

**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:** AA 112  
**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:**

|                          |             |
|--------------------------|-------------|
| <b>Final Examination</b> | <b>45 %</b> |
| <b>Mid-Term Test</b>     | <b>35 %</b> |
| <b>Two (2) Quizzes</b>   | <b>20 %</b> |

**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](mailto: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 7**      **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 14**      **GLOBAL CLIMATE CHANGE (PART I)**  
A warming Earth  
Greenhouse gases and their sources
- Jan 21**      **GLOBAL CLIMATE CHANGE (PART II)**  
Assessing global climate change  
Industry and government action to reduce emissions
- Jan 28**      **AIR POLLUTION (PART I)**  
Criteria air pollutants  
Hazardous air pollutants
- Feb 4**        **AIR POLLUTION (PART II)**  
Pollution from space  
Air pollution in less-developed countries
- Feb 11**      **MIDTERM EXAM**
- Feb 18**      **READING WEEK: NO CLASSES**
- Feb 25**      **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 4**        **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 11**      **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 18**      **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 25**      **AN INCONVENIENT TRUTH & GLOBAL WARMING (THE SIGNS AND THE SCIENCE)**
- Apr 1**        **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 (2<sup>nd</sup> 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.utsc.utoronto.ca>. Please check this site at least once per week, as it will be updated frequently.