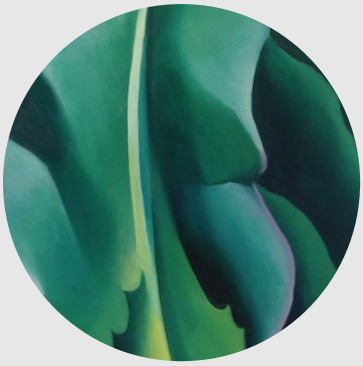

Environmental Policy and Natural Resource Management

PPOL 5210

Instructor Info

Prof. Magdalena Klemun

Office Hrs: Upon request

Room 4616H

https://ppol.ust.hk/ppl/faculty

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Course Info

Prereq: None

Thurs

4.30-7.20pm

Room 4502

TA Info

Xinying Tan

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Overview

This class explores two questions: Why and how do governments intervene in markets to protect the environment and ensure the continued availability of natural resources? What is governments' track record in improving the environmental performance of our economies? We begin by studying the context in which 21st century environmental policy decisions are made, including climate change, ecosystem degradation, environmental inequity, natural resource scarcity, and successes as well as gaps in technology innovation that affect our ability to address environmental challenges. We examine the role of data, models, and uncertainties in environmental policy design and evaluation, and discuss linkages between environmental, energy, and technology policy. Key concepts include: properties of environmental and socio-economic systems that relate to environmental policy design; externalities and other market failures; policy co-benefits; pollution charges, cap-and-trade, technology-push, and market-pull instruments. The primary focus of the course is international, with some more in-depth discussion of policies in China and the U.S.

Learning Objectives

By the end of this course, students will be able to:

- Explain the motivations for environmental policy making and its key objectives
- Distinguish socio-economic, political, technological, and managerial dimensions of current environmental debates
- Identify strengths and weaknesses of methods used in environmental policy assessment
- Apply basic concepts and frameworks to evaluate the suitability of policy instruments to address environmental problems

Grading Scheme

15%	Class participation
15%	Quizzes
30%	Assignments
40%	Final Project

Assignments

- READING REFLECTIONS: Due on Canvas at 3pm on Sept 22/29, Oct 20, and Nov 3. 800 words in length (+/- 50) with two parts of equal length. Part A summarizes key insights from ALL BUT ONE of the assigned readings for the class held on the day before the deadline (e.g., for Sept 22, the Sept 21 reading list applies). Part B discusses one aspect of ONE SINGLE reading of choice in more depth, e.g. a policy-related argument you agree/disagree with, or a research result you find interesting.

- STUDENT MIDTERM PRESENTATIONS will focus on linking theory/methods to specific cases and will be held on Oct 12 (Details to be announced on Canvas).

- THE FINAL PROJECT PLAN is due on Oct 27 (Details on Canvas).

Final project

The project is an opportunity for students to deepen their environmental policy knowledge through research conducted in groups. All projects will involve literature review, data collection, data analysis, and data visualization, but the emphasis can be placed in different ways depending on students' interest/background. There will be a list of suggested topics; groups are welcome to propose alternative topics. Project presentations will be held on Nov 23 and Nov 30. A detailed project description will be posted on Canvas and the timeline and grading criteria will be discussed in class.

COVID-19

The University has returned to pre-pandemic normalcy in full. Members who are tested COVID positive are no longer required to report to the University. They should follow the Government's health advice: those with symptoms (e.g., fever, cough, shortness of breath) should stay at home for rest and seek medical attention as soon as possible. For latest announcements and information on COVID-19 in Hong Kong, please refer to the Government COVID-19 website (https://www.coronavirus.gov.hk).

Make-up and Late Homework Policy

Make-up quizzes or assignments will only be allowed for students who have a substantiated excuse approved by the instructor before the due date. Quiz dates and assignment due dates have been included in the Class Schedule (in this syllabus) to help students plan ahead. Sometimes things do not go as planned, however, and students are therefore allowed to use three late days over the course of the semester, either all at once (turn in an assignment three days after the due date) or spread over different assignments. Please inform the TA when you are planning to use a late day.

Diversity and Inclusivity Statement

All members of this class are expected to contribute to a respectful, welcoming and inclusive environment. Diversity, equity, justice, and inclusion are important values at HKUST and in this class. Students are encouraged to continually learn from each others' diverse backgrounds and viewpoints.

Accommodations for Students with Disabilities

I am committed to ensure that students with disabilities can fully participate in this course. Please email me as soon as possible to set up a time to discuss your needs.

Academic Integrity

Academic integrity and honesty are critical values, at HKUST in general and in this class. Students are expected to be familiar with HKUST's Academic Honor Code. More information can be found here: http://ugadmin.ust.hk/integrity/student-1.html. Violations of the Code are serious and will be handled in a manner that represents the extent of the Code and that befits the seriousness of its violation.

