Graduate School of

# nvironmental Science

Division of Environmental Science Development Division of Earth System Science Division of Biosphere Science Division of Environmental Materials Science



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#### Find our own coordinate axis

The Graduate School of Environmental Science was established in 1977 as the first graduate school in Japan to focus on Environmental Science. After an era as the Graduate School of Environmental Earth Science, it was reorganized into the current four divisions in 2005. Since its inception many environmental studies have been conducted to obtain overall knowledge of the actual status of various issues regarding global environment, to clarify the individual mechanisms behind those issues, and to provide better solutions to them with scientific evidence. These efforts have deepened our understandings of environmental sustainability, which is an essential background for the United Nations' 17 Sustainable Development Goals. Meanwhile, global environmental issues and their regional disparities are becoming more and more serious, therefore the social demands toward environmental science are becoming more important.

Environmental Science is a comprehensive field based on pre-existing hatural sciences while being strongly connected with social and humane sciences. For this reason, any research in the environmental science must balance the need to present new and universal scientific findings, while at the same time, to promote academic activities with the perspective of addressing environmental issues in 21st century.

Existing highly specialized natural science fields have their own peer-review system according to their own coordinate axis. On the basis of that axis, individual scientific fields develop while the scientific significance of each study is guaranteed by the academic community. However, because environmental science is a newer field of study, we left the coordinate axis to the pre-existing academic fields and has not been so enthusiastic about setting our own by ourselves.

It is difficult to create a single coordinate axis that is inclusive to all the diverse and wide-ranging academic activities of environmental science, as embodied by our four divisions in our graduate school. However, with the 21st century one-fifth passed, Environmental Science at Hokkaido University must mature. Therefore, we are now standing at the place where we should look forward beyond 2030 when most of the SDGs are set to be achieved. Each student and faculty member who aspires to pursue environmental science should present a possible coordinate axis, discuss it deeply, and establish it. I hope that all students who are just starting their careers in our graduate school will join in this effort together.

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#### Organization

Graduate School of Environmental Science

> Division of Environmental Science Development

Division of Earth System

Division of Biosphere Science

Division of Environmental Materials Science -Biogeochemistry

Human and Ecological Systems

Practical Science for the Environment

Global Environmental Management

Atmosphere-Ocean and Climate Dynamics
Cryosphere Science

-Plant Ecology and Biodiversity Science

- -Ecological Genetics
- -Molecular Biology
- -Animal Ecology
- -Marine Biogeochemistry and Biology
- -Aquatic Biology
- -Forest Field Science
- Agro-Ecosystem Science

-Biomaterials Chemistry -Environmental Nano-Materials -Molecular Photonics and Electronics Science

- Environmental Catalytic Chemistry

#### Participants

Faculty of Environmental Earth Science Institute of Low Temperature Science Research Institute for Electronic Science Institute for Catalysis Field Science Center for Northern Biosphere Faculty of Fisheries Sciences Arctic Research Center Faculty of Science

## **Division of Environmental Science Development**

Humankind is currently facing many environmental issues, represented by global warming, biodiversity reduction, and ecosystem degradation. The advancement of environmental sciences is a prerequisite to save the earth through the conservation, remediation and restoration of ecosystems at various scales. A sustainable and low-carbon society should be created for future generations. The Division of Environmental Science Development has been established for solving these issues based on solid scientific foundations. To progress in the interdisciplinary studies, we mobilize all of the natural and social sciences. Students in this division are expected to understand and solve such environmental issues.

- Course in Human and Ecological Systems Symbiosis in Nature Environmental Geography and Conservation Sustainability and Low-Carbon Society
- Course in Environmental Adaptation Science Environmental Adaptation Reduction of Environmental Impact Environmental Remediation Risk Assessment and Management for Chemicals
- Course in Practical Science for the Environment Education for Sustainable Development (ESD) Environmental Education Earth System Science Civic Pride
- Course in Global Environmental Management Influence of Global Warming Resource and Risk Management Environmental Education International Perspective





https://www.ees.hokudai.ac.jp/ kigaku/?lang=en

## **Division of Earth System Science**

This division offers students the opportunity to study Earth sciences and thus understand and predict the Earth's environment and its variability on broad time scales. The division's scope includes detection, attribution, and projection of local- to global-scale environmental and climatic changes. The division has three courses to cover various fields of earth sciences. Each of the courses has an extensive curriculum to provide education of geosciences from fundamental to advanced levels in order to cultivate specialties. The study of the Earth's environment requires interdisciplinary cooperation, so a broad perspective is also required. Thus the division offers multidisciplinary classes as well.

