

Syllabus for CHM 300 Chemistry and Society

Instructor: Linda Schweitzer, Ph.D., Associate Professor

Textbook: Chemistry in Your Life – Colin Baird. Also, Student Solutions Manual available. Supplemental reading material will be handed out and/or made available on the WebCT site.

Class: Tu/Th 3-4:47 PM in 378 SEB

Office hours “open door” as available or by appointment

Please note that I teach another class right after this one.

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Catalog Course Description

Designed for non-science majors and elementary and STEP chemistry majors and minors. Applies chemistry to environmental topics including smog; ozone depletion; global climate change; water pollution; acid rain; and fossil fuel, nuclear and alternative energies. Several in-class laboratory experiences included. *Satisfies the university general education requirement in the natural science and technology knowledge exploration area. Satisfies the university general education requirement for a writing intensive course in general education or the major, not both.* Prerequisite for writing intensive: Completion of the university writing foundation requirement.

Course Goals and Objectives

This course is one of a number of OU courses that satisfy the natural science and technology knowledge exploration area requirement in the general education curriculum. Courses in this category are expected to accomplish the following two learning objectives:

The student will demonstrate:

- knowledge of major concepts from natural science or technology, including developing and testing of hypotheses; drawing conclusions; and reporting of findings through some laboratory experience or an effective substitute (*Laboratory experiences are met by either a limited number of interactive experiences, collecting and interpreting raw data, or other effective experiences such as a virtual laboratory*) Requires at least 3 laboratory experiences during the course
- how to evaluate sources of information in science or technology

In addition to the two general-education learning outcomes, this course also includes:

- 1) the **crosscutting capacity of Effective Communication**, and
- 2) the **Intensive Writing Requirement**
 - a) as a **General Education Course**, or
 - b) as the **Intensive Writing Requirement in the STEP Chemistry major**

There will be two quizzes, one comprehensive final, one term project, three in-class experiments, and a short writing assignment.

The graded work will be:

Two quizzes	100 points each
Three experimental reports	25 points each (total 75)
Short writing assignment	25 points
One term project	100 points
Final	<u>100 points</u>
Total	400

Written work will be graded on the basis of the science and environmental content of your work as well as on the quality of your writing and the quality of your arguments. This latter portion of your grade will reflect your spelling and grammar, as well as the quality of your writing. Chemical material will be graded both on the quality of (numerical) answers and on the methods used to arrive at them. This means that you must indicate clearly on examinations the methods you use to arrive at an answer, except for multiple choice questions. Grade penalties for late submissions are a minimum of 5%, ramping up the later an assignment is submitted.

Term Project

Depending on your major, you will be assigned a term paper, a lesson plan or an inquiry as your term project. For those taking the class for the natural science and technology requirement in the general education curriculum, you will write a term paper. For those majoring in elementary education, you will develop a lesson plan. For those in secondary education, you will conduct an inquiry. The term project is worth a total of 110 points.

There will be three stages to your term project. **Stage 1** requires a description of your project detailed enough for a judgment to be made that you topic is appropriate and that the specifics of your project have already been thought through. This Stage may be written as a draft of your project, an extended abstract, an outline or another form of your choosing. This stage will be graded as a maximum of 10 points. **Due Date Stage 1: Sept 25, 2008**

Stage 2 is the completed term project. The Stage 1 materials must be attached to this final project. Stage 2 will be graded up to a maximum of 100 points. No grade will be assigned if the project is not complete, or references within the text and in the reference list are not completed. You may not earn the maximum points if there is more than an average of two writing errors per page (e.g., typographical errors, spelling errors, grammatical errors, errors of syntax, etc.). **Due Date Stage 2: Oct. 23, 2008**

You may use **Stage 3** (optional) as a chance to improve your term project grade by revising the final project as submitted for Stage 2. The instructor, while grading the term projects at Stage 2, will have made extensive comments. Your revisions must respond to those comments although you are expected to improve your project beyond merely responding to the comments. Stage 1 and Stage 2 versions must accompany the Stage 3 version to be considered for regrading. **Due Date Stage 3: Dec. 2, 2008**

You may choose any approved format for crediting your sources such as APA or MLA. I expect to see an accurate **list of references** at the end of your term project. You do not have to use footnotes unless you choose to do so but **credit should be given when appropriate** in parentheses within the text if you do not use footnotes. The in-text credit should tie to the full reference in the list of references and give the appropriate page number(s). Web sites must be clearly cited. **Web citations should include authors' names, date created, title of page, title of complete web site (if different from the page), URL (full web address), and date accessed** according to the format for references that you have chosen.

For term papers, you may choose any topic covered in the textbook. Separate handouts list some sample suggestions. The most likely pitfall is choosing a topic that is too broad. I will comment on the appropriateness of your topic at Stage 1 to help guide you before you embark on the actual writing. Your

paper should be at least five typewritten, single-spaced pages. You must use a computer since your paper is submitted in electronic form to TurnItIn.com.

