Overview:

As the global population grows and the world becomes more industrialized the human impact on the global environment also increases. This class will examine a set of global environmental problems including those which affect the global commons such as ozone layer depletion and climate change including the implications of energy technology choices, and those which are of widespread regional importance such as loss of biological diversity, deforestation and desertification, long-range transport of air pollutants, and issues of sustainable development. For each topic the course will first examine the scientific basis of the problems and will then examine current and possible future policy responses.

Course Format:

Course topics will usually be covered in modules with the first part of the module covering the key scientific concepts surrounding the environmental issue and the second describing the present and possible future policy responses. Class meetings will be divided, very roughly, into half lecture and half discussion. All students are expected to do the required weekly reading which will form the basis for classroom discussion. In addition, during the second week of each topic a student will be asked to read additional material and lead a short discussion of it. Most of the reading is in a course packet available for purchase and the rest is available over the internet with web addresses noted below in the syllabus. A substantial portion of the course grade will be based on class participation.

Grading:

Grades will be based on class participation, a presentation and a mid-term and final paper. The following percentages will be used:
Class participation: 35%
Paper in lieu of midterm: 20%
Presentation of final paper: 10%
Final paper: 35%

SCHEDULE OF CLASSES

Week 1: February 1, 2005. Course Overview and Introduction.

Drivers influencing global environmental problems – growth in population and consumption, increasing global energy consumption, habitat loss. Disparity in wealth and consumption between developed and developing countries.

Reading:


Week 2. February 8, 2005. Stratospheric Ozone Depletion – Science

Ozone in the stratosphere protects life on earth from excess ultra-violet (UV) radiation. It has been depleted at all latitudes except the tropics by the emission of anthropogenic (human produced) chlorofluorocarbons (CFCs) and related substances. Increases in UV radiation result in an increase in the incidence of skin cancer, eye cataracts, decrease in productivity of some ecosystems, and a decrease in air quality. A near global phase-out of the production of CFCs is expected to permit a partial recovery of the ozone layer later this century.

Reading:

An introduction to the science of stratospheric ozone depletion and reasons behind the global phase-out of chlorofluorocarbons (CFCs) has been compiled by the U.S. Environmental Protection Agency and is posted at: http://www.epa.gov/ozone/science/sc_fact.html

An international assessment evaluating the scientific understanding of ozone depletion is conducted every four years. The executive summary for the most recent report completed in 2002 is available at: http://www.unep.org/ozone/pdf/execsumm-sap2002.pdf
An excellent compilation by the 2002 international assessment committee of twenty questions and answers regarding the science of stratospheric ozone depletion is at:

http://www.al.noaa.gov/WWWHD/pubdocs/assessment02/Q&As.pdf
and is also included in your course packet.


The Montreal Protocol, an international treaty to protect stratospheric ozone, has resulted in a near global phase-out of CFCs and related substances. This treaty is considered one of the worlds global environmental success stories. We’ll explore what made it possible and the lessons that can be taken from it to address other global environmental problems.

**Reading:**


Human activities, primarily the burning of fossil fuels such as coal, oil and natural gas, and deforestation are increasing the concentrations of gases in our atmosphere which trap heat. We will examine the current understanding and evidence for climate change as well as its potential future impacts.

**Reading:**

The entire three part report on climate change written by the Intergovernmental Panel on Climate Change (IPCC) is available on the web at: http://www.ipcc.ch/ However, for class, please focus on: Climate Change 2001: The Scientific Basis, Technical Summary, Intergovernmental Panel on Climate Change (IPCC), Working Group I, at: http://www.grida.no/climate/ipcc_tar/wg1/010.htm. If you’d prefer to read a shorter summary for policymakers, you can instead read: http://www.grida.no/climate/ipcc_tar/wg1/005.htm


The Framework Convention on Climate Change (FCCC) was signed at the 1992 Earth Summit in Rio and put the issue of climate change on the international stage. The Kyoto Protocol, negotiated in December 1997, introduced the first commitments to reduce emissions of greenhouse gases by developed countries. The IPCC, set up in 1988 by UNEP and the World Meteorological Organization, and composed of scientists from around the world, reviews the state of scientific knowledge on climate change and issues comprehensive reports every 5-years. We will examine similarities and differences between the policy approach to climate change and stratospheric ozone depletion.

Reading:


Week 6. March 8, 2005. Linkages between energy choices, air pollution and climate change and health – science and policy

Environmental protection has traditionally addressed specific environmental issues in isolation. A better understanding of the linkages among different issues can help us avoid implementing policies that benefit one environmental issue at the expense of another and rather simultaneously improve a number of problems.


**First paper due: March 22, 2005 in class.**

**Spring Break**

**Week 7. March 22, 2005. Long range transport of air pollution – Science of acid rain, ozone and particulate air pollution**

Emissions of precursors to acid rain, ozone and particulate pollution all come from fossil fuel combustion and biomass burning and have been controlled largely due to their impacts on health. These pollutants can be transported long distances and effect regions outside the countries where they were emitted. We will examine differences between pollution levels in developed and developing countries.

**Reading:**


**Week 8. March 29, 2005. Policy responses to air pollution and acid rain – Command and control versus market based mechanisms, Long Range Trans-boundary Air Pollution treaty, etc.)**

**Readings:**


Description of the Long Range Transboundary Air Pollution Treaty (LRTAP)

Continuing and accelerating destruction of biodiversity threatens to impair the natural ecosystem infrastructure supporting human society and economic systems. Extinction is permanent. The root causes include habitat loss, deforestation, water degradation, urban expansion, introduction of non-native species, lack of enforcement of environmental regulations, etc. We will examine the natural distribution of biodiversity on earth and the extent of biodiversity loss.

Reading:
John Terborgh, Diversity and the Tropical Rain Forest, Chapter 1: The Biological Exuberance of the Tropics, pp. 1-29; Chapter 3: The Global Diversity Gradient, pp. 53-71.
   Paul Ehrlich, The Loss of Diversity: Causes and Consequences, pp. 21-27


Week 10. April 12, 2005. Loss of Biological Diversity – Policy responses

Various efforts are being made to protect biodiversity including the establishment of national parks, the passage of the U.S. Endangered Species Act and the international Convention on Biological Diversity following the 1992 ‘Earth Summit’ in Rio de Janeiro. We will examine how much these initiatives are helping stem the rapid loss of biodiversity and will explore what else might help.

Guest lecture, Monday April 14, 2003, Prof. David Wilcove

Reading:

John Terborgh, Diversity and the Tropical Rain Forest, Chapter 8: Conserving Biodiversity pp.185-211; Chapter 9: Managing Tropical Forests, pp. 213-232.
Week 11. April 19, 2005 Sustainable Development

What can be done to encourage the use of natural resources in a sustainable fashion?

Reading:


Read Goals and targets, 10 key recommendations, Why the goals are important, Country processes, International actions, Costs and benefits.


Week 12 April 26, 2005 (and session during reading period if necessary) Oral reports by students of term projects.