Class Schedule

MODULE 1: Introduction to Environmental Policy and Key Challenges

Sept 7	INTRODUCTION	
	Introduction to environmental policy and natural resource management	Harris, J. and Roach, B., Chapter 1: Changing Perspectives on the Environment. *Environmental and Natural Resource Economics: A Contemporary Approach, Fourth Edition, Routledge* Gillingham, K. and Sweeney, J., 2012. Barriers to implementing low-carbon technologies. *Climate Change Economics*, 3(04), p.1250019.
Sept 14	CLIMATE CHANGE	
	Part I: Geophysical basics, scale, uncertainty	IPCC, 2021: Summary for Policymakers. In: Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Masson-Delmotte, V., P. Zhai, A. Pirani, S. L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M. I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T. K. Maycock, T. Waterfield, O. Yelekçi, R. Yu and B. Zhou (eds.)]. Cambridge University Press. In Press.
	Part II: Insights from models	McCollum, D.L., Zhou, W., Bertram, C., De Boer, H.S., Bosetti, V., Busch, S., Després, J., Drouet, L., Emmerling, J., Fay, M. and Fricko, O., 2018. Energy investment needs for fulfilling the Paris Agreement and achieving the Sustainable Development Goals. *Nature Energy*, 3(7), pp.589-599. Donegan, M., 2021. What if it's too late to save our planet without geoengineering? The Guardian Opinion. https://www.theguardian.com/commentisfree/2021/aug/26/planet-earth-climate-crisis-geoengineering
Sept 21	SUSTAINABILITY	
	Part I: Environmental degradation and planetary boundaries	Steffen, W., Richardson, K., Rockstrom, J., Cornell, S.E., Fetzer, I., Bennett, E.M., Biggs, R., Carpenter, S.R., De Vries, W., De Wit, C.A. and Folke, C., 2015. Planetary boundaries: Guiding human development on a changing planet. *Science*, 347(6223).
	Part II: Resource poverty and inequity issues	Luderer, G., Pehl, M., Arvesen, A., Gibon, T., Bodirsky, B.L., de Boer, H.S., Fricko, O., Hejazi, M., Humpenöder, F., Iyer, G. and Mima, S., 2019. Environmental co-benefits and adverse side-effects of alternative power sector decarbonization strategies. *Nature communications*, 10(1), pp.1-13. Energy Primer, Chapter 7 (Energy impact on the Human and Natural Environment, pp. 53-65) Grubler A, Nakicenovic N, Pachauri S, Rogner H-H, Smith KR, et al., 2014: Energy Primer. International Institute for Applied Systems Analysis, Laxenburg, Austria, pp. 1-118.
Sept 28	SCARCITY, NATURAL RESOURCE MANAGEMENT, INNOVATION	

	Part I: The global competition for natural resources	Krautkraemer, J.A., 2005. Economics of natural resource scarcity: The state of the debate (No. 1318-2016-103362).
	Principles of natural resource management	Felter, C., 2021. Water Stress - A Global Problem That's Getting Worse. *Council on Foreign Relations*
	Part II: Barriers to environmental policy making and technology innovation needs	Bretschger, L. and Pittel, K., 2020. Twenty key challenges in environmental and resource economics. *Environmental and Resource Economics*, 77(4), READ ONLY pp.730-743. Gallagher, K.S., Grubler, A., Kuhl, L., Nemet, G. and Wilson, C., 2012. The energy technology innovation system. *Annual review of environment and resources*, 37, pp. 137-162.

MODULE 2: Theory, Methods, Models (Part I)

Oct 5	INTRO TO ENVIRONMENTAL POLICY ANALYSIS	
QUIZ 1	Part I: Concepts in policy analysis	MacRae, D., 1979. Concepts and methods of policy analysis. Society, 16(6), pp. 17-23
	Part II: Environmental and energy data - uncertainties, visualization	Koomey, J.G., Calwell, C., Laitner, S., Thornton, J., Brown, R.E., Eto, J.H., Webber, C. and Cullicott, C., 2002. Sorry, wrong number: The use and misuse of numerical facts in analysis and media reporting of energy issues. *Annual review of energy and the environment*, 27(1), pp.119-158. VIDEO: Minutes 1-35 of a lecture by Edward Tufte: https://www.youtube.com/watch?v=rHUDJ8RyseQ
Oct 12	EXTERNALITIES AND RESOURCE ALLOCATION	
	Part I: Externalities and Pigouvian taxes	Harris, J. and Roach, B., Chapter 3: The Theory of Environmental Externalities. *Environmental and Natural Resource Economics: A Contemporary Approach, Fourth Edition, Routledge* Jaffe, A.B., Newell, R.G. and Stavins, R.N., 2005. A tale of two market failures: Technology and environmental policy. *Ecological economics*, 54(2-3), pp.164-174.
	Part II: Common property and resource allocation	Harris, J. and Roach, B., Chapter 4: Common Property Resources and Public Goods. *Environmental and Natural Resource Economics: A Contemporary Approach, Fourth Edition, Routledge* Harris, J. and Roach, B., Chapter 5: Resource Allocation Orver Time. *Environmental and Natural Resource Economics: A Contemporary Approach, Fourth Edition, Routledge* Ostrom, E., Burger, J., Field, C.B., Norgaard, R.B. and Policansky, D., 1999. Revisiting the commons: local lessons, global challenges. *Science*, 284(5412), pp.278-282.
Oct 19	COST BENEFIT ANALYSIS	

