Course Syllabus
EE 376 Economics of Climate Change
Semester 2/2024

Lecture Time: Monday, 9:00-12:00
Lecture Venue Room 304, 2nd floor, Faculty of Economics
Teaching Materials Platform: Facebook Group **EE376 2024-2**
https://www.facebook.com/groups/612201968055882/

Instructor:
Name: Assoc. Prof. Chayun Tantivasadakarn
Email: [chayunt@econ.tu.ac.th]
Office: Room # 8 the 60th Anniversary Building
Office hour: Wednesday and Friday, 9:30 – 11:30

Number of credits: 3 credits
Prerequisites: EE 210 or EE 211 or EE 213

Course Description:

Basic concepts of climate change relating to environmental economics, efficiency, externalities, and policy instruments. The role of economics in the formation of climate policy. Economic problems of climate change, such as intertemporal decisions, impacts of climate change, cost of mitigation, and adaptation. Thailand and international cooperation and debate in climate policy.

Course Objectives:

Students will be equipped with the basic principle of climate change science and it linkages and impacts to the economy including the economic knowledge and analytical skills to assess the economic implications of climate change, evaluate policy options for climate mitigation and adaptation.

Expected Learning Outcomes

1. Morality and Ethics EE376

Applicability	Expected Learning Outcomes	Evaluation Method
●	1. Students demonstrate integrity.	Quizzes and assignments
●	2. Students prioritize social and public benefits over personal ones.	
●	3. Students are punctual and comply with the code of conduct of the institution and society at large.	
●	4. Students are responsible and accountable to society, the nation, and the subject of economics.	
●	5. Students realize the cultural and environmental value of a sustainable society.	

2. Knowledge

Applicability	Expected Learning Outcomes	Evaluation Method
●	1. Students know and understand modern economics principles and theories, and are up to date with new developments.	Quizzes, assignments, and exam
●	2. Students know and understand Thai and global economic structure and the importance of major international economic events.	
○	3. Students know and understand the instruments of economic analysis.	
●	4. Students know and understand applied fields in economics, including monetary, public, international, business, natural resource, and environmental, industrial, agricultural, cooperative, political, developmental, and	

	entrepreneurial economics as well as agribusiness.	
●	5. Students are informed about related fields including sociology, business administration, education, law policy, and science.	

3. Intellectual Development

Applicability	Expected Learning Outcomes	Evaluation Method
●	1. Students have developed individual critical thinking.	Group project
●	2. Students are sufficiently trained in research skills.	
●	3. Students demonstrate an ability to analyze and synthesize data, as well as appropriately integrate economics concepts to understand the causes of current economic problems in Thailand. Based on analysis and synthesis, students demonstrate an ability to propose policy guidelines to resolve problems.	

4. Interpersonal Skills and Responsibilities

Applicability	Expected Learning Outcomes	Evaluation Method
●	1. Students are responsible for assigned tasks and work in groups effectively.	Group project
●	2. Students have problem-solving skills.	
○	3. Students show leadership skills and team spirit.	
●	4. Students are always improving themselves.	

○	5. Students have good interpersonal skills, adapt, and work under different conditions.	

5. Quantitative Analysis, communication, and information technology

Applicability	Expected Learning Outcomes	Evaluation Method
○	1. Students select and apply appropriate statistical and mathematical methods for data processing, interpretation, conclusions, and recommendations to resolve problems.	Assignments
○	2. Students communicate effectively and select appropriate presentation methods.	Group project
○	3. Students use information and communication technologies appropriately to gather data as well as process, interpret, and present results.	

Remark: ● Primary expected outcome ○ Secondary expected

Reading lists

[T] Tantivasadakarn, Chayun (2019) Economics of Climate Change (in Thai), Thammasat University Press.

[FF] Field, B., & Field, M. (2017). *Environmental economics: An introduction* (Seventh ed.). New York, NY: McGraw-Hill Education.

Grubb, M. (2004). "Technology Innovation and Climate Change Policy: an overview of issues and options." Keio Economic Studies, 41(2): 103-132.

Goulder, L.H., and S.H. Schneider (1999) 'Induced Technological Change and the Attractiveness of CO_2 Abatement Policies,' Resource and Energy Economics, Vol. 21, pp. 211-53.

[HR] Harris, J. M., & Roach, B. (2017). *Environmental and natural resource economics: A contemporary approach*. Routledge.

[H] Houghton, John (2004) Global Warming: The Completer Briefing, 3rd edition, Cambridge University Press. http://www.gci.org.uk/Documents/Global-Warming-the-Complete-Briefing.pdf

[Incropera] Incropera, F. P. (2016). *Climate change: a wicked problem: complexity and uncertainty at the intersection of science, economics, politics, and human behavior*. Cambridge University Press. (ห้องสมุดปรีดี)

IPCC (2013a) 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.)].

