

COURSE OUTLINE

Course Coordinator	:	Swati Sharma
Course Code / Title	:	HE5093 Environmental Challenges, Energy Transition & Sustainability
Pre-requisites	:	N.A. (Basic knowledge in Environment/Energy/Economics Policy/Business)
No. of AUs.	:	3
Contact Hours	:	39

Course Aims

The central theme of the course is to highlight the interplay and intersection of technology, policy, and behavior change (or society or people in other words) in the context of environmental issues and sustainability in general. The course uses an interdisciplinary approach, in which core clean energy technologies and complex environmental issues are understood and discussed through the lenses of economics, policy, and behavioral norms.

This course is part of our effort for international collaboration in teaching. Select students from an Indonesian university will join the course remotely.

A field trip is proposed to Makassar, a port city on eastern Indonesia's Sulawesi Island, where the partner Institution is located. The main objective of the field trip is cultural exchange and fostering a global perspective while learning about environmental issues and sustainable development. Sustainable development or issues of sustainability are predominantly context-specific and impact developing and low-income economies differently than high-income economies. The aim of the field trip is, thus, to foster and develop NTU students' learning in a global context. The field trip experience may help them grow and understand sustainable development in geographically, socially, and economically diverse contexts. The proposed trip also has the potential to highlight the importance of social cohesion, which is at the core of the global sustainable development goals.

Intended Learning Outcomes (ILO)

1. Understand the overall objective and plan of sustainable development, related environmental issues, and need for the energy transition.
2. Describe and recognize basic methods to improve efficiency, make energy transitions, and promote overall sustainability while also focusing on social dimensions.
3. Analyse and evaluate the basic technical and financial feasibility of clean energy technologies.
4. Analyse and evaluate basic economic measures and government policy aspects of clean energy and other environmental solutions.
5. Apply understanding of the basic functioning of technology, policy, and behavioural aspects to design and develop sustainability solutions.

Course Content

The proposed course is a 3AU course involving 3 hours of learning and teaching every week for 13 weeks (in total 39 hours excluding field trips). Weekly teaching and learning sessions of 3 hours are divided between teaching seminars and tutorial discussions (student activities). A variety of topics are covered under the umbrella of environmental issues and energy transition needs, including decarbonization pathways, clean energy sources- technological and financial aspects, discussion of environmental economics and policy tools to analyze the solutions and understand the extent of problems, social and behavioral norms tools, among others. A tentative structure of the syllabus/topic covered is mentioned below.

Course Assessment

Class Participation	: 20%
Presentation	: 15%
Assignment	: 15%
Project	: 50%

Total	100%

Reading and References

1. Harvey, H., Orvis, R., Rissman, J., O'Boyle, M., Busch, C., & Aggarwal, S. (2018). Designing climate solutions: a policy guide for low-carbon energy. Washington: Island Press.
2. Mulvaney, D. (2020). Sustainable energy transitions: Socio-ecological dimensions of decarbonization. Springer Nature.

Reading suggestions and resources will be shared via NTULearn.

Note: The above listing comprises the foundational readings for the course, and additional, more up-to-date and relevant readings will be provided as they become available.

Course Instructors

Instructor	Office Location	Email
Swati Sharma	SHHK-04-48	swati.sharma@ntu.edu.sg

Planned Weekly Schedule

Week	Topic	Course LO	Readings/ Activities
Week 1	Introduction and overview	1, 2, 3, 4, 5	Reading suggestions and resources will be shared.
Week 2	Pathways to decarbonization: Role of technology, policy/economics, and behavior change	1, 2, 3, 4, 5	Reading suggestions and resources will be shared. Group discussion
Week 3	Clean/renewable energy sources: Technology and finances – I	1, 2, 3, 4, 5	Reading suggestions and resources will be shared. Group discussion
Week 4	Clean/renewable energy sources: Technology and finances – II	1, 2, 3, 4, 5	Reading suggestions and resources will be shared. Group discussion

Week 5	Team project discussion and consultation session/doubt-clearing session	1, 2, 3, 4, 5	Group/class discussion
Week 6	Behavior change and social norms	1, 2, 3, 4, 5	Reading suggestions and resources will be shared. Group discussion
Week 7	Environmental economics and policy tools-I	1, 2, 3, 4, 5	Reading suggestions and resources will be shared. Group discussion
Recess Week - Field Visit To Indonesia			
Week 8	Environmental economics and policy tools-II	1, 2, 3, 4, 5	Reading suggestions and resources will be shared. Group discussion
Week 9	Low carbon systems/ Environmental and sustainability performance	1, 2, 3, 4, 5	Guest speaker session, reading suggestions and resources will be shared.
Week 10	Environmental and sustainability performance/carbon accounting	1, 2, 3, 4, 5	Guest speaker session, reading suggestions and resources will be shared.
Week 11	An open topic under the sustainable development aspects (guest speaker)	1, 2, 3, 4, 5	Guest speaker session, reading suggestions and resources will be shared.
Week 12	Individual Micro-Task Presentations: Session 1	1, 2, 3, 4, 5	Presentations and peer-feedback sessions
Week 13	Individual Micro-Task Presentations: Session 2	1, 2, 3, 4, 5	Presentations and peer-feedback sessions