

OGLALA LAKOTA COLLEGE
Fall 2010
Course Syllabus for CHEM 323 Environmental Chemistry

Location: He Sapa, Pine Ridge

Time: Tuesdays, 12 - 4

Instructor: Albrecht (Al) Schwalm, Ph.D.

Office Hours: See me anytime before or after
the Lecture, or schedule a meeting by e-mail

How To Contact Me: aschwalm@olc.edu

Absolutely No Cell Phones Allowed In Class

All students will be required to turn off their cell phones when class begins.

Course Description: A study of the chemical nature of air, water and earth. Some of the specific topics will include the ozone layer, greenhouse effect, radioactivity, acid rain, nutrient cycles, and ecosystems.

Prerequisites: General Chemistry II and Lab (Chem 241/243) and Math 154, both completed with a grade of "C" or better.

Required Textbooks: Principles of Environmental Geochemistry by Eby, Nelson G., published by Brooks/Cole Cengage Learning, 2004

Other Materials: Scientific calculator, 3-hole notebook and ring binder, ruler, and pencil.

Descriptive Reading Load: Grade 15 reading level; one chapter every week.

Types and Amounts of Writing Expected: Assignments and essay questions must be written in complete sentences. The term (project) paper has to be in an accepted scientific format. Simply copying sentences from the textbook constitutes plagiarism and will not be accepted. Copying from the textbook or other students' results in full nullification of any work submitted!

Lakota Perspective Provided Through: Students and instructor will treat each other with respect. Lakota values such as patience, respect, and honor will be maintained. Students will aid the instructor with the inclusion of the Lakota perspective.

Course Objectives:

- Quantitatively predict the behavior of chemical reactions by thermodynamic calculations
- Calculate activity coefficients and the chemical behavior of ionic species in water
- Calculate pH and acid dissociation constants
- Determine the buffering capacities of natural waters and various water-mineral systems
- Qualify and quantify redox processes in natural systems
- Understand and construct Eh-pH diagrams
- Name and draw the structures of basic organic compounds
- Understand the nature and chemical behavior of organic compounds in air, water, and soil
- Understand the chemical behavior of radioactive and stable isotopes and their use in environmental studies.
- Classify minerals based on their mineralogical properties
- Recognize common minerals and their chemical formulas
- Study the common geochemical cycles in the atmosphere
- Study the geochemical cycles and the behavior of elements in continental water (lakes, rivers, groundwater) and in soils and sediments
- Study the geochemical cycles and the behavior of elements in the marine environment

Course Requirements:

Attendance: You must attend all scheduled classes. You are also expected to be punctual and to stay to the end of the class period. **If you an hour late or leave an hour early, you will be counted absent for the class.**

Missed exams can only be made up for documented absences like sickness, etc.; the make-up test will be modified and possibly more difficult (since you had more time to prepare) **and has to be taken before the next class session.** It is your responsibility to schedule a make-up exam with the instructor. Being absent also does not relieve you from handing in your assignments on time. **Only one make-up exam can be taken.**

In accordance with OLC policy, you will be dropped from the course if you miss more than three consecutive class periods **or the first two.** For the online course, this means that you have not logged into the course and/or did not submit homework assignments or exams. You will also be dropped, if you miss more than five class periods during the semester.

Reading Assignments: There will be ten (10) ungraded reading assignments. If you do not carefully read the assigned chapters, you will not be able to complete the homework assignments and will fail the exams. You will also not be able to understand, evaluate, and interpret the data collected for your project which will reflect poorly on your participation and contributions to the project.

Homework Assignments: There will be five (5) graded homework assignments @ **75 points each, due at the assigned date.** Homework assignments have to be typed and can be emailed as a file attachment to the instructor. You might want to use both word processing (like Word) and spreadsheet (like Excel) software to solve at least some of the problems. **Assignment handed or sent in after the due date will not be accepted.**

Exams: There will be three (3) written exams (see attached class schedule); each exam counts for **75 points. Exams can only made up by appointment and have to be taken before the next class period.**

Class Project: Each student has to actively participate in a class project. Each project will be carried out collaboratively by a team of two to four students and will consist of field and/or lab work. Students will have to design all components of the project (with the help of the instructor), collect all samples and/or data, and evaluate and interpret the data. Each project has to produce a term paper of the project in an accepted scientific format and a scientific poster.

The instructor will evaluate the project as a whole and the particular contribution of each project participant. Students are required to work on their projects not only during the scheduled class periods, but also outside the scheduled lecture times. Both the poster and the term paper have to be presented and handed in to the instructor on the last day of class. Each student can earn a maximum number of **400 points** for the project.

Grade Scale:

Assignments	375 pts
Exams	225 pts
<u>Project</u>	<u>400 pts</u>
Total	1,000 pts

The following grade scale will be used:

A = 900-1000
B = 800-899
C = 700-799
D = 600-699
F = below 600

Course Philosophy: You are not studying and learning for the instructor, but for yourself. Grades are

important for your academic career; nevertheless, your professional life really begins after you graduate. Understanding the basic principles of science will help you not only in any professional career, but also to understand and appreciate your surroundings and life itself.

