ENVIRONMENTAL ASSESSMENT METHODS I
ENVH 309

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Course Aim: Students will learn how to perform a variety of environmental assessments. This will include literature research, accessing and using archived data, the theory and practice behind sampling strategies, research design, techniques of environmental sample collection and analysis and statistical analysis of data.

Texts: Selected readings from

Standard Methods for Analysis of Water and Wastewater
OSHA Technical Manual
Industrial Hygiene Evaluation Methods
Statistical Methods for Environmental Pollution Monitoring
Select EPA Methods

Student Learning Outcomes: At the end of the course students will be able to:

Demonstrate the use of the scientific method in performing environmental assessments
Conduct methodologically correct exposure assessments by:
- Selecting appropriate sampling strategies
- Identifying and use standard methods
- Exercising quality assurance and quality control practices such as
  - Use of field and lab blanks
  - Spiked sample applications
  - Chain of custody documentation
  - Equipment calibration

Analyze data using descriptive and inferential statistics
- Emphasizing non-uniform distributions found in environmental assessments

Scope and plan projects within the goals of the assessment
Access peer-reviewed and governmental literature for assessment support
Locate and use warehoused data
Accomplish environmental sampling and analysis tasks for a variety of media and agents
Communicate results of environmental assessments in written and oral format.

Instructional Strategy: The instructional strategy for this course will be to present important topics in environmental assessment methodology within the context of an active learning experience. The theory will be presented in the context of an actual environmental assessment application that the students will undertake. These

applications will range from a single-day exercise to a multiple week comprehensive assessment project. Student learning will take place via some lecture delivery, but more so by guided inquiry through the different scale assessments that they will do.

Student Learning Activities:

Homework: Homework assignments will be used to ensure that the student adequately prepares for class sessions.

Assessment reports: Reports on the assessment applications for each topic will be submitted following standard formats. The formats used will range from standard scientific paper format to the format for a consulting report, depending on the assessment that is done. Rubrics will be distributed detailing the evaluation of the different types of reports.

Quizzes: Quizzes will be given every third week to assure that the theoretical content as well as the specific assessment applications of that content is being learned.

Comprehensive Field Project: Toward the end of the semester there will be a comprehensive field project that will integrate the methods skills developed throughout the semester. A grading rubric will be developed and distributed to provide guidance in the conduct of the project and preparation of the report. This project will be graded as being equivalent to four assessment reports.

Exams: There will be two examinations, one midterm and one final.

Assessment of Student Learning Outcomes

Student learning outcomes will primarily be evaluated in an integrated nature by the performance on the comprehensive project assignment. The grading rubric for this project will be designed to assess student performance on each of the learning outcomes listed above.

Student Performance Evaluation / Grading:

Homework: 15%
Assessment reports: 35%
Quizzes: 20%
Exams: 30%

Course Content: See attached schedule

		Methods I				
Week	Topic	Application				
1	Scientific method	Screening water concentrations (LaMotte kits)				
2	Hypothesis testing	Electrochemical water testing methods				
		(Ion selective probes: pH, nitrate, DO)				
3	Controlling variables	Assessing solid loads in water (total, suspended, dissolved)				
	Standard methods					
4	Controlling variables	Assessing bodies of water on campus				
	Experimental design	Collecting, comparing, reporting				
5	Descriptive statistics	Assessing bodies of water on campus				
	Distributions and percentiles	Collecting, comparing, reporting				
6	Descriptive statistics	Screening indoor gas and vapor concentrations (detector tubes)				
	Central tendency and variability					
7	Calibration theory	Known flow rates for integrative air sampling				
	Calibration curves	(pump use and calibration)				
8	Inferential statistics	Realtime air sampling (PID, Miran, NOx-chemiluminescence)				
	Comparing means	Using NOx ambient data				
9	Inferential statistics	Assessing airbone microorganisms (bioaerosol sampling)				
	Comparing means					
10	Inferential statistics	Thermal comfort (ASHRAE approach, ventilation measurements)				
		Total and size-selective				
11	QA/QC	Extractive air sampling by absorption				
	Sample handling	(impinger sampling, spec analysis)				
	Chain of custody					
12	QA/QC	Indoor particle assessment				
	Blanks: filed, lab, spiked	Total and size selective				
	Accuracy and precision					

13	Project planning	Environmental noise evaluations				
14	Comprehensive Project	Comprehensive indoor environment evaluation				
15	Comprehensive Project	Comprehensive indoor environment evaluation				
16	Exam					