Syllabus of Record

Program: CET Taiwan
Course Code / Title: TP/ENVR 310 Climate Crisis: The Taiwan Response
Contact Hours: 45
Recommended Credits: 3
Primary Discipline / Suggested Cross Listings: Environmental Studies / Asian Studies, Public Policy
Language of Instruction: English
Prerequisites / Requirements: None

Description

This course combines theoretical frameworks of sustainability transition with practical applications, using Taiwan as a case study. Students analyze emission profiles, climate risks, and adaptation strategies while learning to use interactive tools such as the 2050 calculator and energy policy simulator. Through a mix of lectures, discussions, and hands-on activities, students develop skills in climate action design and data analysis of emissions drivers. Key topics include: planetary boundaries, sectoral mitigation pathways, just transition principles, and climate outreach strategies. The course emphasizes both global perspectives and local applications, helping students understand how theoretical concepts translate to real-world policy and action. Through group projects, essays, and regular discussions of current climate news, students gain a comprehensive understanding of the challenges and opportunities in achieving a sustainable, low-carbon future.

Objectives

Through their participation in this course, students will:

- Develop a deeper understanding of the history and future development of the climate crisis.
- Learn about the underlying theoretical frameworks of sustainability transition research.
- Learn about the procedure to design climate scenarios and their application in policy-making and financial decisions.
- Conduct preliminary data analysis on emissions drivers' identification and climate performance benchmarking.
- Master the basics of climate action design.

Requirements

Students are expected to attend each class as outlined in the CET Attendance Policy. Active participation in the classroom is essential. Students are to read all assigned materials before each class session and come prepared to participate thoughtfully in discussions. Reading assignments are generally 50 pages per week. All assignments must be submitted via Canvas unless otherwise noted.

- **Participation:** Participation is not merely attendance; students must actively engage in discussions by contributing insights, asking questions, and responding to peers' comments. This includes being prepared to discuss the assigned readings and participate actively in gaming and model practice

- **Midterm paper:** Students write an essay of 1,200 words on a specific climate risk (heatwave, flooding, etc.) affecting Taiwan and examine Taiwan's climate risk and adaptation strategy specific to that threat. The paper includes an introduction and rationale of the chosen risk, an analysis of the risk, current adaptation strategies, a critical assessment of these strategies, and a recommended action plan. Assessment is based on content quality, research and evidence, analysis and critical thinking, and writing quality.

- **Podcast and news critique:** Individual 7-minute oral presentation on students' perspective and critique of an assigned article or podcast (in English). Students interact with each other and react to the real-time development of sustainability issues. Included are background information of the podcast and the news story, major arguments and takeaways from the article/podcast, and opinions from different stakeholders. Assessment is based on the quality of the presentations and response to the questions raised by classmates.

- **Final group work:** Small group (3-5 students) study of the climate action required to decarbonize a specific sector, industry, or city by 2050, consistent with Taiwan's net-zero ambitions. Each group gives a 25-30 minute presentation with visual aids (slides, videos, handouts, etc.). The presentation includes an emission profile, reduction targets, mitigation measures, barriers, and action designs. Assessment is based on the presentation's content, cooperation with the group, and response to the questions raised by the classmates.

Grading

The final grade is determined as follows:

Participation *(see rubric below)*	15%
Midterm paper	30%
Podcast and news critique	15%
Final group work	40%

- Presentation: 30%
- Question & Answer: 10%

Class Participation Grading Rubric

	A – 90-100% Exemplary	B – 80-89% Proficient	C – 70-79% Developing	D – 60-69% Unacceptable	F – 0-59% Missing
Frequency of class participation	Actively contributes 2+ times per meeting	Actively contributes at least 1 time per meeting	Actively contributes at least half of the time during term	Actively contributes less than half of the time during term	Does not contribute
Quality of class participation *	Contribution is always thoughtful, accurate, and constructive, frequently interacting with peers	Contribution is mostly thoughtful, accurate, and constructive, usually interacting with peers	Contribution is somewhat thoughtful, accurate, and constructive, sometimes interacting with peers	Contribution is rarely thoughtful, accurate, and constructive, rarely interacting with peers	Does not contribute or interact with peers
Level of class preparation	Always fully prepared and on task	Mostly prepared and on task	Somewhat prepared and on task	Rarely prepared and on task	Consistently unprepared and not on task

