

OGLALA LAKOTA COLLEGE

Course Syllabus

CHEM 423 LAB EQUIPMENT

Location: Piya Wiconi

Instructors: Deig Sandoval and Albrecht Schwalm

Time: Fridays 9-12 (or all-day)

Office Hours: After Class

Contact: deig@olc.edu or aschwalm@olc.edu

Emergency Contact: 605-891-8245 (Sandoval), 605-431-0097 (Schwalm)

Course Description: Emphasis of this course will be hands-on learning of sampling procedures, sample preparation and analytical methods with special emphasis on environmental science. We will go out in the field and collect soil, sediment and water samples. The samples are then analyzed by the students with several spectral and chromatographic methods. The analytical results together with the appropriate QA/QC procedures will be evaluated by the students in a lab report for each analytical method. This course will be held in a laboratory, but the student will have to commit to two days in the field.

Prerequisites: Chem 243/241, Math 154, Math 213 or permission of instructor.

Required Textbook: Environmental Chemical Analysis by B.B. Kebbekus and S. Mitra, 1998, 1st edition, Chapman&Hall/CRC Publishers, ISBN: 0-7514-0456-X

Other Materials: 1) Field/Lab Book with pen 2) calculator, 3) ruler 4) appropriate field boots and clothing

Descriptive Reading Load: The text book has a Grade14 reading level according to the Fry Readability Index. Supplemental reading materials are written in a very technical style. Students are expected to read up to two chapters of the textbook every week in addition to the assigned technical papers.

Types and Amounts of Writing Expected: Lab reports must be written in complete sentences. Simply copying sentences from the textbook or other sources constitutes plagiarism and will not be accepted. Nevertheless, essential parts of any technical writings like instrument and analytical method specifications can be largely copied from instrument manuals or websites, but must be adapted to the specific user(s) and the project. The lab reports will have a technical or scientific format accepted in the environmental sciences.

Lakota Perspective Provided Through: Students and instructor will treat each other with respect. This respect will also be extended to all living and natural things that will be gathered for and used in this class.

Course Objectives: Students will:

- Become familiar with the standard soil, sediment and water sampling methods.
- Demonstrate hands-on proficiency in using a range of environmental analytical methods.
- Be able to locate and identify the appropriate sampling and analytical methods in the technical literature (e.g., by the Environmental Protection Agency) for a real-world environmental investigation.
- Be familiar with the purpose and use of standard operating procedures (SOP's)
- Know how to carry out specific parts of a larger environmental project, including sampling, sample preparation and analysis
- Present analytical results in a technical report

Course Requirements: Technology will play a large roll in the course. Internet skills are essential and each student will have to use spreadsheets for their lab reports. Some of the monitoring and analytical instruments are also software driven and operated through a laptop or hand-held computer.

Attendance: You must attend all scheduled meetings, including the field days. Most classes will run all day (indicated as two weeks in the schedule below). Therefore, class sessions will not be held on every Friday, but only on the Fridays indicated in the schedule below. You are also expected to be punctual and to stay to the end of the activity. Aside from the official attendance sheets, the instructors will keep additional records of their own. If you are late or leave early for more than an hour, it will count as a full absence. If you miss more than one day, you might be dropped from the class depending on your overall progress. You will certainly be dropped if you miss more than two days. Attendance will count for **250 points**.

Lab Reports: There will be four (5) graded lab reports @ **175 points each, due at the indicated deadline (see schedule below)**. Some of these assignments might require field work. All submitted material has to be typed and submitted electronically. Lab reports submitted **past the deadline will not be accepted**. Please get help from the instructors, if you have problems in writing the reports. Contact the instructors and set up an appointment.

Grades: The following grade scale will be used:

Participation	250 pts	A = 900-1000
<u>Lab Reports</u>	<u>750 pts</u>	B = 800-899
Total	1000 pts	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 sampling and analytical methods and the regulatory framework guiding them will help you not only in environmental investigations, but also to in your professional career.

This is an upper level class in chemistry with emphasis on environmental science. This is your

chance to start building onto your existing knowledge and excel in it. But it is up to you. You have to invest your time (at least 4 hours of reading and 2 hours of problem-solving per week aside from the lab report compilation and writing for this course).

Tips to Succeed

1. Read the appropriate chapter(s) and technical papers to be dealt with **before** you participate in sample collection or analysis. Then it will be much easier for you to understand and follow the tasks that you are asked to perform and to ask questions about the material that you did not understand. Do not just “read” the literature, but try to comprehend it.

In your notebook:

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

All reports are in essay form. Be sure that you can define (in full, comprehensible sentences) any new concepts and key terms when reading through a chapter or a technical paper.

2. When you do your lab reports, do a literature search and review. Carefully read through the appropriate chapters in the textbook and in the technical papers; all the answers are there.
3. Actively take part in the class, especially when problems are discussed.

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.

EnS493 Preliminary Schedule (always subject to change)

Week 1	Aug 28	Introduction, Sampling Strategies and Procedures Theory
Week 2	Sep 4	Quality Assurance and Control Theory
Week 3+4	Sep 11	Sample Collection (All-Day in Field)
Week 5 +6	Sep 18	Sample Preparation (All-Day)
Week 7	Sep 25	Ultra Violet - Visible Infrared Spectroscopy (UV-VIS)
Week 8+9	Oct 9	Atomic Absorption Spectroscopy: Flame /Graphite Furnace (AA Flame+GF); Report 1 (UV-VIS) is due
Week 10+11	Oct 23	X-Ray Fluorescence Spectrometry (XRF) (All-Day); Report 2 (AA) is due
Week 12+13	Nov 6	Gas Chromatography – Mass Spectrometry (GC-MS) (All-Day); Report 3 (XRF) is due
Week 14+15	Nov 20	Infrared Spectroscopy (IR); Report 4 (GC-MS) is due
Week 15	Dec 4	Review; Report 5 (IR) is due

Note: The instructor reserves the right to make changes. Students will be informed of any such change.