

Course number		G-LAS15 80034 LE28 G-LAS15 80034 LE14					
Course title (and course title in English)	From Carbon Neutral to Carbon Negative From Carbon Neutral to Carbon Negative			Instructor's name, job title, and department of affiliation	Graduate School of Energy Science Professor,MCLELLAN , Benjamin Institute of Advanced Energy Associate Professor,ARIVAZHAGAN RAJENDRAN Institute of Advanced Energy Program-Specific Senior Lecturer,CRAVIOTOCABALLERO, Jordi		
Group	Interdisciplinary Graduate Courses		Field(Classification)	Interdisciplinary Courses			
Language of instruction	English		Old group			Number of credits	2
Number of weekly time blocks	1	Class style	Lecture (Face-to-face course)		Year/semesters	2025 • First semester	
Days and periods	Fri.2		Target year	修士課程		Eligible students	For all majors
(Students of Graduate School of Energy Science cannot take this course as liberal arts and general education course. Please register the course with your department.)							
[Overview and purpose of the course]							
To deepen the knowledge of carbon neutrality and the potential to move even further beyond to carbon negative societies. To understand and discuss the relevant sectoral and national barriers and strategies.							
[Course objectives]							
By the end of the course, students will have advanced knowledge and a high-level understanding of carbon neutrality and carbon negative solutions from technological, environmental, policy and socio-economic perspectives.							
[Course schedule and contents)]							
The course will cover the following topics over 15 weeks, including feedback. The order will be announced on the first day of class.							
(Introduction)							
1. Definition of carbon neutrality and carbon negative							
(Measurements)							
2. Life Cycle Assessment (LCA) and carbon neutrality							
3. Carbon footprints - standards and methods							
(Technology)							
4-8. Technology for zero-carbon energy (I) (Non-carbon fuels and power)							
i) Solar energy							
ii) Wind energy							
iii) Geothermal energy							
iv) Biomass energy							
Materials for carbon-free energy production and conservation							
9. Technology for zero-carbon energy (II) (CCS)							
10. Negative-emissions technology (BECCS)							
11. Energy Efficiency							
(Policy and promotion mechanisms)							
12. Carbon offsets, carbon pricing							
13. <u>Sectoral approaches for net-zero emissions (ZEH, ZEB)</u> _ _ _ _ _							
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From Carbon Neutral to Carbon Negative(2)

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14. Policy for institutional innovation (National; International)
 15. Feedback

[Course requirements]

None

[Evaluation methods and policy]

The evaluation is based upon these factors. Out of a possible 100 points:

1. Essays (60 points).
2. Class participation and short exercises (40 points).

[Evaluation Policy]

Will be evaluated according to the grade evaluation policy of the Graduate School of Energy Science and Institute for Liberal Arts and Sciences.

[Textbooks]

No textbook will be specified, but reading material is provided on PandA.

[Study outside of class (preparation and review)]

Students may have some requirement for pre-class preparation and short exercises to complement and reinforce the class learning.

[Other information (office hours, etc.)]

Instructors may be contacted by e-mail (provided in class).

Students who previously took "Carbon Neutrality" or the course "From Carbon Neutral to Carbon Negative" from the Graduate School of Energy Science in 2024 cannot take this class.

*Please visit KULASIS to find out about office hours.