



Instructor's Manual Overview

Regional Air Quality in the Mid-Atlantic United States Course

By **K.G. Paterson, Ph.D., P.E.**
Michigan Technological University
Department of Civil and Environmental Engineering
Houghton, MI 49931

paterson@mtu.edu

A. Setting the stage:

This course is comprised of a series of eight stand-alone modules. Each module focuses on a different aspect of air quality in the Mid-Atlantic U.S. and requires approximately one-hour of class time. The materials are freely available for you to use. Responsible use warrants considerable preparation by you, the instructor. This document provides an overview of important instructor preparation prior to deciding to offer any of the eight modules.

Chickering (*AAHE Bulletin* 1987) identified seven principles for effective education. All seven are relevant for your efforts, but due to the brief time you will be interacting with the students (one hour versus one semester, for example) you will need to think of ways to facilitate each of the following principles:

1. *Encourage student-teacher contact.* A review of any of the modules shows that they are designed to be much more than lecture, thereby assisting this first principle.

Other simple ways are to greet the students as they come into the room, chat with some as the room gets settled, and so on.

2. *Encourage cooperation among students.* Each module has group activities. As adult learners are sometimes slow to abandon experiences they have had in most other classes, you may need to provide extra encouragement. Most of the group activities start with something simple. Additionally, it's always good to mention that you are looking for the group's answers, not any one individual's within the group.

3. *Encourage active learning.* The modules are designed with a series of sub-modules, built upon a learning cycle. There are frequent examples ("Application") and open-ended discussions ("Analysis") that will get the students participating in the learning.

4. *Give prompt feedback.* Due to the one-hour nature of the modules, any feedback from you must be nearly real-time. One simple way to work this is with the quizzes built into each module. Other ways include offering opinion of student discussion points. Even staying around the classroom until the last student has left is one way to address student questions and comments in a timely fashion. At your discretion, you could also give out your contact information to answer student inquiries following the course (do not do this if you have little interest in responding to such requests, though).

5. *Emphasize time on task.* Each module has much material to cover within a one-hour period. Begin the class on time, explain how long the course will take, the general features of the class, and what will be expected. Most of the activities within the module have suggested durations; following them serves to encourage participation in the activity and keeps the course moving along.

6. *Communicate high expectations.* Invariably you will get from the students exactly what you expect of them.

7. *Respect diverse talents and ways of learning.* The course materials were designed with this in mind. There are many ways to describe how people learn, but upon reviewing the modules, you will quickly see that there are materials and methods that approach learning from different perspectives. There is some reflective learning, some active learning, some visual, some verbal, and so on. In the end, know that each person in the room learns differently, and that includes you too. By utilizing only one teaching method (for example, lecturing) your class is likely to fall far short of memorable.

B. Student preparation:

You are encouraged to download, print out, and make copies of the course notes for each of the students in your course. These notes have space for students to write additional notes during the course. Having a copy during the class will allow the students to be more focused on what you, the instructor, adds to the class and also allows them to be more

engaged during the active learning portions of the course. For the student handouts, go the Modules section of the following web page:

<http://bigmac.cee.mtu.edu/marama/Modules/Modules.html>

C. Instructor preparation:

Depending on your educational background and experiences, consider doing the following to prepare for leading this class:

C.1. Learn about learning

You will be better prepared to offer a more effective class, if you understand how adults learn. There are issues regarding learning styles, attention levels, and retention of material. While it is great to offer courses like this, ultimately it is a waste of everybody's time if nothing is learned over the long term. A summary of some of these issues can be found at the following web page:

<http://bigmac.cee.mtu.edu/marama/Instruction%20Guide/Instruction%20Guide.html>

C.2. Learn about the subject matter

In an ideal world every class should be taught by a subject matter expert. In the real world, however, even experts do not know everything. Equally important, experts need to deliver the material at a level appropriate to the target students. Consider reviewing the additional learning documents noted near the end of each module in your preparation to deliver this class. Also, review the materials for any important terms you do not know. Some excellent online glossaries include the following for air quality terms:

http://www.epa.gov/oar/oaqps/peg_caa/pegcaa10.html
<http://www.baaqmd.gov/dst/glossary.htm>

and one specifically for acronyms:

<http://www.epa.gov/air/acronyms.html>

C.3. Review the instructor's slides

Each of the eight modules has a set of Powerpoint slides to accompany the class. The slides have been designed to be flexible and adaptable. As the instructor, feel free to re-arrange, embellish, or delete materials as fits your objectives, experiences, and interests. For the instructor's slides, go the Module section of the following web site (Powerpoint versions):

<http://bigmac.cee.mtu.edu/marama/Modules/Modules.html>

C.4 Understand the sub-module objectives

Each course module is constructed of a series of sub-modules based on modern learning theory. The sub-module typically focuses on a narrow aspect of the module topic. The module can be viewed as the collection of several discrete topics presented in a fashion

more appropriate for the range of learning styles among students in your class. Most sub-modules are constructed around a *motivation-theory-application-analysis* learning cycle. While it is good practice to have this cycle for each sub-module, it is acceptable to have a portion of the sub-modules that do not have all four components of the cycle. In general though, it is poor practice to have only the theory sections, as this will likely achieve the low-retention rates found in lecture-based learning environments.

C.5 Learn about your students

Find out who has enrolled for your class. If possible, collect some important background information during the registration process. What are their professional backgrounds? Why are they taking the class? Understanding the audience is critical for fine-tuning the message at the appropriate level, and the course objectives to the students' needs.

C.6 Practice

It works in every other endeavor in life. Consider practicing on colleagues or friends that are similar to your expected students.

C.7 Summary

A recent study of university students' perceptions of their instructors (Michigan Tech 2006) paints a clear picture of why certain professors are viewed as excellent instructors:

1. The instructor used class time effectively
2. The instructor was enthusiastic about teaching the subject matter
3. The instructor made connections between new materials and material previously covered (or known)
4. The instructor welcomed student questions in class

These lessons are relevant to your efforts as an educator. Students are most appreciative and responsive to instructors that are organized, engaged, aware, and open. Let this insight guide you in effectively spreading knowledge of air quality in the Mid-Atlantic United States.