

Syllabus for CH151: "Fundamentals of Chemistry I"  
Fall 2009 Dr. Angel

## INTRODUCTORY OBSERVATIONS:

Whatever your goals, *how you start will determine how you end*. "The preponderance of psychological evidence indicates that *experts are made, not born...motivation appears to be a more important factor than innate ability in the development of expertise.*" (P.E. Ross, Scientific America, August, 2006). Proficient athletes, musicians and scientists get there only through much practice.

Student preparation for first semester college chemistry is diverse. For some students, chapters one through five of your assigned text - the majority of this semester's material - will be a review; other students will find themselves in a chemistry class for the first time, perhaps with the added encumbrance of a weak mathematical background. Regardless, *your desire and interest to learn will determine your success*. Desire and interest translate to time. As you devote time in study, your interest and desire to learn increase. The best chemistry students prioritize their time, placing learning first. The amount learned and the grade earned correlate directly to desire and interest – time spent working with chemistry. I recommend that you *develop good habits early*.

Good habits: Attend all classes including recitation. Ask questions inside and outside of class. Take advantage of tutors and office hours. Work your text: always have a pad and pencil to work out problems, take notes and write down questions as you read the material. Do end-of-chapter problems in your text. Do all homework assignments. Do sample problems provided by your instructor. The more problems you work, the more success you'll have in mastering the subject. Stay ahead of lecture as outlined in the calendar. Read the subject material and work some problems in the text *prior* to lecture. Come to class prepared to ask questions.

Learning chemistry is similar to learning a foreign language. Chemistry is vertically aligned: each new topic in chemistry assumes you learned the former material. Each chapter in your text outlines a different principle, and each successive principle assumes and requires that you master the prior. The only way to do better on the next exam is to go back and learn the material from the previous exam. If you do well your first semester, you will probably do well your second semester. If you are successful in your first two semesters of chemistry at Washburn, you will be prepared to be successful in all subsequent chemistry courses. Attend to difficulties as soon as they arise in your studies. Invest early and your science studies progressively become easier and more enjoyable. Again, *how you start will determine how you end*.

## COURSE OBJECTIVES

Chemistry is Western philosophy's attempt at understanding interactions within nature. As an introduction, the student will learn a new, well defined language; the student will observe Newtonian and non-Newtonian mechanics of small particles, apply math skills at generating solutions, and learn to discern and analyze relevant information.

This class may be applied toward general education credit in Natural Sciences, Mathematics and Statistics. It will emphasize three general education skills: 1. "Reason Mathematically and Understand Numerical Data"; 2. "Process Information Both in Terms of Synthesis and Analysis"; 3. "Solve Problems Using the Methods of Analysis Considering Evidence, Relevance and Validity".