But it is up to you. You have to invest your time (at least 8 hours of concentrated reading and 6 hours of problem-solving per week for homework and exams. This will take a lot of self-discipline on your time meaning that you have to appropriate enough time of your weekly schedule, sit down and actually do the work.

Tips to Succeed

1. Read the chapter to be dealt with **before** the lecture, and, at least, before you try to do your homework or take an exam. Then it will be much easier for you to follow the lecture and to ask questions about the material that you did not understand. Do not just “read” your textbook. You need to take notes and solve the example problems.

In your notebook:

- a) Comprehend new concepts **in your own words**.
- b) Define new terms (words) **in your own words**.

A large part of the exams will be essay questions. Be sure that you read through the “Chapter Review” at the end of each chapter and that you can define the “Key Terms” (in full, comprehensible sentences). You should also be able to answer all “Review Questions”, even the ones that are not assigned to the homework. Look through all the worked-out examples of each chapter. It will help you to write them down into your notebook. Work the “practice” problem following the examples (answers to those are given at the very end of each chapter, after the questions and exercises).

3. When you do your homework or weekly assignments, go back through the chapter and read it carefully; all the answers are there. Look especially at the example problems; they are very similar to the assigned ones. And learn how to use the tables in the appendices at the end of the textbook.
4. Actively take part in the class, especially when problems are worked on during lecture or online discussions. This will help you solve similar problems in your homework, quizzes, and exams.
6. Know how to use your calculator, especially how to work with logarithmic numbers. If you feel uncomfortable with math, pull out the old chemistry textbook and work through the appendices dealing with logarithms, scientific notation, and other math problems in chemistry.

If you have a disability and are in need of assistance to successfully complete this class please contact the OLC Coordinator of Support Services, at 455-6040.

Disclaimer: Information contained in this syllabus was, to the best knowledge of the instructor, considered correct and complete when distributed for use at the beginning of the semester. However, this syllabus should not be considered a contract between Oglala Lakota College and any student. The instructor reserves the right to make changes. Students will be informed of any such change.

TENTATIVE CLASS SCHEDULE

(see next page also)

Week 1	Tues, Aug 30	Read: Chapters 1 and 2 (Basic Principles); Project Assignments; Lecture via PicTel; Instructor at Pine Ridge CC (PRCC)
Week 2	Tues, Sep 7	Read Chapter 2(Equilibrium Thermodynamics and Kinetics); Field or lab work to be scheduled during the week); Lecture via PicTel; Instructor at He Sapa; Homework Assignment (HWA) 1 (Chapters 1+2)is due on Sun, Sep 12
Week 3	Tues, Sep 14	Read: Chapter 3 (Acid Base Equilibria); Field or lab work to be scheduled during the week); Lecture via PicTel; Instructor at PRCC
Week 4	Tues, Sep 21	Read: Chapter 4 (Oxidation-Reduction Reactions); Field or lab work scheduled during the week); Lecture via PicTel; Instructor at He Sapa HWA 2 (Chapters 3+4) is due on Sun, Sep 26
Week 5	Tues, Sep 28	Read: Chapter 5 (Carbon Chemistry); Field or lab work to be scheduled during the week); Lecture via PicTel; Instructor at Pine Ridge CC Exam 1 over chapters 1-4 is due on Sun, Oct 3
Week 6	Tues, Oct 5	Read Chapter 6 (Isotopes); Lecture via PicTel; Lecture via PicTel; Instructor at He Sapa HWA 3 (Chapters 5+6) is due on Sun, Oct 10
Week 7	Tues, Oct 12	Read Chapter 7 (Environmental Mineralogy); Lecture via PicTel; Instructor at Pine Ridge CC
Week 8	Tues, Oct 19	Read Chapter 8 (The Atmospheric Environment); Lecture via PicTel; Instructor at He Sapa HWA 4 (Chapters 7+8) is due on Sun, Oct 24 Exam 2 over chapters 5-7 is due on Sun, Oct 24
Week 9	Tues, Oct 26	Read Chapter 9 (The Continental Environment); Lecture via PicTel; Instructor at Pine Ridge CC
Week 10	Tues, Nov 2	Read Chapter 10 (The Marine Environment); Lecture via PicTel; Instructor at He Sapa HWA 5 (Chapters 9+10) is due on Sun, Nov 7
Week 11	Tues, Nov 9	Project Data Compilation; Communication via PicTel; Instructor at PRCC Exam 3 over chapters 8-10 is due on Sun, Nov 14
Week 12	Tues, Nov 16	Project Data Evaluation and Interpretation; Communication via PicTel; Instructor at He Sapa
Week 13	Tues, Nov 23	Poster and Term Paper Compilation; Instructor at Pine Ridge CC or Piya Wiconi (PW); you might have to be at PW on Friday, Nov 26
Week 14	Tues, Nov 30	Poster and Term Paper Compilation; Instructor at He Sapa or Piya Wiconi (PW); you might have to be at PW on Friday, Dec 3
Week 15	Tues, Dec 7	Poster and Term Papers are due ; Presentations