

## **PPOL 5290 Managing for Sustainability, Spring 2022-2023**

*8 February 2023*

### **1. Time and Venue:**

Monday, 18:30-21:20

Venue: LSK 1009

### **2. Instructor:**

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### **3. Course Abstract**

This course aims to introduce students a set of basic concepts to understand managing sustainability issues and to use the concepts to analyze the problems and propose their solutions. They will understand the basic principles and practices behind the use of management and policy instruments, including command-and-control regulation, tax and emission trading, to conserve energy resources and to control environmental impacts. They will be able to apply innovative solutions to tackle sustainability challenges. This course equips students to engage in well-informed and balanced debates on how to develop our sustainable societies in the long run. This course examines the existing management policies and strategies implemented by governments and enterprises across the globe and explores opportunities and challenges in facilitating sustainable development in the future. The students are encouraged to cultivate an understanding of the problems and prospective solutions associated with fostering a transition away from resource-intensive technologies and practices for sustainability.

### **4. Intended Learning Outcomes**

Upon successful completion of the course, students are expected to be able to:

- Articulate environmental problems and resource limitations and constraints. Critically analyze the impact of energy use on the environment. This includes:
  - Introduction to environmental problems and sustainability challenges
  - Issue of non-renewable resources
  - Implications of climate change caused by greenhouse gas emissions
  - Introduction to political economy of sustainability
- Articulate personal and societal value considerations that impact sustainability policies and management strategies affecting people in different countries and of different generations.
- Critically evaluate international policy and management efforts to address climate changes issues.
- Analysis of current policies and management strategies implemented by governments and enterprises across the globe.
- Demonstrate argumentative reasoning and critical thinking in interpersonal dialogues, oral presentations and group reports.

## **5. Teaching and Learning Activities**

Tasks and activities designed to facilitate students' achievement of the intended learning outcomes:

- **Interactive Lectures:** Interactive lectures are designed to facilitate application and synthesis of assigned readings.
- **Readings:** Readings provide students with the knowledge base necessary to participate effectively in interactive lectures.
- **Assignments:** Students will be asked to work on assignments to ensure that they understand what is discussed in the class.
- **Group project:** Students are asked to choose an issue concerning sustainability, conduct an analysis of the problem by using the principles and methods discussed in the class, and propose a solution to manage the problem.

## **6. Course Activities and Grading Criteria**

Course grades will be based on class participation (10%), assignments (50%), and group project (40%).

- **Class Participation (10%)**
  - Students are encouraged to actively participate in discussions with other students in class.
- **Assignments (50%)**
  - Students will be asked to work on specific themes by applying the concepts and methodologies discussed in the class.
- **Group project, presentations, and report (40%)**
  - Students will be asked in a group of four students to analyze a specific problem concerning sustainability and to make a proposal to manage the problem.
  - Each group is expected to address the key issues, including
    - ◇ Why is the problem is important?

- ✧ What is the basic structure of the problem?
- ✧ What types of stakeholders are involved?
- ✧ What kinds of relationships and interactions exist among the stakeholders?
- ✧ Where can potential interventions be made to tackle the problem?
- ✧ What kinds of measures are available?
- ✧ What criteria should be applied to choose an appropriate measure?
- Each group will be asked to make a presentation on mid-term progress and a final presentation each for 10 minutes, followed by questions and answers. Each group member must present.
- Then each group will be asked to submit a final report on problem analysis and a proposal for managing the problem (3,000 – 5,000 words).

## 7. Core Readings and Additional References

### Core Readings

(Core readings are basically required for understanding lectures and participating in class discussions and group projects.)

- Jonathan M. Harris and Brian Roach, *Environmental and Natural Resource Economics: A Contemporary Approach, Fifth Edition*, Routledge (2022).

