

ECON 4454 Green Economy and Sustainability

Spring 2026

Hong Kong University of Science and Technology

Department of Economics

Instructor	Deyu RAO 饒德宇 dyrao@ust.hk
Lecture	TuTh 01:30PM - 02:50PM @ LSK 1034
Office Hours	By appointment only. Preferred around lunchtime (noon \pm 1h) on Tue/Wed/Fri @ LSK 6072
Tutorial/TA Office Hours	Fr 10:30AM - 11:20AM @ LSK 1033 Tutorial sessions will take place <u>only</u> if they have been officially announced on Canvas, e.g. after PS and before midterm. TA will hold office hours by appointment, instead.
TA	LI, Qingyang qlice@connect.ust.hk
Prerequisite	Microeconomics (ECON 2103/2113 or equivalent) Exclusion: ENVR 3410
Credit	4 units

Course Description

This course discusses the application of economics and finance in addressing contemporary environmental issues, such as pollution and climate change. Topics include the fundamental theories of environmental economics, strategies for a green economy and sustainable business, as well as related legislative and regulatory frameworks. The course also covers cases regarding the environmental impacts on asset prices, such as real estate prices and stock market performance, and discusses the challenges in public finance in the setting of sustainability. Students will learn basic financial tools to navigate environmental risks as an investor, an asset manager, or a regulator.

Assessment Scheme

This course will be assessed using criterion-referencing and grades will not be assigned using a curve. Detailed rubrics for each assignment are provided below, outlining the criteria used for evaluation.

- Homework (15%): There will be two problem sets. Students are encouraged to discuss with each other but should submit their own copy.
- Midterm (25%): An in-class midterm exam will be scheduled on April 16th, covering topics before the midterm. Venue TBA.

- Class participation (10%): Class participation will be measured from in-class mini-quizzes (or surveys, games, etc.). The mini-quizzes will have one or two questions and will be graded only on participation (i.e., not on your answers).
- Group Presentation (25%) and Paper (25%): Students should form groups of four and work on one of the following topics.
 - a trading pitch (on a stock, a bond, or a trading strategy) with a specific focus on their sustainability (“green”) aspects;
 - a report on the current developments of a regional green finance market;
 - an evaluation of an environmental policy.

The final products include a group presentation at the end of semester, and a paper/report of 6-8 pages (12pt font, double space, including references) due on May 24th.

Presentations will be ~ 20 min per group (including Q&A), held in class on May 5th and 7th, and also during May 8th’s tutorial session if needed.

Presentation grades (25%) will be based on a combination of peer reviews (5%), as well as evaluations from the professor and the teaching assistant (20%). The paper or report, however, will be graded exclusively by the professor.

Rubrics on Group Presentation and Paper: See table attached.

Course AI Policy: In the context of this course, students are *encouraged* to employ AI or large language model (LLM) tools such as **ChatGPT** or **HKUST GenAI** to refine their final reports. These tools can be useful for improving clarity, organization, and overall writing quality, as well as for facilitating idea generation. At the same time, it is essential to uphold the highest standards of academic integrity. Students should use these tools judiciously, ensuring that the ideas, arguments, and substantive content of their final reports remain their own. Poor or unclear writing, particularly where it suggests a lack of basic revision or polishing, will be reflected negatively in grading.

Satisfying ECON4670: This course offers a research paper option that may be used to fulfill the ECON4670 requirement for ECON, ECOF, and MAEC students. Students intending to use this option must *separately* submit a paper that satisfies the additional requirements of ECON4670, as specified in the **ECON4670 syllabus**.

Students may collaborate with non-ECON4670 students, although such collaboration is discouraged. In such cases, the following conditions must be met:

- Non-ECON4670 students must explicitly grant permission for their contributions to be used in an ECON4670 submission.
- The ECON4670 submission must satisfy the page-length requirements¹ for group projects based on the *total number of students in the group*, regardless of the number of non-ECON4670 students. Non-ECON 4670 students are not required to contribute beyond the requirements of this course.

¹As of January 2026, ECON4670 requires the following for group projects: “Minimum length of 3.5 pages (single-spaced) per student, excluding references and appendices (equivalently, 5–6 pages at 1.5 spacing or 7 pages double-spaced per student).”