Readings / Resources

Axsen, J., Plötz, P. & Wolinetz, M. Crafting strong, integrated policy mixes for deep CO2 mitigation in road transport. Nat. Clim. Chang. 10, 809–818 (2020). https://doi.org/10.1038/s41558-020-0877-

Bashmakov, I.A. et al, 2022: Industry. In IPCC, 2022: Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [P.R. Shukla, J. Skea, R. Slade, A. Al Khourdajie, R. van Diemen, D. McCollum, M. Pathak, S. Some, P. Vyas, R. Fradera, M. Belkacemi, A. Hasija, G. Lisboa, S. Luz, J. Malley, (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA. doi: 10.1017/9781009157926.013

Bergero, C., Binsted, M., Chia-Wei Chao, Kuen-Tien Chou, Cheng-Cheng Wu, Yang Wei,Yarlagadda, B., McJeon HC., 2020. An Integrated Assessment of a Low Coal Low Nuclear Future Energy System for Taiwan. Energy and Climate Change. Online First https://doi.org/10.1016/j.egycc.2020.100022.

Breyer, C., Khalili, S., Bogdanov, D., Ram, M., Oyewo, A. S., Aghahosseini, A., Gulagi, A., Solomon, A. A., Keiner, D., Lopez, G., Ostergaard, P. A., Lund, H., Mathiesen, B. V., Jacobson, M. Z., Victoria, M., Teske, S., Pregger, T., Fthenakis, V., Raugei, M., ... Sovacool, B. K. (2022). On the History and Future of 100% Renewable Energy Systems Research. IEEE Access, 10, 78176-78218. Article 9837910. https://doi.org/10.1109/ACCESS.2022.3193402

Carman, J., Verner, M., Rosenthal, S., Ballew, M., Leiserowitz, A., Wood, E., Thulin, E., Ordaz Reynoso, N., Marlon, J., & Buttermore, N. (2024). Global Warming's Six Audiences: International Update, 2023. Yale University. New Haven, CT: Yale Program on Climate Change Communication.

CDP (2021). Transparency to Transformation: A Chain Reaction, CDP Global Supply Chain Report 2020. https://www.cdp.net/en/research/global-reports/transparency-to-transformation Retrieval Date: 2021/02/11.

Chancel, L., Bothe, P., Voituriez, T. (2023) Climate Inequality Report 2023, World Inequality Lab Study 2023/1

Chao, Chia-Wei and Kuei-Tien Chou, 2020. “Governing the Climate-Driven Systemic Risk in Taiwan – Challenges and Perspective” in Climate Change Governance in Asia, eds. by Kuei Tien Chou, Dowan Ku, Koichi Hasegawa and Shu Fen Kao. New York: Routledge.

Climate Outreach. 2024. Talking climate on the doorstep. https://climateoutreach.org/reports/talking-climate-on-the-doorstep/

Creutzig, F., Niamir, L., Bai, X. et al. Demand-side solutions to climate change mitigation consistent with high levels of well-being. Nat. Clim. Chang. 12, 36–46 (2022). https://doi.org/10.1038/s41558-021-01219-y

D. G. Victor, F. W. Geels, S. Sharpe, Accelerating the Low Carbon Transition: The Case for Stronger, More Targeted and Coordinated International Action(Energy Transition Commission, 2019).

D. Rosenbloom, J. Markard, F. W. Geels, L. Fuenfschilling, Why carbon pricing is not sufficient to mitigate climate change—and how “sustainability transition policy” can help. Proc. Natl. Acad. Sci. U.S.A. 117, 8664–8668 (2020).

Dubash, N.K., et al., 2022: National and sub-national policies and institutions. In IPCC, 2022: Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [P.R. Shukla, J. Skea, R. Slade, A. Al Khourdajie, R. van Diemen, D. McCollum, M. Pathak, S.

Some, P. Vyas, R. Fradera, M. Belkacemi, A. Hasija, G. Lisboa, S. Luz, J. Malley, (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA. doi: 10.1017/9781009157926.015

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Retrieval Date: 2020/12/14.