	Part I: Environmental valuation	Harris, J. and Roach, B., Chapter 6: Valuing the Environment. *Environmental and Natural Resource Economics: A Contemporary Approach, Fourth Edition, Routledge* Kling, C.L., Phaneuf, D.J. and Zhao, J., 2012. From Exxon to BP: Has some number become better than no number?. *Journal of Economic Perspectives*, 26(4), pp.3-26.
	Part II: Cost-benefit analysis	Harris, J. and Roach, B., Chapter 7: Cost-Benefit Analysis. *Environmental and Natural Resource Economics: A Contemporary Approach, Fourth Edition, Routledge* Wegner, G. and Pascual, U., 2011. Cost-benefit analysis in the context of ecosystem services for human well-being: A multidisciplinary critique. *Global Environmental Change*, 21(2), pp.492-504.

MODULE 3: Policy Cases

Oct 26	CASE 1: CHINA'S FIGHT AGAINST AIR POLLUTION	Zhang, Q., Zheng, Y., Tong, D., Shao, M., Wang, S., Zhang, Y., Xu, X., Wang, J., He, H., Liu, W. and Ding, Y., 2019. Drivers of improved PM2. 5 air quality in China from 2013 to 2017. Proceedings of the National Academy of Sciences, 116(49), pp.24463-24469. Fang, D., Chen, B., Hubacek, K., Ni, R., Chen, L., Feng, K. and Lin, J., 2019. Clean air for some: Unintended spillover effects of regional air pollution policies. Science Advances, 5(4), p.eaav4707. Loh, C., 2021. How Hong Kong can take its 2035 Clean Air Plan further. South China Morning Post.
Nov 2	CASE 2: THE PARIS AGREEMENT AND IMPLEMENTATION CHALLENGES	Michaelowa, A., Shishlov, I. and Brescia, D., 2019. Evolution of international carbon markets: lessons for the Paris Agreement. Wiley Interdisciplinary Reviews: Climate Change, 10(6), p.e613.
	CASE 3: GLOBAL MERCURY POLLUTION POLICIES	Selin, N.E., 2018. A proposed global metric to aid mercury pollution policy. Science, 360(6389), pp.607-609.

MODULE 4: Theory, Methods, Models (Part II)

Nov 9	INTEGRATED ASSESSMENT MODELS	
QUIZ 2	Part I: Introduction to models of environmental and energy systems	Herbst, A., Toro, F., Reitze, F. and Jochem, E., 2012. Introduction to energy systems modelling. *Swiss journal of economics and statistics*, 148(2), pp.111-135.
	Part II: Integrated assessment models: Basics, benefits, drawbacks	Weyant, J., 2017. Some contributions of integrated assessment models of global climate change. *Review of Environmental Economics and Policy*, 11(1), pp.115-137. Jewell, J. and Cherp, A., 2020. On the political feasibility of climate change mitigation pathways: Is it too late to keep warming below 1.5°C?. Wiley Interdisciplinary Reviews: Climate Change, 11(1), p.e621.
Nov 16	OTHER METHODS	

	Part I: Introduction to behavioral environmental economics	Croson, R. and Treich, N., 2014. Behavioral environmental economics: promises and challenges. Environmental and Resource Economics, 58(3), pp.335-351.
	Part II: System dynamics	Collins, R.D., de Neufville, R., Claro, J., Oliveira, T. and Pacheco, A.P., 2013. Forest fire management to avoid unintended consequences: A case study of Portugal using system dynamics. Journal of environmental management, 130, pp.1-9. VIDEO: Short intro to system dynamics: https://www.youtube.com/watch?v=IenySRdkRu8 VIDEO: First 21 minutes of a lecture by Donella Meadows: A Philosophical Look at System Dynamics. https://www.youtube.com/watch?v=XL$_lOoomRTA$

FINAL PRESENTATIONS AND CLASS WRAP-UP

Nov 23	FINAL PRESENTATIONS I
Nov 30	FINAL PRESENTATIONS II, class summary