COURSE DESCRIPTION

This is a "project" oriented course, that will enable the students to analyze the socio-economic structure and trends of Ohio's coal producing region, and to assess the regional economic impacts of the 1990 Clean Air Act Amendments (CAAA). Indeed, the 1990 CAAA requires Ohio electric utilities to drastically reduce their SO$_2$ emissions by the year 2000. Because these utilities have been the major consumers of Ohio's high-sulfur coal, the widespread compliance strategy involving shifting to out-of-state low-sulfur coals has impacted the economic and social structure of many of Ohio's 24 coal-producing counties. The public policy problem is then how to balance the cost minimization goal of the electric utility industry with the high social costs of unemployment and community disruption. Gathering and analyzing data pertaining to these issues is the basic goal of the studio, which will be structured into several individual/team subprojects involving the implementation of various economic analysis and quantitative methods, and the extensive use of the computer to analyze large-scale data bases.

COURSE METHOD

Information pertinent to the project is provided to the students through lectures and readings. All the materials included in the reference list are available in closed reserve at the Science and Engineering Library. Additional material will be provided as needed.

Students will be grouped into teams, and each team will be responsible for carrying out a specific subproject. However, the methodological approaches to be used will be discussed and decided by all students and the instructor in class. Large-scale data bases have been prepared by the instructor and are available on magnetic tapes that can be accessed on the IBM 3081 Mainframe. Information will also be provided regarding access to the Censuses of Population and Housing and County Business Patterns, CD-ROMs, and the WWW. Students are encouraged to use the SAS statistical package but other packages (e.g., spreadsheets) may also be considered, in consultation with the instructor. The instructor will provide an introduction to the SAS package and will be available throughout the course to help the students with their programming. Students interested in using linear programming will be able to use the GAMS package.

The following research themes are envisioned:

1) **Analysis of Ohio’s electric utilities**

   a) Statistical analysis of monthly fuel purchases by Ohio’s electric utilities, using data from the Federal Energy Regulatory Commission (FERC) Form 423 for the years 1993 through 1997, to assess trends in fuel (coal, oil, natural gas) amounts, costs, and qualities (sulfur content, ash content, Btu value). Models may be estimated with regression analysis to explain relationships between fuel market shares, costs, and qualities. These files can be downloaded from the EIA (Energy Information Administration) Web site.

   b) Statistical analysis of monthly power generation by Ohio's power plants, using data from the Energy Information Administration (EIA) Form 759 for the years 1992 through 1997, leading to forecasts of future power needs in Ohio. These files can be downloaded from the EIA Web site.
c) Analysis of the Clean Air Act Database, downloadable from the EIA Web site, to analyze the compliance strategies of the Ohio power plants.

d) Development of a linear programming model for an electric utility to minimize its fuel purchases and pollution emissions control costs, using Ohio data and the GAMS package.

2) Analysis of Ohio coal mining activities

Statistical analysis of coal production patterns at individual mines in Ohio, to relate output (tons of coal per year) with labor and other production inputs. Using data available from the Ohio Department of Natural Resources. Data files will be prepared, and models of coal mining production will be estimated.

3) Analysis of air quality and acidification

Analysis of NO\textsubscript{x} and SO\textsubscript{2} concentration data from the EPA AIRSData Web site, and acidity data (sulfates, nitrates, pH) data from the NADP (National Atmospheric Deposition Program). Assessment of spatial variations and temporal trends.

4) Analysis of the socio-economic structure of Ohio's coal region

This subproject will make use of data from the 1990 Census of Population and Housing to analyze the demographic characteristics of the population in the coal-producing counties (e.g., age structure, education, labor occupation, income), as well as the characteristics of the housing stock (size, age, value, equipment).

4) Analysis of employment impacts

Various employment impact assessment methodologies, such as the economic base model, the shift-share model, and the input-output model, will be considered. The data available include the County Business Patterns files for Ohio and the whole U.S., as well as the 1992 National Input-Output tables.

Each student team will have the responsibility to read thoroughly the reserve materials (an possibly other pieces) pertaining to its specific subproject, and make in-class presentations of this material for the benefit of all students. Discussions will then take place among all students with regard to choice of methodology and implementation of the approach.

**COURSE SCHEDULE**

**Week 1** Instructor's presentation of the studio: issues, data bases, general research framework, computer programming

**Weeks 2-5** Elaboration of research methodologies through readings and class discussions. Data gathering, and preliminary analyses

**Weeks 6-8** Data analyses--Model developments--Policy analyses

**Week 9** Presentation of results in class

**Week 10** Submission of team research reports
**GRADING**

Students will be graded as follows:

- Oral Presentation of research progress 25%
- Class discussions 25%
- Final reports 50%

**READINGS** (on closed reserve at the Science and Engineering Library)

1. **Coal - General**


2. **Coal - Ohio**


   1994 Report on Ohio Mineral Industries, Department of Natural Resources, State of Ohio, Columbus, Ohio, 1005.

3. **The 1990 CAAA**


4. **Energy and Coal Regional Models**


5. **Coal Mines Econometric Models**


6. **Economic Impact Analysis**

6.1 **General**


6.2 **Economic Base Models**


6.3 **Input-Output Models**


6.4 **Shift-Share Models**