### Additional References

(Additional references for students to learn to expand their knowledge about the subject)

- Stephen Morse, *Sustainability: A Biological Perspective*, Cambridge University Press (2010).
- Kent E. Portney, *Sustainability*, The MIT Press (2015).
- Jeremy L. Caradonna, *Sustainability: A History*, Oxford University Press (2014).
- Stephen Smith, *Environmental Economics: A Very Short Introduction*, Oxford University Press (2011).
- Tom Tietenberg and Lynne Lewis, *Environmental and Natural Resource Economics, 10th Edition*, Routledge (2016).
- Daniel J. Phaneuf and Till Requate, *A Course in Environmental Economics: Theory, Policy, and Practice*, Cambridge University Press (2017).
- Thomas Sterner and Jessica Coria, *Policy Instruments for Environmental and Natural Resource Management, Second Edition*, Routledge (2011).
- Winston Harrington, Richard D. Morgenstern, and Thomas Sterner, eds., *Choosing Environmental Policy: Comparing Instruments and Outcomes in the United States and Europe*, Resources for the Future (2004).
- Robert Falkner, ed., *The Handbook of Global Climate and Environmental Policy*, Wiley-Blackwell (2016).
- Eva Sternfeld, ed., *Routledge Handbook of Environmental Policy in China*, Routledge (2017).

- Tony Bovaird and Elke Loeffler, eds., *Public Management and Governance, Third Edition*, Routledge (2016).
- Rüdiger Hahn, *Sustainability Management - Concepts, Instruments, and Stakeholders from a Global Perspective*, Rüdiger Hahn (2022).

## 8. Course Schedule, Topics, and Readings

(Normally class PowerPoint slides will be available by the time the class starts. Additional readings would also be provided as appropriate. Information on the schedule, topics, readings and others can be modified in due course.)

### *Class 1 – Monday 6 February 2023*

#### **Introduction to Sustainability**

- Changing Perspectives on the Environment
  - Economic Approaches to the Environment
  - Principles of Ecological Economics
- Resources, Environment, and Economic Development
  - Economic Growth
  - Environmental Trends in Recent Decades
  - Optimists and Pessimists
  - Sustainable Development

#### Required Readings

Harris, Jonathan M., and Brian Roach, “Chapter 1: Changing Perspectives on the Environment” and “Chapter 2: Resources, Environment, and Economic Development,” *Environmental and Natural Resource Economics: A Contemporary Approach, Fifth Edition*, Routledge (2022).

#### Supplementary Readings

Intergovernmental Panel on Climate Change (IPCC), *Climate Change 2014 Synthesis Report Summary for Policymakers*, Geneva: IPCC (2014).

Meadows, Donella, Jorgen Randers, and Dennis Meadows, *A Synopsis: Limits to Growth, The 30-Year Update*, Chelsea Green (2004).

Steffen, Will, et al., “Planetary boundaries: Guiding human development on a changing planet,” *Science*, **347** (6223), 1259855 (2015).

United Nations Environment Programme (UNEP), *The Emissions Gap Report 2017: A UN Environment Synthesis Report*, UNEP (2017).

### *Class 2 – Monday 13 February 2023*

#### **Policy and Management on Pollution**

- Pollution: Analysis and Policy

- The Economics of Pollution Control
- Policies for Pollution Control
- The Scale of Pollution Impacts
- Assessing Pollution Control Policies
- Pollution Control Policies in Practice

### Required Reading

Harris, Jonathan M., and Brian Roach, “Chapter 8: Pollution: Analysis and Policy,” *Environmental and Natural Resource Economics: A Contemporary Approach, Fifth Edition*, Routledge (2022).

### Supplementary Readings

Ackerman, Frank, and Rachel Massey, “The True Costs of REACH,” *TemaNord 2004:557*, Nordic Council of Ministers, Copenhagen (2004).

Burtraw, Dallas, and Sarah Jo Szambelan, “U.S. Emissions Trading Markets for SO<sub>2</sub> and NO<sub>x</sub>,” Discussion Paper 09-40, Resources for the Future, Washington, DC, October (2009).