Intended Learning Outcomes (ILOs)

On successful completion of the course, students will be able to:

- Demonstrate a solid understanding of core concepts, principles, and models in environmental economics, including their application to sustainability-related economic problems.
- Explain the economic foundations of sustainable business practices and the basic principles of green finance, and relate them to real-world environmental and business contexts.
- Analyze environmental challenges, sustainability risks, and policy interventions using economic reasoning and, where appropriate, empirical or analytical tools, and evaluate their implications for firms, markets, and society.
- Apply economic principles and evidence to assess the consequences of environmental policies or regulatory changes and formulate informed policy recommendations for governments and international organizations.
- Communicate economic arguments, analytical findings, and policy insights related to sustainability clearly and effectively in both oral and written English, including through group-based projects and presentations.
- Demonstrate awareness of professional and ethical responsibilities related to sustainability, and reflect on the balance between economic growth, environmental protection, and social responsibility in local and global contexts.
- Develop academic or career interests related to environmental economics, sustainability, or green finance, and identify how economic training can support future professional pathways.

Note: For details on the Program Intended Learning Objectives, please refer to <https://econ.hkust.edu.hk/programs-n-courses/ecof/curriculum> and <https://econ.hkust.edu.hk/programs-n-courses/econ/econ-curriculum>.

Academic Honesty and Integrity

Honesty and integrity are central values in HKUST. Please be aware of the importance and maintain a high standard of honesty in the problem sets and examinations in this course. Please familiarize yourself with the university rules and the HKUST academic honor code. The code will be strictly enforced, and any violation cases will be reported to the university. For details on academic integrity, please refer to <https://registry.hkust.edu.hk/resource-library/academic-integrity>.

Tentative Course Schedule

- **Module 1.** Principles of environmental economics (7 lectures).
 1. Environmental challenges and their implications for the economy.
 2. Market efficiency and regulatory tools.
- **Module 2.** Green asset pricing (3 lectures).
 1. Emission trading.
 2. Environmental factors in asset pricing: real estate and market portfolio.
- **Module 3.** Strategies for a greener economy and a sustainable business (5 lectures).
 1. Principles of corporate social responsibility (CSR) and sustainable business practices.
 2. Environmental, social, and governance (ESG) investing and disclosure.
 3. Negative screening, green classification, and greenwashing.
 4. Behavioral biases and their potential role in ESG investing.
- **Module 4.** Fundamentals of green finance (4 lectures).
 1. Overview of green finance market: participants, policies, and regulations.
 2. Green financial instruments: green bonds and green loans.
 3. Green investments from the public sector: sustainable development goals (SDGs) and green financing.
- **Module 5.** Macroeconomics of climate change (2 lectures).
 1. Growth, structural transformation, and migration.
- **Other in-class activities.**
 - **Guest lecture** (1 lecture, tentative). During our lectures, we may invite one or two speakers (previously, from Hong Kong Green Finance Association, PAG ESG) to share his/her industry insights, complementing the academic and theoretical knowledge covered in our lectures. Location and time TBA. Nominations are welcome.
 - **Midterm** (1 lecture).
 - **Midterm Review** (if time allows).
 - **Group presentations** (2 lectures). Last two lectures at the end of semester.

Note: This is a tentative course outline. The instructor may fine-tune the topics while ensuring that the course objectives are achieved.

Table 1: Rubrics on Group Presentation and Paper

Criteria	Content Mastery	Critical Thinking and Analysis
Excellent	Demonstrates exceptional comprehension (Evaluation level) by accurately explaining advanced environmental economic theories and tools and applying them to contemporary environmental issues such as pollution, climate change, or natural resource management. Effectively uses well-chosen empirical or institutional examples and draws insightful connections across environmental contexts.	Provides an in-depth analysis (Synthesis level) with a well-developed argument, critical evaluation of empirical evidence, and integration of theory and data to generate original insights or policy implications in environmental settings.
Good	Shows strong comprehension (Application level) by clearly explaining key environmental economic concepts and tools and their relevance to environmental issues, supported by appropriate examples and logical reasoning.	Offers a clear analysis (Analysis level) with a coherent argument and sound evaluation of evidence, demonstrating an understanding of how economic incentives and constraints shape environmental outcomes and policy trade-offs.
Satisfactory	Displays satisfactory comprehension (Comprehension level) by explaining basic environmental economic concepts and their relevance to environmental issues, with some supporting examples or discussion.	Presents a basic analysis (Application level) with a straightforward argument and limited evaluation of evidence, demonstrating the ability to apply economic reasoning to environmental contexts.
Marginal	Demonstrates a basic understanding (Knowledge level) by outlining fundamental environmental economic topics, with limited explanation, examples, or connections to real-world environmental issues.	Demonstrates limited analysis (Comprehension level) with a weak or incomplete argument and minimal evaluation of evidence, indicating only a rudimentary grasp of the issues discussed.
Fail	Shows minimal understanding of environmental economic concepts, with little or no connection to relevant theories, tools, or environmental applications, and a lack of coherent explanation.	Lacks analysis (Knowledge level), with no clear argument or meaningful evaluation of evidence, demonstrating a substantial lack of understanding of environmental economic issues.