

## SW 334 EVERYDAY CHEMISTRY - Fall, 2006

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Hours: Saturday 9:00 a.m. – 12:00 p.m.  
Location: O'Hare Campus

Competencies Offered: **S-4, S-1-A, S-1-E, S-3-A**

### **COURSE DESCRIPTION:**

Each day we are immersed in chemicals and are participants in and observers of many chemical reactions. This course is designed to teach chemistry and physical science through the observation and explanation of many events we observe in daily life. It is specially designed for students who have little or no background in science. We will examine the chemistry of substances from table salt and food additives, to fuels for our cars and homes, to semiconductors, new plastics, and revolutionary materials that will improve our lives in the 21st century. This class will emphasize the interconnections in our world through science. We will address safety and the "positive" and "negative" impact of chemicals on our world.

**Learning Experience:** Students will increase their understanding of scientific methods and concepts so that they may make informed societal judgments on issues relating to science and technology. Learning experiences such as exercises, learning resources as handouts and internet links, discussions, textbook readings, and an array of "hands on" and virtual experiments are all designed to encourage students to participate, to draw on previously learned information, to make judgments, and to inquire, thereby forming a basis for conceptual learning.

### **LEARNING TOOLS:**

Textbook: Snyder, Carl H., *The Extraordinary Chemistry of Ordinary Things*, Fourth Edition; John Wiley & Sons, Inc., 2003. (ISBN 0-471-41575-8)

Duplicated materials and Internet sites.

### **EXPECTED OUTCOMES:**

Upon successful completion of this course, students will:

1. Have a basic understanding of fundamental chemical concepts in the context of ordinary things in our everyday lives.
2. Develop a general understanding how the chemical universe works and how science and in particular chemistry contribute to the development of new products, medicines and advances in our standard of living.
3. Be able to present and discuss ideas and information concerning science and their effect on the environment, on health, and on the quality of life.
4. Have a framework in which to evaluate scientific and technical issues and to make reasoned judgments on societal issues relating to them.
5. See the interconnections among the basic scientific principles with technology found in our homes and workplaces, with advances in medicine, and with utilization of natural resources.

### **COMPETENCE CRITERIA:**

#### **For All Competencies:**

Participation in class discussions, completion of a written Take Home Midterm Exam, laboratory experiments, and smaller assignments during the term.

#### **For All Competencies:**

In addition, each competence will be fulfilled by either a written report or a class demonstration. **The written report or oral presentation should teach the chemistry of the topic you have chosen.** If a student is registered for one competence, the student may choose to demonstrate competence through either a written

report or an oral demonstration. If a student is registered for 2 competencies, the student will demonstrate one with a written report and the other with an oral demonstration.

### **General Guidelines for the Class Demonstration**

The purpose of using this medium for fulfilling a competence is to emphasize the experimental basis of chemistry by allowing the students to perform an experiment using simple equipment and common substances.

**The instructor has a number of sources that describe demonstrations suitable for classroom situations. The following gives the standard pattern for each demonstration:**

- **Topic:** Pick an aspect of chemistry that is of interest to you and that would be relevant for your particular competence(s).
- **Purpose:** The purpose states the basic goals for your experiment in view of your particular competence.
- **Materials:** A list of necessary supplies.
- **Procedure:** Step by step instructions on how to perform the experiment with an emphasis on safety considerations.
- **Results:** An explanation clearly stating what is expected to happen, even if it does not work as well as expected.
- **Why?:** An explanation of why the results were achieved. **This is the major portion of your demonstration of competence.** Here you will be able to teach the class the underlying principles of your demonstration. This will require background reading from sources other than your textbook to give an in depth scientific explanation of your demonstration. The perspective you take will depend upon the particular competence you are demonstrating. Use and list at least 4 references besides your textbook.