**CALENDAR: Tentative – check for updates**

<u>DATE</u>	<u>CHAPTERS† (on-line hmwk due*)</u>	<u>FUNDAMENTAL PRINCIPLES</u>
8/17	1	Introduction; Measurements
8/19	1	Units/Dimensional Analysis
8/21	1	Accuracy/Precision/Significant Figures
8/24*	1 (Chapter 1)	Temperature/Density
8/26	2	Atomic Picture; Isotopes; Formula Mass
8/28	2	Periodic Table; Periodic Properties
8/31	2	Ionic Compounds/Nomenclature
9/2	2	Molecules/Nomenclature
9/4*	21 (Chapter 2 & 21)	Nuclear Chemistry
9/7	Labor Day (University Holiday)	
9/9	<b>EXAM 1: Chapters 1, 2 &amp; 21</b>	
9/11	3	Mole/Molar Mass
9/14	3	Mass Percent, Empirical Formulas
9/16	3	Chemical Equations & Stoichiometry
9/18*	3 (Chapter 3)	Limiting Reactants; Theoretical, Act. & % yields
9/21	4	Molar Solutions; Molar solutions in reactions
9/23	4	Electrolytes; Ionic equations; Solubilities
9/25	4	Acid/Base Reactions; Titrations
9/28	4	Oxidation States; Oxidation and Reduction
9/30*	20.1, 20.2	Balancing Redox Reactions
10/2	<b>EXAM 2: Chapters 3 &amp; 4</b>	
10/5	10	Kinetic Molecular Theory; Ideal Gas Law
10/7	10	Reactions with Gases
10/9	Fall Break	
10/12	10; 11.1 (11.2)	Intermolecular Bonds
10/14*	10; (Chapter 10)	Real Gases
10/16	5; 11.4-pg 450 – 451	Energy/Enthalpy/Heating curve
10/19	5	Heat Capacity/ Calorimetry
10/21	5	Heat of Formation; Heat of Reaction
10/23	5	Hess's Law
10/26*	5 (Chapter 5)	Review
10/28	<b>EXAM 3: Chapters 10 &amp; 5</b>	
10/30	6	EM Radiation; Planck; de Broglie; Heisenberg
11/2	6	Bohr; Rydberg; Energy Levels; Quantum numbers
11/4*	6 (Chapter 6)	Shells; Subshells; Orbitals
11/6	7	Pauli; Aufbau; Hund; Electron Configurations
11/9	7	Zeff; Atomic Size
11/11*	7 (Chapter 7)	Ionization Energy & Electron Affinity
11/13	8	Lattice Energy & Born-Haber Cycle
11/16	8	Lewis Structures
11/18	8	Covalent Bonds; Bond Order
11/20	8	Electronegativity; Polarity; Bond Length/ Energy
11/23*	8 (Chapter 8)	Review
11/25; 11/27	Thanksgiving Holiday	
11/30	<b>EXAM 4: Chapters 6, 7 &amp; 8</b>	
12/2 (5PM)	<b>Make-Up (Replacement) EXAM</b>	
12/4	Review	
<b>12/8 – Tuesday</b>	<b>FINAL EXAM: Chapters 1 – 8, 10 &amp; parts of 20 &amp; 21: comprehensive @ <u>9:00AM</u></b>	

†Chapters listed are from the required text: CHEMISTRY The Central Science 11<sup>th</sup> Ed., Brown, etal.

\*Homework for the Unit Chapter(s) needs to be recorded on the computer *by this day* at 11:00 PM to receive credit.

**EVALUATION:**

Exams	50%
Lab	20%
Final	30%
A:	100% - 90%
B:	89% - 80%
C:	79% - 70%
D:	69% - 60%
F:	59% - 0%

There are six scheduled exams, including the final. There are four, in-class, hour exams: each account for 12.5% of your grade. You may take these exams prior to the scheduled exam date only with a valid excuse. Only *one* make-up or replacement exam will be given. It is scheduled for a Wednesday evening, starting at 4:00PM. Plan to take this exam: it can only help your grade: it will replace your lowest exam score (a zero if you missed an exam), and it will not count if it is your lowest exam score. It will also serve as a review for the final: it will be comprehensive for all material covered up to the date it is given. There are no other make-up exams. Extra credit is not offered. There is no make-up exam for the Final. The Final Exam is comprehensive.

**Formal Homework.** On-line homework may be accessed at <http://www.masteringchemistry.com/>. You should have received an access code with the purchase of your text. If not, you may purchase one on-line. The Course ID is MCANGEL2009. Use your WID as your student number. Please use your first and last name as it appears on your transcript. The school zip code is 66621. Become acquainted with the software through the assigned introduction as soon as possible. This formal homework will count as *extra credit on exams*: Percentage extra credit points (ecp) on the exam will correspond to your average homework percentage grade: 100% - 90% = 5 ecp; 89% - 80% = 4 ecp; 79% - 70% = 3 ecp; 69% - 60% = 2 ecp. (It is possible to earn a score of 105% on an exam.) All homework has a due date. You are strongly encouraged to start work on this homework the first (not the last) day of the chapter material as presented on the Calendar. Some homework assignments may take over four hours to complete: do not plan to complete it all in one session.

**Recommended Homework.** As you progress through the text, cover up the solutions to the “Sample Exercises” and try to get the correct answer; also work the “Practice Exercises” in the chapter. Work the problems in the back of each chapter where the answers are provided. The formal homework (mentioned above) is taken mostly from end-chapter problems; however, some end-chapter problems, while important, were not available to be assigned. Also work the example problems provided by the instructor – see class webpage at <http://www.washburn.edu/faculty/sangel/Courses/CH151.htm>. The more problems you work, the more you will learn, the easier this class becomes.

**Laboratory.** Chemistry is predominantly a laboratory science. Your lab grade represents 20% of your averaged grade; however, you can earn no more than one letter grade for the class above your laboratory grade.

