

Title: Integrating Humanities into Environmental Engineering Classrooms

Overview:

In this module, students will be exposed to the broader context of several major components within the area of environmental engineering by integrating humanities into the environmental engineering classroom. This module includes lecture content pertaining to the areas of (1) solid and hazardous waste management and (2) management of air pollution. This module will help provide students with a background of these subject areas by: introducing students to the history of waste management practices and regulations in the United States and exposing students to various major air pollution episodes throughout history and the implications air pollution has on human and environmental health. This module is best used prior to lecture content regarding the engineering principles and technologies associated with these areas of environmental engineering. Through various lecture content included in this module, students will be exposed to the cultural, ideological, political and historical context in which environmental problems occur.

This material was created as part of an upper-level introductory course in an undergraduate environmental engineering curriculum.

Goals:

1. *Students will become familiar* with the historical and social context that led to the development and regulation of techniques that environmental engineers practice today pertaining to the:
 - a. Management of solid and hazardous waste, and
 - b. Management of air pollution.
2. *Students will be able to identify* major laws and regulations in the U.S. associated with the management of solid and hazardous waste and air pollution.
3. *Students will foster* an increased understanding of the broader context of environmental engineering work.

User Guide:

This module includes lecture material pertaining to the topics of (1) solid and hazardous waste management and (2) management of air pollution. For the subject of solid and hazardous waste management, this module includes lecture materials that will introduce students to the history of waste management practices in the U.S., several major historical events that led to the passing of current waste management laws and regulations in the U.S. (e.g., the Resource Conservation and Recovery Act of 1976 [RCRA] and the Comprehensive Environmental Response, Compensative

and Liabilities Act of 1980 [CERCLA], also known as the “Superfund Act”), and how that laws created the framework for the proper management and disposal of solid and hazardous waste in the U.S.

For the subject of the management of air pollution, this module includes lecture materials that will engage students in discussions of the history of the development of air pollution laws and regulations in the U.S. by introducing them to various major air pollution episodes throughout history (e.g., the Clean Air Act of 1970 [CAA]) and the effects that air pollution has on the health of humans and the environment.

This module also includes guidelines and grading materials for a group project that requires students to conduct research outside the classroom into the history and current practices of solid and hazardous waste management and the management to air pollution in various developing and developed countries around the world, as well as require students to research various events of waste mismanagement and air pollution emission and their effects on human and environmental health. Project deliverables include addressing the social, political, economic, environmental and moral implications of the management strategies and regulations of the various countries.

Materials:

1. PowerPoint lecture material (~20-25 minutes) associated with an introduction to solid and hazardous waste management.
 - a. [**Introduction to Solid and Hazardous Waste Management**](#)
2. PowerPoint lecture material (~20-25 minutes) associated with an introduction to the management of air pollution.
 - a. [**Introduction to Air Pollution Management**](#)
3. Group project guidelines for oral presentations on management practices in various countries around the world and major events leading to environmental regulation.
 - a. [**Group Project Guidelines and Grading Rubric**](#)

Sample Implementation:

The materials included in this module can be implemented into an introduction to environmental engineering course at any level, or into any engineering or science course (e.g., environmental engineering, environmental science, geography, planning, etc.) that aims to discuss the historical, cultural and social context of the management of solid and hazardous waste and air pollution within the U.S. This material could also be included in any course (e.g., environmental law, environmental ethics, etc.) that aims to discuss environmental laws and regulation.