### **General Guidelines for the Analytical Report**

The purpose of using this medium for demonstrating competence is to allow students to integrate the scientific principles behind a particular consumer product or technical process with the ramifications of its implementation. Use the techniques that you have learned in your writing courses for preparing an original report. ***All reports are to be submitted electronically to your instructor. Reports will be checked for originality using DePaul's software prior to grading.***

- **Topic:** Pick an aspect of chemistry, a consumer product, or an everyday technical process that is of interest to you and that would be relevant for your particular competence.
- **Information Sources:** Use newspapers, popular journals, scientific journals and books, the internet, personal experience, your own data gathering/surveys, etc. to discuss your topic and its importance.
- **Perspective:** Your emphasis will depend on the competence you are demonstrating, but in general you must show an understanding of the scientific principles underlying your choice of topic.
- **Development of Ideas:** Give definitions in your own words of terms, concepts, ideas, processes, etc., state and develop your evidence, offer an explanation, develop various aspects of the issue adequately, place your interpretations and definitions of issues in a framework. Your framework depends on the competence you are demonstrating.
- **Organization:** **You must use and list at least 4 sources other than your textbook to gain background information and to develop your topic.** Develop your report by bringing in your own insights; do not copy or paraphrase the work of others. Follow the standard guidelines for writing an original term paper. **Be prepared to present the highlights of your paper to the class.**

## RELATIONSHIP OF THIS COURSE TO THE COMPETENCE FRAMEWORK:

**S-4:** Chemicals that are fashioned into new materials, health care products, and agricultural products require natural resources as well as energy. We will study the interconnections between the use of natural resources and the quality of life generated through the use of everyday chemicals. We will also address their affects on the environment.

**S-1-A:** Natural phenomena can be as diverse as foods, polymers, fossil fuels, and natural forms of radiation. We will use a systematic approach to study the formation, acquisition, use, and ultimate disposal of items such as these, which are so vital to our everyday well-being. We will learn how to control our environment by manipulating the chemical reactions that all matter undergoes.

**S-1-E:** New chemicals are used to increase crop yields, improve our health, enhance our looks, sanitize our environment, and make our lives easier. We will examine some broad categories of new materials and plastics, medicines, cosmetics, pesticides, and alternative fuels. We will see how chemical reactions can generate electricity and how electricity can generate chemical reactions.

**S-3-A:** New, "improved" technology is constantly being applied to existing products and processes that we use every day in our homes and workplaces. We will closely scrutinize technology, analyze the science on which it is based, and try to assess the impact this technology really has on our social, economic, and cultural structures.

## ASSESSMENT OF LEARNING:

These are rough guidelines and are subject to change.

Participation in discussions	15
Lab experiments	20
Problems / Small assignments	15
Mid-Term Exam	15
If registered for one competence, choose one of the following. If registered for two competencies, both will be submitted for grading.	
Analytical report	35
Demonstration	35

Some of the criteria used to evaluate the oral and written demonstration of competence will be based on:

- How well the chemistry was presented.
- Accuracy of facts.
- Discussion of issues within the context of your particular competence.
- Clarity.
- Integration of topic with your experience and/or interests.
- Content and references.

All research topics and experiments must be discussed with your instructor and approved by your instructor before you begin serious work on your report or demonstration. (This includes a safety review of your demonstration).

**Attendance Policy:** Excessive absences will result in a failing grade.

**Academic Policy:** I follow DePaul University's policy on Academic Integrity that is discussed in the student handbook.

Please become familiar with <http://studentaffairs.depaul.edu/handbook/code16.html>

**Plagiarism:** Plagiarism is a major form of academic dishonesty involving the presentation of the work of another as one's own. Plagiarism includes but is not limited to the following:

- The direct copying of any source, such as written and verbal material, computer files, audio disks, video programs or musical scores, whether published or unpublished, in whole or part, without proper acknowledgement that it is someone else's.
- Copying of any source in whole or part with only minor changes in wording or syntax, even with acknowledgement.
- Submitting as one's own work a report, examination paper, computer file, lab report or other assignment that has been prepared by someone else. This includes research papers purchased from any other person or agency.
- The paraphrasing of another's work or ideas without proper acknowledgement.

Plagiarism, like other forms of academic dishonesty, is always a serious matter. If a facilitator finds that a student has plagiarized, the appropriate penalty is at the facilitator's discretion. Actions taken by the facilitator do not preclude the college or the university from taking further punitive action including dismissal from the university.

### **COURSE GRADING SCALE**

The DePaul standard for grading is as follows:

A = 95 to 100	A- = 91 to 94	B+ = 88 to 90
B = 85 to 87	B- = 81 to 84	C+ = 77 to 80
C = 73 to 76	C- = 69 to 72	D+ = 65 to 68
D = 61 to 64	F = 60 or below	

### **PASS/FAIL OPTION**

Students can elect to take this course for Pass/Fail. If this is your choice, ***you must inform your instructor before the end of the second week of the course.***

To pass this course you must earn at least the equivalent of 80% of the points available for each competence that you have registered for and complete,

- for one competence EITHER a demonstration OR an analytical paper, or
- for two competences BOTH a demonstration AND an analytical paper.

