

2023 International Joint Graduate Course on Sustainable Energy



WASEDA University



Participants:

Waseda University, Japan (Host)
Korea University, South Korea
University of Maryland, College Park
Hamburg University of Technology, Germany
Shanghai Jiao Tong University, China

Date: July 10-21, 2023

Location: Nishiwaseda Campus
Faculty of Science and Engineering
Waseda University, Tokyo, Japan

Course Objectives: Sustainable Energy Production, Conversion, Utilization, and Recovery

- Gain an understanding of production, conversion and utilization of sustainable energy.
- Gain an understanding of limitations and opportunities.
- Gain experience in designing sustainable energy systems.
- Develop your own vision for a future sustainable energy scenario and a strategic plan.
- Learn about assessing and enhancing sustainability of current energy resources.

Main instructors

Instructors from Waseda University, Korea University, Hamburg University of Technology, University of Maryland, and Shanghai Jiao Tong University, as well as visiting experts from Japanese industry, will guide students.

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Course Subjects / Outlines

- Fundamentals and future developments of heat pump technologies
- Open cycle air conditioning in hot and humid climates
- Desiccant technology
- Refrigeration heat pumps
- Brain wave measurement for assessing thermal-comfort
- Performance evaluation methodologies for heat pumps and air conditioners
- MATLAB deep learning workshop
- AI and machine learning for HVAC-R performance monitoring
- Energy trans-mission & storage
- Air as ultimate medium for power, cooling, heating, and storage cycles
- Wind energy
- Solar thermal system and renewable synthetic fuel
- Solar PV and solar cooling technologies
- Ocean Energy and Advanced Heat Pump System
- Combined Cooling, Heat and Power (CCHP)
- Green building energy system

The above topics will be taught and developed group work by the students. Grading is based on quizzes, homework projects, and presentations.

- Student Presentations (Final selection of topics will be made jointly in class)
- Laboratory exercise

Grading

Quizzes (20%)

Presentations (50%)

Homework reports (30%)

While in the course:

The students will attend classes for 8-hours per day, for 10 days. A typical class day will have lectures, in-class projects in mixed teams, and homework assignments.



Nishiwaseda Campus, Waseda University



Waseda University