European Commission, “Environmental Fact Sheet: REACH - A New Chemicals Policy for the EU,” European Commission, February (2006).

Harrington, Winston, Richard D. Morgenstern, and Thomas Sterner, *Choosing Environmental Policy: Comparing Instruments and Outcomes in the United States and Europe*, Washington, DC: Resources for the Future (2004).

Organization for Economic Cooperation and Development (OECD), *Environment at a Glance 2015: OECD Indicators*, Paris: OECD Publishing (2015).

Stavins, Robert, “What Can We Learn from the Grand Policy Experiment? Lessons from SO<sub>2</sub> Allowance Trading,” *Journal of Economic Perspectives*, **12** (3), 69-88 (1998).

## ***Class 3 – Monday 20 February 2023***

### **Natural Capital and Environmental Accounting**

- Ecological Economics: Basic Concepts
  - An Ecological Perspective
  - Natural Capital
  - Issues of Macroeconomic Scale
  - Long-Term Sustainability
  - Ecological Economics and Policy
- National Income and Environmental Accounting
  - Greening the National Income Accounts
  - Green GDP
  - Adjusted Net Saving
  - The Genuine Progress Indicator
  - The Better Life Index
  - Environmental Asset Accounts

- Evaluating Alternative Indicators

#### Required Readings

Harris, Jonathan M., and Brian Roach, “Chapter 9: Ecological Economics: Basic Concepts” and “Chapter 10: National Income and Environmental Accounting,” *Environmental and Natural Resource Economics: A Contemporary Approach, Fifth Edition*, Routledge (2022).

#### Supplementary Readings

Monastersky, Richard, “Anthropocene: The Human Age,” *Nature*, **519**, 144-147 (2015).

United Nations Environmental Programme Financial Initiative (UNEP FI) and Global Footprint Network (GFN), “A New Angle on Sovereign Credit Risk - E-RISC: Environmental Risk Integration in Sovereign Credit Analysis,” UNEP FI and GFN, Geneva, November (2012).

United Nations University International Human Dimensions Programme (UNU-IHDP) and the United Nations Environment Programme (UNEP), *Inclusive Wealth Report 2014: Measuring progress toward sustainability*, Cambridge, UK: Cambridge University Press (2014).

Stiglitz, Joseph E., Amartya Sen, and Jean-Paul Fitoussi, “Report by the Commission on the Measurement of Economic Performance and Social Progress” (2009).

### ***Class 4 – Monday 27 February 2023***

#### **Energy and Climate Change**

- Energy: The Great Transition
  - Four Global Energy Challenges
  - Nonrenewable Energy Sources
  - Renewable Energy Sources
  - Energy Economics: Current Analyses and Alternative Futures
  - Policies for the Great Energy Transition
- Global Climate Change: Science and Economics
  - Causes and Consequences of Climate Change
  - Responses to Global Climate Change
  - Economic Analysis of Climate Change

#### Required Readings

Harris, Jonathan M. and Brian Roach, “Chapter 11: Energy: The Great Transition” and “Chapter 12: Global Climate Change: Science and Economics,” *Environmental and Natural Resource Economics: A Contemporary Approach, Fifth Edition*, Routledge (2022).

#### Supplementary Readings

Intergovernmental Panel on Climate Change (IPCC), *Climate Change 2014 Synthesis Report: Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, Geneva: IPCC (2014).

Intergovernmental Panel on Climate Change (IPCC), *Global Warming of 1.5 °C: Summary for Policymakers*, Geneva: IPCC (2018).

International Energy Agency (IEA), *World Energy Outlook 2017*, Paris: IEA (2017).

Revesz, Richard L., Kenneth Arrow, et al., “Global Warming: Improve Economic Models of Climate Change.” *Nature*, **508**, 173-175 (2014).

