

University of Maryland Baltimore County
Department of Civil and Environmental Engineering

Environmental Engineering Laboratory (3 credit hours)

Course Overview: In this course the student will be introduced to basic laboratory techniques needed to conduct environmental research. The course will be geared towards the student who chooses the thesis option. Topics to be discussed include laboratory safety, quality assurance/quality control, contaminant analysis, physical /chemical /biological processes and data analysis. For process and analytical portions of the course, the process experiment will be conducted during the first week and the contaminant analysis conducted the following week. Laboratory reports are required for each lab section, which will include sections on goals and objectives, description of the process, experimental design, analytical techniques, QA/QC, data analysis, discussion, and conclusions.

Prerequisites: Environmental Chemistry, Physicochemical Processes, Biological Processes (all CEE MS-level courses) or consent of instructor

Lecture Day/Time/Room: TBA

Instructor: Brian Reed

Office: 278 TRC Building

Phone: 410 455 8649, email: reedb@umbc.edu

Office Hours: TBA

Grading Policy: 6 laboratory reports: 90% (each report 15%)
 Safety Quiz: 10%

Required Text: AEEESP Laboratory Manual

Reference Texts:

Standard Methods for the Analysis of Water and Wastewater

Water Chemistry, Snoeyink and Jenkins, Wiley, 1980

Wastewater Engineering: treatment, Disposal, Reuse. Metcalf and Eddy, 3d Edition, McGraw Hill, 1991.

Water Quality and Treatment, AWWA, 4th Edition, McGraw Hill, 1990

Unit Operations and Processes in Environmental Engineering, Reynolds and Richard, 2nd

Supplemental readings (library): journal articles, handouts, etc.

Course Outline

Week	Topic
1	Laboratory safety
2	Basic laboratory skills (weighing reagents, making solutions, etc), Quality Assurance/Quality Control, Data Analysis Techniques
3	Basic instrumentation skills (pH and conductivity meters, UV-Vis spectroscopy)
4-5	<u>Process:</u> Adsorption of organic contaminants by solids <u>Analysis:</u> Gas chromatograph analyses
6-7	<u>Process:</u> Biodegradation of organics, reaction kinetics <u>Analysis:</u> Biochemical oxygen demand, chemical oxygen demand tests
8-9	<u>Process:</u> Media filtration and gravity separation <u>Analysis:</u> Solids analysis
10-11	<u>Process:</u> Removal of heavy metals by precipitation, ion exchange, adsorption <u>Analysis:</u> Atomic absorption/graphite furnace
12-13	<u>Process:</u> Disinfection by chlorine and UV oxidation and membrane processes <u>Analysis:</u> Most probable number
14-15	<u>Process:</u> Tracer study through porous media

<u>Analysis:</u> UV-Vis spectroscopy)