For elementary education majors, the project should be a lesson plan at the level of one of the grades K-8 for the topic. Emphasis should be on a constructivist approach with specific hands-on material incorporated. Material should meet the Michigan Department of Education benchmarks. More particularly, the lesson plan **must** address the standards and benchmarks for **both an environmental issue as well as another science concept**.

If you are a secondary teacher education program (STEP) major, you will do an independent term project to learn to engage students in science inquiry and understand the role inquiry plays in the development of scientific knowledge. This project will help you better understand the importance of using inquiry-based teaching in your classroom. Studies have shown that students must be active learners and take part in hands-on activities to learn concepts and create a concrete understanding of science. If you are unaware of the idea of inquiry-based teaching, this project will help you understand what it entails and how it can be integrated into teaching. You will conduct an investigation as if you were a student and perform your own inquiry to answer a question of your choice. You will perform research and collect data to find information on your own open-ended topic. You will do your research by conducting your own experiment(s), working on a mini-research project with a faculty member, or finding previous experiments to try. This means that you cannot rely on other peoples' answers to your question. You must conduct your own open-ended research and draw conclusions on your own. At the end of the semester your final project will consist of a written summary of your research and conclusions and a class presentation. The presentation is open for creativity; the only specification is to present your research findings that answer your research question.

Grading Scale:

Considered "A"s

Considered "B"s

4	95.00-100	3.4	78.38-80.74
3.9	92.63-94.99	3.3	76.00-78.37
3.8	90.25-92.62	3.2	73.63-75.99
3.7	87.88-90.24	3.1	71.25-73.62
3.6	85.50-87.87	3	68.88-71.24
3.5	80.75-85.49		

Considered "C"s: 2.0-2.9

Considered "D"s: 1.0-1.9

Formula: GPA = Total % points awarded /23.75

EXPERIMENTS

DATES:

1. Volume-of-Air Experiment – Sept. 9
2. Energy in Fuels Experiment – Oct. 14
3. Water Experiment - Nov. 25

BOOK TOPICS

The amount of time we spend on each chapter will depend partially on you. If not much time is needed, we will move faster in order to spend more time on topics that are challenging and/or of greater interest.

CHAPTER 1: THE “ELEMENTAL” FOUNDATION OF CHEMISTRY: ATOMS, MOLECULES, ELEMENTS, COMPOUNDS, MIXTURES, AND STATES OF MATTER

CHAPTER 2: NEW IDENTITIES?: PHYSICAL AND CHEMICAL CHANGE

CHAPTER 3: AN INSIDER’S PERSPECTIVE: THE INTERNAL WORKINGS OF ATOMS AND MOLECULES

CHAPTER 4: POWERING THE PLANET: HYDROCARBONS AND FOSSIL FUELS

CHAPTER 5: FROM DIAMONDS TO PLASTICS: CARBON’S ELEMENTAL FORMS, ADDITION POLYMERS, AND SUBSTITUTED HYDROCARBONS

CHAPTER 6: THE FLAVOR OF OUR WORLD: THE OXYGEN-CONTAINING ORGANIC COMPOUNDS WE DRINK, SMELL, AND TASTE

CHAPTER 7: HEALTH AND ENERGY: CARBOHYDRATES, FATS, AND OILS

EXAM

CHAPTER 8: THE CHEMISTRY OF MEDICATION AND CLOTHING: CONDENSATION POLYMERS, ESPECIALLY THOSE CONTAINING NITROGEN

CHAPTER 9: THE MOLECULES THAT MAKE YOU WHAT YOU ARE: NUCLEIC ACIDS, PROTEINS AND HORMONES

CHAPTER 10: CHEMICALS IN OUR BODIES AND OUR ENVIRONMENT: VITAMINS, FOOD ADDITIVES, PESTICIDES AND MORE

CHAPTER 11: CHEMISTRY IN WATER: SALTS, ACIDS, AND BASES

CHAPTER 12: BATTERIES, FUEL CELLS, AND THE HYDROGEN ECONOMY: OXIDATION AND REDUCTION

CHAPTER 13: FIT TO DRINK: WATER: SOURCES, POLLUTION, AND PURIFICATION

CHAPTER 14: DIRTY AIR, DIRTY LUNGS: AIR POLLUTION

EXAM

CHAPTER 15: STRATOSPHERIC CHEMISTRY AND THE OZONE LAYER: A THIN VEIL OF PROTECTION

CHAPTER 16: GLOBAL WARMING AND THE GREENHOUSE EFFECT

CHAPTER 17 THE CORE OF MATTER: SOLAR ENERGY, NUCLEAR ENERGY, RADIOACTIVITY BIOFUELS (TIME PERMITTING)

FINAL EXAM

Fall 2008 OU Academic Calendar			
Labor Day holiday		Monday	September 1
New Student Convocation		Tuesday	September 2
Classes begin	>5 PM	Tuesday	September 2
Thanksgiving Recess begins	10 PM	Wednesday	November 26
Classes resume	7:30 AM	Monday	December 1
Classes end	10 PM	Saturday	December 6
Study period		Sunday	December 7