### ***Class 5 – Monday 6 March 2023***

#### **Climate Change and the Economy**

- Global Climate Change: Policy Responses
  - Responding to a Climate Emergency
  - Climate Change Mitigation: Economic Policy Options
  - Getting to Net-Zero Emissions
  - Climate Change Policy in Practice
  - Other Climate Issues: Adaptation and Equity
  - Dimensions of Climate Change
- Greening the Economy
  - The Green Economy: Introduction
  - The Relationship between the Economy and the Environment
  - Industrial Ecology
  - Does Protecting the Environment Harm the Economy?
  - Creating a Green Economy

#### Required Readings

Harris, Jonathan M. and Brian Roach, “Chapter 13: Global Climate Change: Policy Responses” and “Chapter 14: Greening the Economy,” *Environmental and Natural Resource Economics: A Contemporary Approach, Fifth Edition*, Routledge (2022).

#### Supplementary Readings

Dechezleprêtre, Antoine, and Misato Sato, “The Impacts of Environmental Regulations on Competitiveness,” Policy Brief, Grantham Research Institute on Climate Change and the Environment and Global Green Growth Institute, November (2014).

Frankfurt School - United Nations Environment Programme (UNEP) Collaborating Centre for Climate & Sustainable Energy Finance and Bloomberg New Energy Finance (BNEF), “Global Trends in Renewable Energy Investment,” Frankfurt School of Finance & Management, Frankfurt am Main (2018).

Franks, Max, Kai Lessmann, Michael Jakob, Jan Christoph Steckel, and Ottmar Edenhofer, “Mobilizing domestic resources for the Agenda 2030 via carbon pricing,” *Nature Sustainability*, **1**, 350-357 (2018).

Schellnhuber, Hans Joachim, Stefan Rahmstorf, and Ricarda Winkelmann, “Why the Right Climate Target was Agreed in Paris,” *Nature Climate Change*, **6**, 649–653 (2016).

World Bank and Ecofys, *State and Trends of Carbon Pricing 2018*, Washington, DC: World Bank (2018).

### ***Class 6 – Monday 13 March 2023***

#### **Mid-term Presentation of Group Projects**

- Each group makes a presentation on the progress of the group project.
  - Presentation for 10 minutes, followed by questions and answers for five minutes

### ***Class 7 – Monday 20 March 2023***

#### **Population, Agriculture, and Food**

- Population and the Environment
  - The Dynamics of Population Growth
  - Predicting Future Population Growth
  - The Theory of Demographic Transition
  - Population Growth and Economic Growth
  - Ecological Perspectives on Population Growth
  - Population Policies for the Twenty-First Century
- Agriculture, Food, and Environment
  - Feeding the World: Population and Food Supply
  - Trends in Global Food Production
  - Projections for the Future
  - Agriculture’s Impact on the Environment
  - Sustainable Agriculture for the Future

#### **Required Readings**

Harris, Jonathan M., and Brian Roach, “Chapter 15: Population and the Environment” and “Chapter 16: Agriculture, Food and Environment,” *Environmental and Natural Resource Economics: A Contemporary Approach, Fifth Edition*, Routledge (2022).

#### **Supplementary Readings**

United Nations, Department of Economic and Social Affairs, Population Division, “World Population Prospects: The 2017 Revision - Key Findings & Advance Tables,” Working Paper No. ESA/P/WP/248, United Nations (2017).

Food and Agriculture Organization (FAO), International Fund for Agricultural Development (IFAD), United Nations Children’s Fund (UNICEF), World Food Programme (WFP), and the World Health Organization (WHO), *The State of Food Security and Nutrition in the World 2018: Building climate resilience for food security and nutrition*, Rome: FAO (2018).

### ***Class 8 – Monday 27 March 2023***

#### **Nonrenewable and Renewable Resources Management**

- Nonrenewable Resources: Scarcity and Abundance
  - The Supply of Nonrenewable Resources
  - Economic Theory of Nonrenewable Resource Use
  - Global Scarcity or Increasing Abundance?



