

CHEMISTRY I / Chemistry and the Environment – CHM 113 Lecture

North Central College

Winter 2002, Brandt

Lecture : MWF, 12:00 - 1:10, SC 204.

Text (required): Brown, T.L.; LeMay, H.E.Jr.; and Bursten, B.E. *Chemistry the Central Science*, 8th Edition, Prentice Hall, Upper Saddle River, NJ, 2000.

Text (optional): Stanitski, D.L.; Eubanks, L.P.; Middlecamp, C.H.; Stratton, W.J. *Chemistry in Context: Applying Chemistry to Society*, 3rd Edition, McGraw-Hill, Boston, MA, 2000.

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Office Hours: MF 2:00 – 4:00, and W 9:00 – 11:00 or stop by my open door at any time.

Course Description: This is an introduction to chemical principles within the context of environmental issues such as energy sources, acid rain, global warming, and water quality. Major chemical topics include chemical formulas and equations, acid-base, oxidation-reduction, thermochemistry, and nuclear reactions.

Course Aim: Many of you have had General Chemistry in High School and many of the topics may seem redundant to you. However, in college we cover these topics at an advanced pace and in this course the chemical topics will be seen in the context of our everyday world. This means that we will discover the topics only as they become necessary to investigate the issue at hand. The chemical topics will only be revealed on a need to know basis. This means that we will go through the required textbook in an uneven way so that the chemical topics can be covered as needed to understand the environmental issues. Thus, the goal of the course is that upon reading a general science article, you will have the basic chemistry tools and the critical thinking ability to research the topic (jumping from source to source as need be) and discover for yourself the accuracy and validity of the statements and opinions.

Evaluation:

Take Home Quizzes @ 50	= 100 points
2 Hourly Exams @ 100	= 200 points
Paper	= 100 points
Final Exam	= 200 points
Lab	= <u>150 points</u>
Total	= 750 points

You must pass the lab in order to pass the course!

Guaranteed Grades

A (90%)

B (80%)

C (70%)

D (60%)

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Tentative Lecture Schedule

<u>Dates</u>	<u>CIC Chapter #</u>	<u>CTCS Chapter #</u>	<u>Chapter Topics</u>
What are you breathing in?			
Jan 2	1.1 – 1.6	1.1-2, 1.4-6	Matter, Units, and Dimensional Analysis
Jan 4	1.7 – 1.8	2.1-5	Atoms and Molecules
Jan 7	1.9 – 1.15	3.1-4	Chemical Equations, Molecular Weights, and the Mole
Is ozone or the ozone hole really a problem?			
Jan 9	2.1 – 2.3	8.1, 8.4-6	Lewis Structures and Covalent Bonding
Jan 11	2.4 – 2.6	6.1-3	Electronic Structure – Bohr Model
Jan 14	2.7 – 2.9	6.5-9	Electronic Structure – Quantum Mechanics and Orbitals
Jan 16	2.10 – 2.19	18.1-3	Earth's Atmosphere
Global warming, is it here?			
Jan 18	3.1 – 3.7	9.1	Molecular Shapes
Jan 21	3.8 – 3.15	3.6-7, 18.4	Limiting Reagent and Percent Yield
Jan 23			Catch-up Day
Jan 25			Hour Exam #1
What energy source should your car use?			
Jan 28	4.1 – 4.2	5.1, 5.3-4	Enthalpy
Jan 30	4.3 – 4.4	8.9	Covalent Bond Strength
Feb 1	4.5 – 4.14	5.6-7, pp 172-3	Hess's Law and Enthalpy of Formation
Is bottled water really necessary?			
Feb 4	5.1 – 5.4	8.2-3, 4.1-2	Ion, and Ionic Bonding in Water
Feb 6	5.5 – 5.10	11.2	Intermolecular Forces
Feb 8			Catch-up Day
Feb 11	5.11 – 5.16	2.6, 18.5-6	Take Home Quiz #2 Municipal Water
Is acid rain still a problem?			
Feb 13	6.1 – 6.3	16.1-3	Acids-Bases
Feb 15	6.4 – 6.6	16.4-7	pH and Strength of Acids-Bases
Feb 18	6.7 – 6.14	18.4	Acid Rain
Feb 20			Catch-up Day
Feb 22			Hour Exam #2
Alternative energy sources; Have you seen the latest invention?			
Feb 25	8.1 – 8.2	4.6, 20.1-2	Solution Stoichiometry and Redox Reactions
Feb 27	8.3	20.3-4	Electrochemical Cells and EMF
Mar 1	8.4	20.5	Spontaneity
Mar 4	8.5 – 8.7	20.7-8	Batteries and Corrosion
Nuclear power is being heard from again!			
Mar 6	7.1 – 7.7	21.1-4	Nuclear Reactions and Radioactivity
Mar 8	7.8 – 7.14, 8.8	21.6-9	Nuclear Energy
Mar 11	8:00 am – 9:50 am		Final Exam

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Homework:

While reading the chapter you should attempt to do all of the chapter-problems without looking at the answers that are found at the end of the book. It is imperative that you work as many of the assigned problems as you possibly can, as this is what most quizzes and exams will be based on. It is also important to stay current when studying Chemistry because we will be constantly building on the principles just learned. Falling behind by a single day can be detrimental. For this reason, try to do all the problems assigned for that day, and if possible, try to read the next days material in the text.

Paper:

The term paper must be a minimum of 5 typed (on a word processor, not a typewriter), double-spaced pages. Margins will be 1" on all sides, and the font should be a standard (Arial, Courier, Geneva, Helvetica, Monaco, or Times) 12-point font. Be sure to include at least 3 references using the format found in the journal *Science*. At least 1 of these should be a magazine or newspaper from the past year. The paper will be graded on the science content, style, and grammar. The Writing Center may be of help if you find yourself struggling with the written language. The paper is due on Monday, March 4. Due dates to parts of this paper (e.g., topic, outline) will be announced in class during the term.

Academic Dishonesty: This may well be the first "exam" for you at NCC that is a take home. For this reason, I think it is particularly important to review the Academic Dishonesty Policy in the Catalog:

Any instructor who has assembled evidence of plagiarism will first offer the student a chance to provide an alternate explanation of the evidence or to admit fault. If the inference of plagiarism remains, the instructor may choose one of these options, listed in order of increased severity according to the extent and evident deliberateness of the deceit. The first two options suppose that the plagiarism is not extensive, that it would not have given the student substantial academic advantage such as full course credit or high course grade, or that the instructor has clear reasons to believe that the plagiarism can be accounted for by ignorance, which, though subject to discipline, is genuine.

1. Reprimanding the student and requiring either a revision of the work or an additional paper or exam.
2. Lowering the grade for the paper or exam (even as far as F) without opportunity to regain the lost credit.

The remaining three options come into play if the plagiarism is extensive, if it gave the student substantial academic advantage, or if the student had previously been warned against it.

3. Directed withdrawal of the student from the course.
4. Failure of the student for the course.
5. Referral of evidence to the dean of faculty for appropriate disciplinary action (which may go so far as suspension or dismissal).

Any sanction beyond 1) will be reported to the Dean of Faculty for notation in the student's file. The record of past plagiarism for a given student may affect the disposition of any new case. No notation will appear on the student's permanent transcript, nor will any notation be sent off campus with the student's records.

You will find the following statement on your take home quizzes and you will be asked to sign it:

My signature is my pledge that I neither received nor provided aid from/to another individual. I understand the **Responsibility for the integrity of one's education** on pages 142-3 of the student handbook and its' consequences on page 125.

This responsibility does not end with the take-home quizzes, but will be strictly upheld on the laboratory write-ups as well.