### **INCOMPLETE GRADES**

If you need to take a grade of "incomplete" in this course, you must first discuss this with your course instructor before the ninth week at the latest. Incomplete grades are given at the discretion of the instructor.

You must request an incomplete grade in writing two weeks before the end of the quarter. Incomplete grades will be considered only after you have *satisfactorily* completed at least 75 percent of the coursework. Do not assume that you will qualify for an incomplete. Students who are failing the course at the point where they request an incomplete will not receive one.

If you do receive permission from the instructor to take an incomplete in the course, you will be required to complete a contract with the instructor, specifying how you will finish the missing work within the next two quarters. Incompletes not finished by the end of the second quarter will automatically become an F grade on your transcript.

### **TOPICS and TIME FRAME:**

We will not be able to cover the textbook chapters in their entirety. Selected pages and/or sections for the chapters are given below. Students are encouraged to read the whole chapter, but emphasis will be placed on the assigned readings. Students are expected to read the assigned materials before each class. (Week 1 is an exception.) Demonstrations, "hands on" experiments, and discussions may take more or less time than allowed by the syllabus. Thus the syllabus will be flexible. [NOTE that The Extraordinary Chemistry of

Ordinary Things textbook is frequently updated; thus the chapter numbers may be different. Look for the chapter titles listed below. Thus far the publisher has not made major changes in the substance of each chapter.]

Week-Date	Topic	Readings	Experiment	Assignment Due
1 – 09/09	COURSE OVERVIEW, PHILOSOPHY, and BASIC CHEMICAL CONCEPTS	Chapter 1 An Introduction to Chemistry	Solutions and Mixtures	Lab Report
2 - 09/16	The BUILDING BLOCKS OF CHEMISTRY	Chapter 2 Atoms and Elements Chapter 3 Chemical Bonding	Periodic Table Exercise / Static Electricity	“Introduce an Element” Lab Report
3 – 09/23	THE DRIVING FORCE OF ENERGY	Chapter 7 Petroleum	Class Demo: Distillation, Solar Energy, Global Warming Debate	Alternative Energy source, Global Warming Summary
4 – 09/30	ACIDS AND BASES  AIR POLLUTION	Chapter 10 Acids and Bases Chapter 14 Chemicals, Pollution, and the Environment (Introductory section and sections relating to air pollution only)	Measure pH of household liquid products	<b>Pick up a Take-Home Mid-Term Exam</b>  Lab Report  Bring a sample of a household liquid product for Acid/Base evaluation Class Demonstrations /Presentations
5 - 10/07	THE ELECTRICITY OF CHEMISTRY	Chapter 11 Oxidation and Reduction Section: 10.7, pp. 271-283	Oxidation and reduction experiments	Return Take Home Mid-Term at 9:00 a.m. Lab Report Class Demonstrations /Presentations
6 - 10/14	Fats and Oils	Section: 10.7, pp. 271-283 Chapter 15 Fats and Oils (Vegetable Oil Chemistry, Triglycerides and Iodine Number sections only)	Fats and Oils Examine Labels	Discussion of labels Demonstrations /Presentations
7 - 10/21	THE PLASTICS AGE	Chapter 21 Polymers and Plastics	Crosslinking experiment	<b>Bring a sample of a polymer to class.</b> Lab Report. Class Demonstrations /Presentations
8 – 10/28	STATES OF MATTER	Chapter 12 Solids, Liquids, and Especially Gases	Gas experiments, atmospheric pressure demo	Lab Report, Demonstrations /Presentations
9 - 11/04	SPECIAL TOPICS	Readings will be assigned in class	Experiment will be assigned in class	Analytical Report due, Class Demonstrations /Presentations
10 - 11/11	SPECIAL TOPICS	Readings will be assigned in class	Experiment will be assigned in class	Demonstrations /Presentations

PLEASE BRING A LARGE, SELF-ADDRESSED, STAMPED ENVELOPE, SO THAT YOUR REPORTS, EVALUATIONS, AND EXAMS CAN BE MAILED TO YOU.