Milton, E.J., and Euston Quah (2023) Cost-Benefit Analysis, Routledge.

Nordhaus, W. D. (2007). A review of the Stern review on the economics of climate change. *Journal of economic literature*, *45*(3), 686-702.

[Nordhaus] Nordhaus, W. D. (2013). *The climate casino: Risk, uncertainty, and economics for a warming world*. Yale University Press.

Pearce, David (1991), "The Role of Carbon Taxes in Adjusting to Global Warming," The Economic Journal, Vol. 101, No. 407, (Jul., 1991), pp. 938-948.

[Stern] Stern, N., & Stern, N. H. (2007). *The economics of climate change: the Stern review*. Cambridge University press.

[TT] Tietenberg, T. H., & Lewis, L. (2016). *Environmental and natural resource economics*. Routledge.

Additional links:

Glossary terms: https://archive.ipcc.ch/pdf/special-reports/srex/SREX-Annex_Glossary.pdf

Gas Emissions by Countries and Sectors:
https://www.wri.org/blog/2020/02/greenhouse-gas-emissions-by-country-sector

Global emission: https://www.c2es.org/content/international-emissions/

NASA: https://climate.nasa.gov/evidence/

Lecture Schedule

Date	Topics
1 Jan 20, 2025	**1. Introduction to Climate Change Science** • The Earth's climate system • Greenhouse gas (GHGs), global energy balance, and the greenhouse effect • Important GHGs: CO_2 and carbon cycles, other GHGs • Dissenting opinions: the great hoax? **Reading:** H Ch. 1-4, T Ch. 1, Nordhaus Ch.5, 13-14, 24-25, Incropera Ch. 2-6, 9.
2	**2. Anthropogenic global warming and consequences** • GHGs concentration and global temperature

Date	Topics
Jan 27, 2025	• Impacts, damages and losses of CC • GHGs data and information • GHGs emission by countries • Share of mitigation responsibility for climate stability **Reading:** H Ch. 6-7, Incropera Ch. 5, T Ch. 2, IPCC (2013a), Stern Ch. 3-6
3 Feb 3, 2025	**3. Climate Change and Market Failure** • Externalities and carbon pricing • Global commons and Tragedy of Commons • The under provisioning of Public Goods **Reading:** HR Ch. 3-4, T Ch. 3 **Exercise 1:** topic #1 and #2

4
Feb 10, 2025
	4. Carbon Taxes
	• Optimum emission
	• Correction market failure with carbon
	  o Single source
	  o Multiple sources
	• Pros and cons of carbon taxes
	• Carbon tax research
	Reading: HR Ch. 16, T Ch. 4, Pearce, David (1991) pp. 938-948.

5-6
Feb 17, Feb24, 2025
	5. Carbon Market or Cap-and-Trade
	• Definition and concept of Carbon market
	• Demand and supply of carbon credits
	  o Deriving the demand and supply for carbon credits
	  o Factors influencing the demand and supply
	  o Carbon market equilibrium
	• Choices of carbon credits allocation and efficiency
	• Comparison of carbon market and carbon tax
	• Carbon market research
	Reading: HR Ch. 16, T Ch. 5
	Exercise 2: topic #3

7 Mar 3, 2025	**6. Carbon Pricing and Competitiveness** • Background • Theoretical impacts • Empirical studies **Reading:** Tantivasadakarn, Chayun; "Carbon Pricing and International Competitiveness for Thailand and ASEAN," Thammasat Review of Economic and Social Policy, Vol. 6, No. 2, July-December, 2020.

Date	Topics
	Midterm: Monday, Mar 10, 2025; 09:00-11:00 AM
8 Mar 17, 2025	**7. International Trade and Climate Change** • Carbon offshoring and Carbon leakages • Concepts about GHGs responsibility • Production-based, Ownership-based and consumption-based responsibility **Reading:** Incropera Ch. 8, T Ch. 8-9
9 Mar 24, 2025	• Border-Carbon Adjustment (BCA) or Carbon-Border-Adjustment Measures (CBAM) ○ Pros and cons of BCA • Impacts of CBAM **Reading:** Incropera Ch. 8, T Ch. 8-9
10 Mar 31, 2025	**7. Carbon Labeling** • Life cycle assessment (LCA) • What is carbon labelling? • Economics of carbon labelling • Types of carbon labelling • Carbon labelling situation in other countries • Carbon labelling in Thailand
11 Zoom meeting, TBA	**8. Behavioral Economics and climate mitigation** • Concept of nudge • Applications **9. Global Institutions: Kyoto Protocol and Post-Kyoto** • The Intergovernmental Panel on Climate Change (IPCC) • The United Nations Framework Convention on Climate Change (UNFCCC) • Kyoto Protocol • Paris Agreement **Reading:** Incropera Ch. 8, T Ch. 5 **Assignment:** En-Roads model
12 Apr 21, 2025	**6. Technological Development Policy and mitigation** • Why do mitigation technology grow so slow? • Technology-push vs. Demand-pull debate • Policy for inducing technological change • Costs of low carbon technology and mitigations

