

PHIL 315/OCN 315 - SPRING 2008
The Role of Models in Environmental Sciences
MWF 1:30–2:20 p.m.
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This course provides an introduction to the philosophy of science for those with some background in the natural sciences. In particular we will focus on the nature of scientific reasoning and the role for models in scientific reasoning. After looking at the larger context of model use in science we will concentrate on issues arising in connection with the construction and use of computer models, particularly in the context of global environmental science and other environmental sciences. The issue of global warming and the role of science and scientists in that debate will be used as an example to give practical focus to philosophical questions about science, the sources of its authority, its theories, methods and models.

Course objective

By the end of the course students should know what kinds of questions to ask when confronted with predictions made on the basis of models, or when thinking about using a model. They should also know how to go about obtaining answers to those questions and have some appreciation of the differences between the use of models in a purely scientific context and their use in public policy arenas.

Required Text

Understanding Scientific Reasoning (fifth edition) Ronald N. Giere, John Bickel and Robert F. Maudlin.

Recommended Text

Computer Modelling in Atmospheric and Oceanic Sciences Peter Müller and Hans von Storch

Additional readings will be supplied in electronic format through the myuh web site for the course.

Class format

The skill of scientific reasoning is best acquired by practicing it. The instructors will present general ideas and principles, most of them taken from the required text, and will illustrate them by examples, most of them taken from the climate context. Students are then asked to provide their own examples and apply the general principles. Active participation in class room discussions is required.

Group project

Students will be formed into groups and each group will be asked to select and work on a different model or kind of model through the latter part of the semester. The class will be introduced to a check-list for assessing models, and groups will apply this list as a guide to assembling a full discussion of their model by the end of semester. Each individual in the group should take primary responsibility for writing up one part of the report. Individuals will be graded on their own contribution as well as receiving a part of the grade for the group report.

Tests

There will be a mid-term and a final.

Grading

Class room participation 40%; group report 20%; mid-term 20%; final 20%. Plus/minus grading will be used.

Student learning outcomes:

By the end of the class students should be able to:

- Ask the right kind of questions when confronted with predictions made on the basis of models, or when thinking about using a model.
- Know how to go about obtaining answers to those questions.
- Appreciate the differences between the use of models in a purely scientific context and their use in public policy arenas.