 'E' in the course. Additionally, a letter detailing the cheating incident will be put in the student's permanent academic file.

Disclaimer. The information provided here and in the syllabus does not represent a binding legal contract. This syllabus may be modified by the instructor when the student is given reasonable notice of the modification.

Tentative Class Schedule

day and date	topic/event	prior reading
M January 7	Introduction, logistics, and philosophy	
W January 9	Alkanes	Chapter 12
F January 11	Alkanes	
M January 14	Unsaturated Hydrocarbons	Chapter 13
W January 16	Unsaturated Hydrocarbons	
F January 18	Unsaturated Hydrocarbons	
M January 21	Martin Luther King Day – University closed	
W January 23	Organic Compounds That Contain O, X or S	Chapter 14
F January 25	Organic Compounds That Contain O, X or S	
M January 28	Organic Compounds That Contain O, X or S	
W January 30	Three-Dimensional Shape of Molecules	Chapter 15
F February 1	Exam 1	
M February 4	Three-Dimensional Shape of Molecules	
W February 6	Three-Dimensional Shape of Molecules	
F February 8	Aldehydes and Ketones	Chapter 16
M February 11	Aldehydes and Ketones	
W February 13	Aldehydes and Ketones	
F February 15	Carboxylic Acids, Esters and Amides	Chapter 17
M February 18	Presidents Day - University closed	
W February 20	Carboxylic Acids, Esters and Amides	
F February 22	Carboxylic Acids, Esters and Amides	
M February 25	Amines and Neurotransmitters	Chapter 18
W February 27	Amines and Neurotransmitters	
F March 1	Exam 2	
M March 4	Amines and Neurotransmitters	
W March 6	Lipids	Chapter 19
F March 8	Lipids	
M March 11	no class - U of U Spring break	
W March 13	no class - U of U Spring break	
F March 15	no class - U of U Spring break	
M March 18	Lipids	
W March 20	Carbohydrates	Chapter 20
F March 22	Carbohydrates	
M March 25	Carbohydrates	
W March 27	Amino Acids, Proteins and Enzymes	Chapter 21
F March 29	Amino Acids, Proteins and Enzymes	

M April 1	Amino Acids, Proteins and Enzymes	Chapter 22
W April 3	Nucleic Acids and Protein Synthesis	
F April 5	Exam 3	
M April 8	Nucleic Acids and Protein Synthesis	Chapter 23
W April 10	Nucleic Acids and Protein Synthesis	
F April 12	Metabolism and Energy Production	
M April 15	Metabolism and Energy Production	Chapter 24
W April 17	Metabolism and Energy Production	
F April 12	Carbohydrate, Lipid, and Protein Metabolism	
M April 22	Carbohydrate, Lipid, and Protein Metabolism	
W April 24	Carbohydrate, Lipid, and Protein Metabolism	
W May 1	Final exam, 7:30-10:00	

CHEM 1120 Lab Schedule

Week of:

January 7	no lab
January 14	Structural and <i>cis-trans</i> Isomerism in Carbon Compounds
January 21	no lab
January 28	Qualitative Test for Alkenes
February 4	Molecular Structure and Optical Isomerism
February 11	Analyzing the Vitamin C in Fruit Juice
February 18	no lab
February 25	Preparation and Identification of Esters
March 4	Synthesizing Aspirin
March 11	no lab
March 18	Preparing Soap and Determining its Properties
March 25	Qualitative Testing for Carbohydrates
April 1	Qualitative Tests for Amino Acids and Proteins
April 8	no lab
April 15	Estimating the Optimum pH and Temperature for Digestive Enzyme Activity
April 22	no lab