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IEA (2021). Net Zero by 2050, IEA, Paris https://www.iea.org/reports/net-zero-by-

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“Global Sustainable
Development Report 2023”. United Nations. New York.

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IPCC, 2022: Summary for Policymakers [H.-O. Pörtner, D.C. Roberts, E.S. Poloczanska, K. Mintenbeck, M. Tignor, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem (eds.)]. In: Climate Change 2022: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, B. Rama (eds.)]. Cambridge University Press. In Press.

IPCC, 2022: Summary for Policymakers. In: Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [P.R. Shukla, J. Skea, R. Slade, A. Al Khourdajie, R. van Diemen, D. McCollum, M. Pathak, S. Some, P. Vyas, R. Fradera, M. Belkacemi, A. Hasija, G. Lisboa, S. Luz, J. Malley, (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA. doi: 10.1017/9781009157926.001

IPCC, 2022a: Annex I: Glossary [van Diemen, R., J.B.R. Matthews, V. Möller, J.S. Fuglestvedt, V. Masson-Delmotte, C. Méndez, A. Reisinger, S. Semenov (eds)]. In IPCC, 2022: Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [P.R. Shukla, J. Skea, R. Slade, A. Al Khourdajie, R. van Diemen, D. McCollum, M. Pathak, S. Some, P. Vyas, R. Fradera, M. Belkacemi, A. Hasija, G. Lisboa, S. Luz, J. Malley, (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA. doi: 10.1017/9781009157926.020

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M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, B. Rama (eds.)]. Cambridge University Press. In Press.

P. J. Newell, F. W. Geels, B. K. Sovacool, Navigating tensions between rapid and just low-carbon transitions. Environ. Res. Lett. 17, 041006 (2022).

Rockström, J., Gupta, J., Qin, D. et al. Safe and just Earth system boundaries. Nature 619, 102–111 (2023). https://doi.org/10.1038/s41586-023-06083-8

Sachs, J.D., Schmidt-Traub, G., Mazzucato, M. et al. Six Transformations to achieve the Sustainable Development Goals. Nat Sustain 2, 805–814 (2019). https://doi.org/10.1038/s41893-019-0352-

Teske, S. Achieving the Paris climate agreement goals: global and regional 100% renewable energy scenarios with non-energy GHG pathways for +1.5°C and +2°C. Springer International Publishing (2019), 10.1007/978-3-030-05843-2 (Open Access)

Wilson, C., Grubler, A., Bento, N., Healey, S., De Stercke, S., and Zimm, C. (2020). Granular technologies to accelerate decarbonization. Science 368, 36–39. https://doi.org/10.1126/ science.aaz8060.

Content

Topic 1 – Planetary Boundaries and Sustainability Transitions

- Introduction of Anthropocene and planetary boundaries Basic elements of transition.

Topic 2 – Status of Climate Change and Basic Principles of Net-Zero Emissions
- Net-Zero emissions timelines
- Climate change evidence over the years and latest debates

Topic 3 – Emissions Trends and Drivers
- Global Emission Profile
- Emission Profile of Taiwan

Topic 4 – Climate Scenarios and Pathways
- Scenarios used by IPCC and global energy outlook
- Applications of scenario and pathways
- Imagine the future through scenarios and pathways

Topic 5 – Sectoral Mitigation Pathways and Measures
- Energy system to achieve net-zero
- Demand side solution to achieve net-zero

Topic 6 – Climate Adaptation
- Global climate policy
- Climate Policy of Taiwan

Topic 7 – Theoretical Framework of Sustainability Transitions
- Analyzing Transition Dynamics with Multi-Level Perspective
- Facilitating action plan through transition management

Topic 8 – Policy and Action
- Climate actions in Cities and Communities
- Climate actions in Daily Life

Topic 9 – Just Transition
- Justice consideration in climate change research
- The policies and measures to implement just transition

Topic 10 – Climate Outreach and Engagement
- Opinion Survey
- Media framing

Field study and experiential learning components may include:
- Visit to the nuclear power plants and nearby citizen power plants
- Visit to organic farm using black soldier flies to address the compost overflow issue or other organic circular farms

Syllabus of Record is subject to minor changes in Term-specific Syllabus at faculty's discretion.