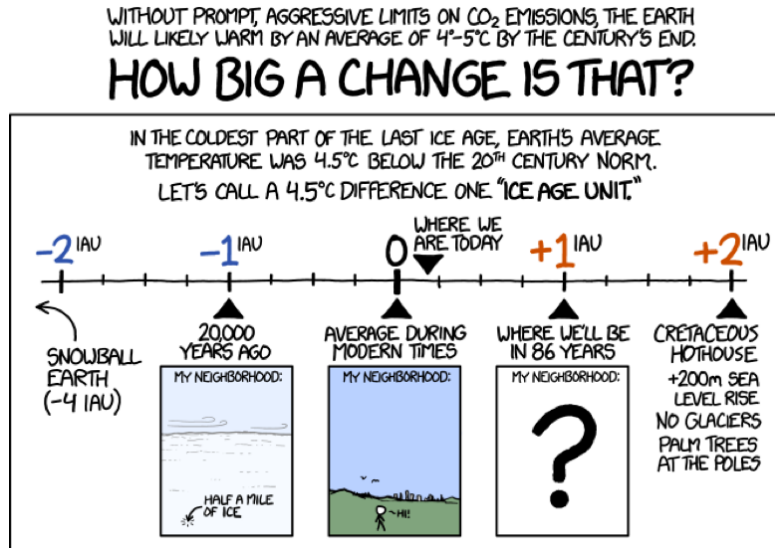


ENVIRONMENTAL SCIENCE - ENVI 133
Spring 2019
1:10-2:10 MWF - OLRI 301/Lab 8:00-11:10 R - OLRI 273
This syllabus is subject to change!

INSTRUCTORS –
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<https://www.climateproject.org/sites/climateproject.org/files/blog/howbig.png>

Course Description – From the catalog

This course provides the basic scientific knowledge and understanding of how our world works from an environmental perspective. It provides a framework of knowledge into which additional information can be readily integrated over a lifetime of continued learning. Topics covered include, but are not limited to, general issues on the environment, basic principles of ecology and ecosystem function, human population growth, production and distribution of food, water resources and management, water pollution, hazardous chemicals, air pollution and climate change, biodiversity and its conservation, energy resources, and sustainability. There are no prerequisites.

Course Organization

Since Environmental Science is an extremely broad area and can touch on a wide array of topics, from protecting endangered species, to understanding weather patterns, to examining factors that influence human health, we will focus on a few major topics rather than trying to “cover” everything that could be considered part of Environmental Science. The 5 topics we will focus on are:

1. Population Growth
2. Climate Change
3. Water Availability and Water Pollution
4. Energy.
5. Biodiversity

Course Textbooks

1. Raven, Peter H., David M. Hassenzahl and Linda R. Berg. 2012. Environment, 8th Edition. John Wiley and Sons. Inc.
2. Spencer R. Weart. 2008. The Discovery of Global Warming: Revised and expanded edition. Harvard University Press. Cambridge, MA.

ATTENDANCE

In my experience students who come to class do better than those that don't – so come to class. You'll find that the vast majority of the material on the exams will come from the topics presented and discussed in class. This is another good reason to attend.

EXAMS

There are 3 tests in the class. The dates are set and there will be no exceptions to when the exams will be given. If you miss an exam you must provide documentation for the reason for your absence. Acceptable documentation would include such items as a note from your physician, etc. Without such documentation you will be assigned a grade of ZERO for the exam. Makeup tests will be different from the original test given

WRITTEN ASSIGNMENTS

1. You will be assigned a number of short essays (1-2 pages, double-spaced 12 pt font) throughout the semester, based on the assigned readings. These do not require any additional outside research. These essays should be your thoughtful *reflection and evaluation/analysis* of the assigned material. There are due at 8:30 am of the due date. **You must also include one or two questions that you'd like to discuss during class.** If you wish to use ideas or materials from other sources, make sure that you use proper citation format in order to avoid plagiarism.
2. I also expect you to attend at least TWO EnviroThursday talks and to write a 1-2 page summary of each. If you cannot make these talks at noon on Thursdays you can substitute going to other environmental talks/events on or off campus. At least one of these summaries must be submitted before spring break (March 13).
3. There will be a 5-7 page paper summarizing and commenting on the Weart book, *The Discovery of Global Warming*
4. Finally, there will be group presentations, a poster and a paper (7-10 pages) on an issue related to sustainability. Your participation in this project will be a significant component of the course grade. More information is given below.

LAB

There is a required lab with this course. You are expected to be in lab each week. If is impossible for labs to be made up, thus your attendance is essential.

CLASS PROJECT

Students will work together in groups throughout the semester on a class project. The success of these group projects requires that all participants on each team are well-prepared and equal contributors to the learning process. The class will become the MAC-ENVI consulting firm. The firm will break into groups and each group will develop a “report” to legislators and their staff to help them understand the science, economics and social justice aspects of particular environmental legislation that they will be considering in the upcoming legislative session. Your group could provide information to either the US Congress dealing with national policies or the MN Legislature dealing with state policies. More information can be found on the Moodle site.