**SCHEDULED OFFICE HOURS:** ST312G

Open: Tue: 10 - 12; Wed: 1 -2 PM; Thur: 1 - 2 and/or by appointment @ 670-2266.

Not available: M 9 – 4; T 2 – 5 and W, F 9A – 1PM.

**Tutors and student supplemental instructors** (SIs) are provided for this class free of additional charges.

Let me reemphasize the importance of staying current with this class. Read the material *before* I cover it in class. Finish working the problems in the text before we review the chapter. Use all available resource material to reinforce your knowledge. Don't appreciate your ability to cram. See me immediately when you are having difficulty.

**Select Mission of the University:**

Washburn University shall prepare qualified individuals for careers, further study and life long learning through excellence in teaching and scholarly work. Washburn University shall make a special effort to help individuals reach their full academic potential. Washburn University Board of Regents, 1999

**Academic Misconduct Policy:**

All students are expected to conduct themselves appropriately and ethically in their academic work. Inappropriate and unethical behavior includes (but is not limited to) giving or receiving unauthorized aid on examinations or in the preparation of papers or other assignments, or knowingly misrepresenting the source of academic work. Washburn University's Academic Impropriety Policy describes academically unethical behavior in greater detail and explains the actions that may be taken when such behavior occurs. For guidelines regarding protection of copyright, consult [www.washburn.edu/copyright/students](http://www.washburn.edu/copyright/students). For a complete copy of the Academic Impropriety Policy, contact the office of the Vice President for Academic Affairs, Bradbury Thompson Alumni Center Suite 200, or go on-line to: [www.washburn.edu/admin/vpaa/fachdbk/FHsec7.html#VIII](http://www.washburn.edu/admin/vpaa/fachdbk/FHsec7.html#VIII)

**Disability Services:**

The Student Services Office is responsible for assisting in arranging accommodations and for identifying resources on campus for persons with disabilities. Qualified students with disabilities must register with the office to be eligible for services. The office MUST have appropriate documentation on file in order to provide services. Accommodations may include in-class note takers, test readers and/or scribes, adaptive computer technology, brailled materials. Requests for accommodations should be submitted at least two months before services should begin; however, if you need an accommodation this semester, please contact the Student Services Office immediately.

Location: Student Services, Morgan Hall Room 135 (new location)

Phone: 785-670-1629 or TDD 785-670-1025

E-Mail: [student-services@washburn.edu](mailto:student-services@washburn.edu)

Students may voluntarily identify themselves to the instructor for a referral to the Student Services Office.

**Center for Undergraduate Studies and Programs (CUSP):**

As a Washburn student, you may experience difficulty with issues such as studying, personal problems, time management, or choice of major, classes, or employment. The Center for Undergraduate Studies and Programs (Office of Academic Advising, Educational Opportunity Program, and Office of Career Counseling, Testing and Assessment) is available to help students either directly through academic advising, mentoring, career counseling, testing and developing learning strategies or by identifying the appropriate University resource. If you feel you need someone with whom to discuss an issue confidentially and free of charge, contact CUSP in Morgan 122, 785-670-2299, [advising@washburn.edu](mailto:advising@washburn.edu).

**Withdrawal Policy:**

During fall and spring semesters, students may withdraw from full semester courses through the second week of class with no recorded grade. From the third through the eleventh week a "W" is recorded for any dropped course. Beginning with the start of the twelfth week, there are NO withdrawals, and a grade will be assigned for the course. For short-term or summer course deadlines, please check the appropriate Semester/Session Course Bulletin Web Site ([www.washburn.edu/schedule](http://www.washburn.edu/schedule))

**Official E-Mail Address:**

Your Washburn University e-mail address will be the official address used by the University for relaying important messages regarding academic and financial information and the University will consider this your official notification for important information. It may also be used by your instructors to provide specific course information. If you prefer to use an alternate e-mail address to receive official University notices, you can access your MyWashburn e-mail account, choose the "Options" tab, and select "Settings", scroll to the bottom of the screen, click enable forwarding and enter the e-mail address you would like your Washburn emails forwarded to in the "mail forwarding" area. Click add and the click on save changes. This will complete the process of forwarding your Washburn e-mail. It is your responsibility to ensure that your official e-mail box does not exceed your message quota resulting in the inability of e-mail messages to be accepted into your mailbox