Environmental Chemistry, with Lab

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| **C-ID Number** | CHEM 106 B |
| **Discipline** | Chemistry |
| **Date Approved** | March 30, 2011 |

## General Course Description

This course and its laboratory component present the fundamentals of chemistry as applied to selected contemporary environmental topics concerning the atmosphere, water, solids, and green chemistry.

## Minimum Units

4.0

## Any rationale or comments

## Advisories/Recommendations

Reading proficiency in English

## Course Content

Chemistry Fundamentals:

Atoms and Chemical Bonding
Chemical Equations and Reactions
Solutions
Organic Chemistry (Hydrocarbons, Functional Groups, Natural and Synthetic Polymers)
Scientific method:  Benefits and Limitations

 Environmental Topics:  Contemporary topics such as:

Atmosphere: (Description of the atmosphere ozone hole, smog, Chemical reaction cycles, Chemistry of nitrogen compounds, chemistry of oxygen compounds. Role of the Sun’s radiation)
Water: (pH, metal and non metals [mercury and arsenic], organic pollutants, radioactivity in water, eutrophication)
Solids: particle formation and the role of the particles in the atmosphere.

Green Chemistry: Solvents

## Laboratory Activities

The laboratory sequence will support the above topics including both qualitative and quantitative experiments, analysis of data and error propagation.
Experiments can be based on household materials and their transformations. Acids and Bases, Solvents, Polymers, Photochemistry

## Course Objectives

At the conclusion of this course, the student should be able to:

Apply scientific reasoning in contexts involving chemistry and the environment
Use chemical theories, principles, and models, in conjunction with the scientific method, to analyze environmental phenomena involving chemistry and society
Critique the benefits and limitations of applying the scientific method to problems in the analysis of environmental phenomena involving chemistry
Explore contemporary environmental topics independently
Ability to conduct chemical experiments and evaluate the results

## Prerequisites

Elementary algebra

## Corequisites

None

## Methods of Evaluation

ExaminationsHomeworkLab workPortfoliosProjectsWritten papers and/or reportsQuizzes

## Sample Textbooks

Environmental Chemistry, Collin Baird, W.H. Freeman
Environmental Chemistry, Manahan, CRC Press
Principles of Environmental Chemistry Girard, Jones and Bartlett Publishers
Materials from the ACS Green Chemistry Institute (available on the web) http://portal.acs.org/portal/acs/corg/content
http://greenchem.uoregon.edu/gems.html

## Notes