ACADEMIC INTEGRITY

I assume all students will adhere to the College’s standards of academic integrity. You can access the Dean of Academic Programs website to learn more about academic integrity -

<https://www.macalester.edu/academicprograms/academicpolicies/academicintegrity/>.

Procedures to be followed for alleged breaches of academic integrity can also be found at the website above. One of the most common breaches of academic integrity comes through **Plagiarism**. Information about ways to avoid plagiarism can be found at <https://www.macalester.edu/max/writing/betterparaphrasing/>.

ACADEMIC SUPPORT

The Macalester Academic Excellence (MAX) Center (<http://www.macalester.edu/max>) provides academic support (help with writing, study habits, time management, etc.) to all students and also provides services to accommodate students with documented disabilities. The MAX Center is located on the first floor of Kagin Commons.

DISABILITIES

I am committed to providing assistance to help you be successful in this course. Accommodations are available for students with documented disabilities. Contact information about how to document disabilities can be found at <https://www.macalester.edu/max/disability/>. It is important to meet early in the semester to ensure your accommodations are approved to ensure you begin the semester successfully.

GRADING

The number of points you accumulate throughout the semester will determine your final grade for this course. You will not be permitted to submit extra work in an attempt to raise your grade.

Exams (3 @ 100 points)	300
Portfolio of written assignments	
Summaries of assigned readings (10 pts each)	90
Summaries of 2 EnviroThursday talks(5 pts each)	10
5-7 page paper on Weart Reading	25
Group Projects:	
MAC-ENVI consulting project – paper	100
- presentation	50
Lab Grade	140
Class Participation	5
TOTAL POINTS	720

Preliminary Schedule

Exam Dates are close to final. Topics on other dates may change. Updates will be put on Moodle. Highlighted Date – meet in OLRI 101

Day	Date	Lecture Topic	Reading Assignment	Assignment Due	Important Dates	Lab Topic
R	24	NO LAB				NO LAB
F	JAN 25	Intro to Class				
M	JAN 28	What are the "big" environmental issues? What is Environmental Science? - What is science?	Chapter 1 pp.1-6, 12-18	Summary of Ozawa article		Population Demography
W	JAN 30	Population Issues – Screening of “World in the Balance: The Population Paradox”	Chapter 9			
F	FEB 1	Population Issues – Intro to Population Growth	Chapter 8; <i>Overshoot</i> - Chp. 1 Limits to Growth- The 30-yr update			
M	FEB 4	Population Issues - Human Health and Risk Analysis	Chapter 7; Jacobs article. Precautionary Principle	Summary of Jacobs Article		Population Growth
W	FEB 6	Population Issues - Urbanization/ Land use	Chapters 9, 18			

Day	Date	Lecture Topic	Reading Assignment	Assignment Due	Important Dates	Lab Topic
F	FEB 8	Urbanization/ Land use (continued)	Chapter 14 – Lal 2015. - Soil Erosion	Summary of Lal Article	Last Day to Register or Validate and Drop/Add	
M	FEB 11	MAC-ENVI Consulting Planning Day				Island Bio- geography – Hypothesis testing T201
W	FEB 13	Tragedy of the Commons	Chapter 1 p. 7- 10. Hardin- Tragedy of the Commons	Summary of Hardin Article		
F	FEB 15	Environmental Economics	Chapter 2			
M	FEB 18	Sustainability	Chapter 1 – pp.6-12 Chapter 24	Ecological Footprint Calculation due <i>Sunday</i> – <i>FEB 17</i>- Summary of Dietz Article		MAC-ENVI Consulting Workday
W	FEB 20	Climate Change - Introduction to Atmosphere, Weather, ocean circulation	Chapter 4 (pp.75-80)			
F	FEB 22	Climate Change	Chapter 20 - IPCC 5th Assessment - Working group I - The Physical Science Basis			

Day	Date	Lecture Topic	Reading Assignment	Assignment Due	Important Dates	Lab Topic
M	FEB 25	Climate Change - Finish Topics	IPCC 5 th Assessment - group II - and group III - Mitigation of Climate Change			Tour of St. Paul District Energy
W	FEB 27	Climate Change - Finish Topics	IPCC 5 th Assessment – Synthesis Report			
F	MAR 1	Climate Change - Finish Topics				
M	MAR 4	EXAM #1				Climate Lab – current climate
W	MAR 6	Climate Change - Finish Topics Water - Hydrologic cycle and other biogeochemical cycles related to water	Chapter 4 (pp59-68)			
F	MAR 8	Water - Aquatic Habitats	Chapter 6 (pp124-137)			
M	MAR 11	Water – Pollutions and Availability (freshwater)	Chapter 21; Chapter 12 pp. 243-244, Chapter 13; Hanjra & Qureshi article			STELLA modeling of Climate Change
W	MAR 13	Freshwater Pollution and Marine Issues	Chapter 13; Chapter 21	Hanjra and Qureshi article		
F	MAR 15	Water - Aquatic Habitats	Chapter 6 (pp129-142)			

