

CE479D – WATER QUALITY LABORATORY
SPRING 2009

CE 497D Laboratory: 3:35 – 6:35 pm M (some W)
 124 Sackett Building

CE 475 Lecture: 2:30 – 3:20 pm MWF
 120 Sackett Building

Instructor: Dr. Bill Burgos
 115 Sackett Building

Telephone: 863-0578
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Office hours: 11am-12:30pm TTh, 3:30-5:00pm F, other times by appointment

Assistant: Ching DeSa, Graduate Teaching Assistant, 5-C Sackett Building, tcd5005@psu.edu

Prerequisites: CE 370, CHEM 012, CHEM 014

Course Objectives: Prepare students for independent laboratory research. Improve students' technical writing skills.

Textbook: Chemistry For Environmental Engineering and Science 5th Ed. (2003) C.N. Sawyer, P.L. McCarty and G.F. Parkin, McGraw Hill (required for CE 475), ISBN 0-07-248066-1, International Edition ISBN 0-07-119888-1.

Laboratory Manual: Available at Engineering Copy Center, 101 Engineering Unit A (required for CE 497D)

Course Web Page: The ANGEL course management system will be used to communicate with students, to post lecture material to post homework assignments (and solutions), and as a link to other relevant reference material.

Grading:	6 Lab Quizzes @ 12.5 pts each	75	25	93-100%	A
	Progress Report	100	33.3	90-92%	A-
	2 Student Peer Evaluations @ 12.5 pts each	25	8.3	87-89%	B+
	Final Report and Presentation	<u>100</u>	<u>33.3</u>	83-86%	B
	Total	300	100%	80-82%	B-
				77-79%	C+

Lab Quizzes: To motivate students to read the Lab Manual BEFORE they come to lab, lab quizzes will be given a number of times over the semester. These quizzes will not be difficult and questions will be based only on material discussed in the current lab's description.

Progress Report: Each lab group will participate in our collective research project that involves both field work in collecting water samples from specified sampling locations, and lab activities in analyzing these samples for a number of specified parameters. The first eight laboratory exercises are designed to train students to perform all of these tasks independently. The following three lab periods are reserved for bringing your water samples into lab, and performing the requisite analyses. The progress report will be due Wed 03/26/2008 and include the introduction, materials and methods, and some of the results sections for the technical report describing your research project. Additional information on this reports and specific format information will be provided during the semester.

Final Report and Presentation: Student groups will be required to submit a final written report and present an oral report to the class. The final presentations will require compiling not only your group's research results, but also the results from all the student groups for the different water sources tested. A complete analysis of all the data is required to fully evaluate the potential impact of the I-99 acid rock drainage (ARD) on Buffalo Run (description below). For the final oral presentation, our class results will be presented at a "public meeting" where representatives of local municipal governments, conservation groups, PennDOT, PADEP and local citizens will be invited to attend. We will collaborate to produce one presentation composed of four parts: background information; study design and methods; results; and, conclusions and recommendations. Each group will be responsible for presenting one of the parts and the assignment of the parts will be decided on by all groups. Each part is anticipated to be a 10-15 minute presentation. Selection of the groups and the format of these presentations will be decided upon later in the semester. The final oral presentations will be scheduled for Monday April 27, 2009, 4:00pm, and the final written reports are also due at that time.

Student Peer Evaluations: To evaluate individual performance on group assignments student-peer evaluations will be used during the semester. The criteria used for these evaluations will be developed by the students, and evaluations will be administered confidentially by the instructor. Two evaluations will be used over the semester.

Focus of Independent Research Projects:

The laboratory activities for this semester will involve evaluating the potential impact of the acid rock drainage (ARD) associated with the construction of interstate I-99 over Skytop Mountain in Patton Township, Centre County, Pennsylvania. A significant amount of ARD flows into Buffalo Run, although significant efforts have been made to eliminate this pollution. ARD is generated from runoff from "cut faces" and from waste rock piles. Our focus as water quality chemists will be to determine how the water quality changes from near the ARD sources to locations downstream along Buffalo Run. Individual groups will be assigned two particular water sources, and all groups will analyze their source for the same parameters. Data will be shared among all groups for comparative purposes. A significant amount of background information, reports, and water quality data should be available on-line through targeted searches.

CE 497D COURSE SYLLABUS, SPRING 2009:

Date	Laboratory Topic	Related Reading
Wed 01/21	Lab Safety: Tour of Teaching Lab; I-99 Project Intro	
Mon 01/26	Technique Demonstrations: Volumetric Transfers, Dilution	Ch 15
Mon 02/02 (lab begins at 2:30pm)	Solids Determination Turbidity	Ch 26 Ch 13
Mon 02/09	Standard Solutions Sulfate	Ch 15 Ch 29
Mon 02/16	Volumetric Analysis: Alkalinity, acidity, carbonate system	Ch 16, 17, 18
Mon 02/23	Organic Matter Analyses: COD, BOD ₇	Ch 22, 23, 24
Mon 03/02	Spectrophotometric Analysis: Determination of N and P	Ch 25, 30
Mon 03/16 (dress warmly!)	Field Sampling Techniques Demonstrations: Field trip to I-99 construction and Buffalo Run	
Mon 03/23 field work Wed 03/25 lab work	Independent Laboratory Research Period #1/3	
Mon 03/30 field work Wed 04/01 lab work	Independent Laboratory Research Period #2/3	
Mon 04/06 field work Wed 04/08 lab work	Independent Laboratory Research Period #3/3	
Mon 04/27	Final Research Presentation (both oral and written)	