

EESA11H3S – ENVIRONMENTAL POLLUTION

This course provides students an introduction to issues related to environmental pollution, with emphasis on causes, pathways, risks, mitigation and prevention. By the end of this course, students will have a good understanding of the dynamic nature of human-environment relationships, and the multidimensional characteristics of environmental pollution, through the use of Canadian and international examples. Special emphasis will be placed on issues related to eutrophication phenomena, exotic species invasions, water quality/fisheries management and the role of modeling as a tool for guiding the environmental policy/decision making process.

Instructor: George Arhonditsis **Office:** SW410A **Tel:** (416) 208-4858

Lectures: Thursday 19:00-21:00 h **Room:** SY 110
Office hours: Thursday 15:00-18:00 h SW410A
Friday 10:00-14:00 h SW410A

I will NOT respond to e-mails!!!! Please take advantage of the 3 hours every Thursday and 4 hours every Friday!!!!

A weekly handout will be given and the lectures will be posted on the web.

Course Grade:

Final Examination	45 %
Mid-Term Test	35 %
One (1) Written Assignment	20 %

Prerequisites: No prior knowledge of environmental science is required.

N.B. Students with diverse learning styles and needs are welcome in this course. In particular, if you have a disability/health consideration that may require accommodations, please feel free to approach me and/or the AccessAbility Services Office as soon as possible. The UTSC AccessAbility Services staff (located in S302) are available by appointment to assess specific needs, provide referrals and arrange appropriate accommodations (416) 287-7560 or ability@utsc.utoronto.ca. The sooner you let us know your needs the quicker we can assist you in achieving your learning goals in this course.

TENTATIVE COURSE OUTLINE

Jan 8 **ORIENTATION**
Course Outline; Lecture Schedule

UNDERSTANDING POLLUTION

Humans are massively changing the Earth

Why does pollution happen?

Global pollution and global environmental health

Root causes

Our actions have consequences

- Jan 15** **GLOBAL CLIMATE CHANGE (PART I)**
A warming Earth
Greenhouse gases and their sources
- Jan 22** **GLOBAL CLIMATE CHANGE (PART II)**
Assessing global climate change
Industry and government action to reduce emissions
- Jan 29** **AIR POLLUTION (PART I)**
Criteria air pollutants
Hazardous air pollutants
- Feb 5** **AIR POLLUTION (PART II)**
Pollution from space
Air pollution in less-developed countries
- Feb 12** **MIDTERM EXAM**
- Feb 19** **READING WEEK: NO CLASSES**
- Feb 26** **STRATOSPHERIC-OZONE DEPLETION**
The stratosphere and ozone
Antarctica
Consequences of ozone depletion
Ozone-depleting pollutants
Reducing atmospheric levels of ozone-depleting substances-The future
- Mar 5** **WATER POLLUTION-EUTROPHICATION**
Basic Concepts of Eutrophication
Food Web Structure
Natural and Cultural Processes of Eutrophication
Relationships among Nutrients, Water Clarity, and Phytoplankton
Response Models for Trophic State – Simple Eutrophication Models
Other Pollutants and Mitigation of Water Pollution
- Mar 12** **WATER POLLUTION-EUTROPHICATION**
Internationally-known examples of eutrophication
Gulf of Mexico
Chesapeake Bay and Neuse River Estuary
Baltic Sea
Black Sea

Lake Washington
Lake Nyos

- Mar 19** **GREAT LAKES ECOLOGY-FOOD WEB DYNAMICS**
Great Lakes Water Quality Agreement
Eutrophication problems in:
(i) Lake Erie; (ii) Lake Superior; (iii) Lake Michigan, (iv) Lake Huron;
(v) Lake Ontario
Invasive Species
Biotic Resistance Model-Invasional Meltdown Model
Examples
- Mar 26** **AN INCONVENIENT TRUTH & GLOBAL WARMING (THE SIGNS AND THE SCIENCE)**
- Apr 2** **MATHEMATICAL MODELS & ENVIRONMENTAL MANAGEMENT**
Models as a Management Tool
Models as a Scientific Tool
Modelling Elements
The Modelling Procedure
Selection of Model Type
Selection of Model Complexity and Structure
Evaluation of the Current State of Mechanistic Aquatic Biogeochemical Modeling

READINGS

The required textbook for this course is:

Hill, Marquita K. (2004). *Understanding Environmental Pollution (2nd Ed.)*. New York: Cambridge University Press.

Mann, E.M. & L.R. Kump (2008). *Dire predictions: Understanding Global Warming*. Pearson Education Canada

Specific readings will also be given out for some lectures.

UTSC Intranet

Many announcements (such as the weekly readings or any changes to the lecture schedule) will be made on the course intranet page. To access this, you need to sign up for a UTSC account. The page is located at <https://intranet.uts.utoronto.ca>. Please check this site at least once per week, as it will be updated frequently.