Day	Date	Lecture Topic	Reading Assignment	Assignment Due	Important Dates	Lab Topic
M	MAR 18	SPRING BREAK				SPRING BREAK
W	MAR 20	SPRING BREAK				
F	MAR 22	SPRING BREAK				
M	MAR 25	Biodiversity - Intro to Ecosystems	Chapter 5		First Day to Designate Grading Option	Sewage Treatment Plant Tour
W	MAR 27	Biodiversity - Intro to Ecosystems (cont.)	Chapter 5	Outline of MAC-ENVI Consulting Project Due		
F	MAR 29	Biodiversity - Intro to Ecosystems (cont.)	Chapter 5, 3		Weart paper due	
M	APR 1	BioSim Top-Down Predator Control				MAC-ENVI Consulting Workday
W	APR 3	MAC-ENVI Consulting Workday – upload outline by 5 pm				
F	APR 5	Biodiversity - Major Ecosystems of the World; Intro to Ecosystems, Invasive Species	Chapter 6 (pp. 113-124- water was earlier); Chapter 17 – pp. 333-334;		Last Day to Withdraw; Last Day to Designate Grading Option	
M	APR 8	Biodiversity - Valuing Biodiversity	Marris Article Chapter 16 – pp. 323-331.	Summary of Marris Article		Target Field Sustainability Tour

Day	Date	Lecture Topic	Reading Assignment	Assignment Due	Important Dates	Lab Topic
W	APR 10	EXAM #2				
F	APR 12	Conservation and Management	Chapter 17 – pp. 331-344	Summary of Dodds Article		
M	APR 15	Hornbach gone				Wind Energy
W	APR 17	Hornbach gone				
F	APR 19	Energy - Intro, energy use, fossil fuels	Chapters 10, 11			
M	APR 22	EARTH DAY Energy - Nuclear, Wind, Solar	Chapters 12			Tour of Frogtown Farm
W	APR 24	Energy – Wind, Solar Cont.	Chapters 12			
F	APR 26	MAC-ENVI Consulting Work Day		Poster for April 23 Presentations Due		
M	APR 29	Energy - Biofuels	Mafakheri, and Nasiri, 2014	Summary of Mafakheri, and Nasiri Paper Poster for April 25 Presentations Due		Ordway Biodiversity Lab
W	MAY 1	MAC-ENVI Consulting Presentation				

Day	Date	Lecture Topic	Reading Assignment	Assignment Due	Important Dates	Lab Topic
F	MAY 3	MAC-ENVI Consulting Presentation				
M	MAY 6	EXAM #3				No lab
S	MAY 11	Project Report Due				

Papers

- Cusack, D.F., J. Axsen, R. Shwom, L. Hartzell-Nichols, S. White, and KRM Mackey. 2014. An interdisciplinary assessment of climate engineering strategies. *Frontiers in Ecology and the Environment*. 12: 280-287.
- Dietz, T., E. A. Rosa and R. York. 2012. Environmentally efficient well-being: Is there a Kuznets curve? *Applied Geography* 32: 21-28.
- Dodds, W.K., K. C. Wilson, R. L. Rehomeier, G. L. Knight, S. Wiggam., J. A. Falke E, H. J. Dalglish, and K. N. Bertrand. 2008. Comparing Ecosystem Goods and Services Provided by Restored and Native Lands. *BioScience* 58: 837-845.
- Hanjra, M.A. and M. E. Qureshi. 2010. Global water crisis and future food security in an era of climate change. *Food Policy* 35: 365–377.
- Hardin. G. 1968. The Tragedy of the Commons. *Science* 162: 1243-1248.
- IPCC, 2013: Summary for Policymakers. In: *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.
- IPCC, 2014: Summary for policymakers. In: *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Field, C.B., V.R. Barros, D.J. Dokken, K.J. Mach, M.D. Mastrandrea, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L. White (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 1-32.
- IPCC, 2014: Summary for Policymakers. In: *Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Edenhofer, O., R. Pichs-Madruga, Y. Sokona, E. Farahani, S. Kadner, K. Seyboth, A. Adler, I. Baum, S. Brunner, P. Eickemeier, B. Kriemann, J. Savolainen, S. Schloßner, C. von Stechow, T. Zwickel and J.C. Minx (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.
- IPCC. 2014. *Climate change 2014 Synthesis Report Summary for Policymakers*.

- Jacobs, J.R. 2014. The precautionary principle as a provisional instrument in environmental policy: The Montreal Protocol case study. *Environmental Science and Policy* 37: 161-171
- Lal, R. 2015. Restoring Soil Quality to Mitigate Soil Degradation. *Sustainability* 7: 5875-5895.
- Mafakheri, F. and F. Nasiri. 2014. Modeling of biomass-to-energy supply chain operations: Applications, challenges and research directions. *Energy Policy* 67: 116-126.
- Marris, E. 2009. Ragamuffin earth. *Nature* 460:450-453.
- Meadows, D. J. Randers and D. Meadows. 2004. *Limits to Growth: The 30-year update*. Chapter 1. Overshoot pp 1-16. Chelsea Green Publishing Co.: White River Junction, VT.
- Ozawa, C.P. 1996. Science in environmental conflicts. *Sociological Perspectives* 39:219-230.