- Environmental Impacts of Mining
- The Potential for Minerals Recycling
- Renewable Resource Use: Fisheries
  - Principles of Renewable Resource Management
  - Ecological and Economic Analyses of Fisheries
  - The Economics of Fisheries in Practice
  - Policies for Sustainable Fisheries Management

#### Required Readings

Harris, Jonathan M., and Brian Roach, “Chapter 17: Nonrenewable Resources: Scarcity and Abundance” and “Chapter 18: Renewable Resource Use: Fisheries,” *Environmental and Natural Resource Economics: A Contemporary Approach, Fifth Edition*, Routledge (2022).

#### Supplementary Readings

Food and Agriculture Organization (FAO). *The State of World Fisheries and Aquaculture 2020: Sustainability in Action*. Rome, Italy: FAO (2020a).

### ***Class 9 – Monday 3 April 2023***

#### **Ecosystem and Water Management**

- Forests and Land Management
  - The Economics of Forest Management
  - Deforestation: Trends and Drivers
  - Policies for Sustainable Forest Management
  - The Economic Value of Land Preservation
  - Land Preservation Policies
- Water: Economics and Policy
  - Global Supply and Demand for Water
  - Addressing Water Shortages
  - Water Pricing
  - Water Rights, Water Markets, and Privatization
  - Water as a Common Property Resource

#### Required Readings

Harris, Jonathan M., and Brian Roach, “Chapter 19: Forests and Land Management” and “Chapter 20: Water: Economics and Policy,” *Environmental and Natural Resource Economics: A Contemporary Approach, Fifth Edition*, Routledge (2022).

#### Supplementary Readings

Food and Agriculture Organization (FAO). *Global Forest Resources Assessment 2020: Key Findings*. Rome, Italy: FAO (2020b).

Organisation for Economic Co-operation and Development (OECD), “Managing Water for All: An OECD Perspective on Pricing and Financing,” OECD, Paris (2009).

## ***Class 10 – Monday 17 April 2023***

### **Globalization and Sustainable Development**

- World Trade and the Environment
  - Environmental Impacts of Trade
  - Trade and Environment: Policy and Practice
  - Trade Agreements and the Environment
  - Strategies for Sustainable Trade
- Policies for Sustainable Development
  - The Concept of Sustainable Development
  - Sustainable Development: Implications for Developed and Developing Countries
  - Reforming Global Institutions
  - Rethinking Economic Growth

#### Required Readings

Harris, Jonathan M., and Brian Roach, “Chapter 21: World Trade and the Environment” and “Chapter 22: Policies for Sustainable Development,” *Environmental and Natural Resource Economics: A Contemporary Approach, Fifth Edition*, Routledge (2022).

#### Supplementary Readings

Gallagher, Kevin P., “Economic Globalization and the Environment,” *Annual Review of Environment and Resources*, **34**, 279-304 (2009).

United Nations, *The Millennium Development Goals Report 2015*, New York: United Nations (2015).

## ***Class 11 – Monday 24 April 2023***

### **Digitalization and Sustainability**

#### Readings

Global Partnership on Artificial Intelligence, *Climate Change & AI: Recommendations for Government*, GPAI, November (2021).

Creutzig, F., Acemoglu, D., Bai, X., Edwards, P., Hintz, M., Kaack, L., Kilkis, S., Kunkel, S., Luers, A., Milojevic-Dupont, N., Rejeski, D., Renn, J., Rolnick, D., Rosol, C., Russ, D., Turnbull, T., Verdolini, E., Wagner, F., Wilson, C., Zekar, A., Zumwald, M. “Digitalization and the Anthropocene,” *Annual Review of Environment and Resources*, **47** (23), 1-23 (2022).

Jones, Nicola (2018). “The Information Factories: Data centres are chewing up vast amounts of energy,” *Nature*, **561**, 163-166.

## ***Class 12 – Monday 8 May 2023***

### **Final Presentation of Group Projects**

- Each group makes a presentation on the progress of the group project

- Presentation for 10 minutes, followed by questions and answers for five minutes).