Date	Topics
	Reading: Grubb, M. (2004), Goulder and Schneider (1999), T Ch. 5
13 Apr 28, 2025	**12. Economics of Climate Change Adaptation** • Climate risks • Climate change adaptation • Cost-Benefit Analysis (CBA) concept • Social discount rates **Reading:** FF Ch.6Stern Ch. 5,6, 9, 12, 18-20, Nordhaus Ch.15-16, 18
14-15 Zoom meeting,TBA	**13. Group project presentation**
	Final exam: Monday, May 19, 2025; 13:30 – 16:30 PM

Evaluation

Midterm Examination	35%
Final Examination	35%
Group project	15%
Exercises, Quizzes, and Assignments	15%

Group project (15 points): maximum 3 member/group

- Design and print **an A0-sized academic poster** linking climate change issue with a selected topic from the following list. A poster may have a free-style title, but must be informative and comprehensive in its content, and contain some constructive arguments in the analytical part.

Suggested topic lists:

Charging stations for EV	Electric train system	Early Warning Systems and Climate Monitoring	Industrial decarbonization
Concentrating solar power	Climate-smart agriculture	Biochar carbon credits	Funding climate technology
Pumped storage hydropower	Solar cell regulations in thailand	Water management	Food waste management

Bio fuel	Plant-based meat	Flood management	Forestry carbon credit
Nuclear power	Coral reef restoration technology	Plastic recycling	Climate and circular economy
Small wind turbine energy	Urban Planning and Green Infrastructure	Waste water management	Greenwashing
Carbon Capture and Storage (CCS)	Low carbon tourism	Climate-related health issues	Climate Data and AI Applications for climate change

Evaluation will be based on the ability to arrange data and information with proper visualization and citation, presenting sharp arguments (concise and interesting leading questions and the existing conflicts of viewpoint relevant to the chosen topic) linking the topic with **the economics of climate change mitigation and/or adaptation**, cost-effectiveness evaluation when applicable, attractive and reader-friendly poster design. The total mark will come from instructor evaluation (7 marks), peer evaluation (4 marks), and Facebook like and share (4 marks)

Your oral presentation would take 12 minutes (without any notes!) and 3 minutes of Q&A.

Submission date of selected topic: Mar 17, 2025
Submission date of the outline: Mar 24-31, 2025
Presentation dates: TBA, May, 2025

Note: Please be strictly aware of the '*plagiarism rule*' which could bring a zero score for violators.

CONTACT INFORMATION
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BACHELOR OF ECONOMICS
THAMMASAT UNIVERSITY

Academic Calendar (Semester 2/2024):

Semester 2/2024 (January 20 – May 14, 2025)	
Create Plan from Quota via TU Greats App (*ID.64 – 67)	December 13 – 20, 2024
Registration via TU Greats App (*ID.64 – 67)	December 16 – 20, 2024
Tuition Fee Payment Period (Via TU Greats App) (*ID.64 – 67)	December 16, 2024 – January 17, 2025
Classes Begin	January 20, 2025
Add-drop period	January 20 – February 2, 2025 *(from 9.00 AM of January 20 to 10.30 PM of February 2).*
Tuition Fee Payment Period (Via TU Greats App)	January 20 – February 3, 2025 *(9 AM - 10.30 PM)*
*Makha Bucha Day **	*February 12, 2025*
Mid-term Examination Period	March 9 – 16, 2025
Withdrawal period with "W" on record	February 3 – March 30, 2025 *(from 9.00 AM of February 3 to 10.30 PM of March 30).*
Special Withdrawal with "w" on record	March 31 – 2 May, 2025
*Substitution for Chakri Memorial Day**	*April 7, 2025*
*Songkran Festival Day**	*April 13 – 16, 2025*
Last day of class for Semester 2/2024	May 14, 2025
*Substitution for Visakha Bucha Day**	*May 12, 2025*
Final exam period	May 16 - 30, 2025
Submitting Forms for Degree Conferral	January 20 – February 2, 2025

Remark * Holiday, No classes during this period
Updated: *October 17, 2024*