Course in Biogeochemistry

Biogeochemical Cycle, Paleoenvironment and Paleoclimate, Environmental Chemical Analysis, Isotope Analysis of Bio and Geomaterials Field Science of Land, Ocean, and the Atmosphere, Climate Change

- Course in Atmosphere-Ocean and Climate Dynamics Meteorology, Physical Oceanography, Sea Ice and Polar Sciences, Climate System Science, Field Observations, Data Analysis, and Numerical Modeling
- Course in Cryosphere Science Glacier and Ice Sheet Science Cold Region Hydrology and Meteorology Geocryology Ice Core Research





https://www.ees.hokudai.ac.jp/ earth/?lang=en

## **Division of Biosphere Science**

The Division of Biosphere Sciences integrates knowledge and techniques from various fields of biology, including ecology, biochemistry, molecular biology, and production science. Through a diverse range of lectures and research guidance, the division aims to nurture promising young researchers capable of making significant contributions to the field. Comprising eight courses, it allows students the flexibility to seek advice from professors of other courses, adapting to the intricate nature of environmental challenges involving living organisms.

- Course in Plant Ecology and Biodiversity Science Forest Community, Plant-Animal Interaction, Succession
- Course in Ecological Genetics Genetic Diversity, Evolution, Phylogeny, Genome Science
- Course in Molecular Biology Environmental Microbiology, Plant Molecular Biology, Bioremediation, Microbial Ecology, Animal Physiology
- Course in Animal Ecology Population Ecology, Community Ecology, Conservation Biology
- Course in Marine Biogeochemistry and Biology Fisheries Oceanography, Marine Biogeochemistry, Fisheries Physics, Reproductive Fish Physiology, Fish Aquaculture Biology
- Course in Aquatic Biology Aquatic Biology, Developmental Biology, Aquatic Ecology
- Course in Forest Field Science Forest Ecology, Ecosystem Function
- Course in Agro-ecosystem Science Cropping Systems, Land use and Livestock Production Systems, Plant Conservation





https://noah.ees.hokudai.ac.jp/ bio\_en/

## **Division of Environmental Materials Science**

Environmental pollution and environmental destruction are serious problems throughout the world. In order to resolve these problems, comprehensive chemistry-based research and understanding of the natural environment are essential, because chemical reactions are the basis of all natural phenomena. The Division of Environmental Materials Science conducts cutting-edge research and special education on the distribution and activity of chemical substances involved in environmental problems and on the development of novel methods for environmental remediation and environmental protection. We foster students' talents so that students can play a central role in problem solving.

- Course in Biomaterials Chemistry Synthetic Organic Chemistry, otechnology, R Marine Natural Product Chemistry Course in Environmental Nanomaterials Chemosensors Environmental Electrochemistry, Supramolecular Chemistry, Environmental Catalysis Environmental dynamic analysis Porous materials Course in Molecular Photonics and Electronics Science Supramolecular crystalline materials, Molecular conductors and dielectrics, Molecular magnets, Porous organic materials, Solar energy materials, Fluorescent molecules and nanomaterials, Molecular and bio sensors Laser trapping crystallization
- Course in Environmental Catalytic Chemistry Catalytic chemistry, Heterogeneous Catalysis, Green & sustainable chemistry, Catalytic biomass conversion, Renewable carbon resources, Acid-base Catalysis, Oxidation-reduction catalysis, Plasma catalysis, Synchrotron X-ray characterization, Surface science





https://www.ees.hokudai.ac.jp/ material/?lang=en

### International programs and affairs

#### One program for Global Goals (OGGs)

- OGGs is an international program for graduate students established to develop human resources who can contribute to the realization of a sustainable society.
- · OGGs consists of three courses: PARE, NJE3, and STSI.
- PARE is conducted in collaboration with Hokkaido University and partner universities in Indonesia and Thailand to develop frontier human resources who can solve various problems related to "populations," "activities," "resources," and "environments" and can play leading roles in the development of Asia.
- NJE3 course aims to develop northern reginal specialists with a multidisciplinary and comprehensive perspective that can be obtained by connecting the various research fields practiced in this course.
- STSI jointly implement by Hokkaido University and three of India's top universities to foster professionals with the ability to maximize results in endeavours that address various issues related to transportation system and infrastructure development in India.
- · All OGGs classes are conducted in English, with classes at Hokkaido University and overseas practical training.
- It is possible to learn with students from OGGs partner universities and with students studying various specialized fields.
- · In FY2025, we plan to hold courses at Indonesia, Finland/Sweden, Bulgaria, and India.

#### EPEES program

English Program of Environmental Earth Science for Sustainable Society (EPEES) is for master's and doctoral courses, started in April of 2014.

EPEES aims to foster professionals who can contribute to the protection of the global and local environments having broad knowledge.

The program is conducted entirely in English. The pre-arrival admission is also available for this program.

#### Other programs

• Student Exchange Support Program (Scholarship for Study in Japan under Agreement)

- Special Grant Program for International Students
- Antarctic Science program
- ABE Initiative program
- SDGs Global Leader Course
- Program for Advancing Strategic International Networks to Accelerate the Circulation of Talented Researchers

## Information for Students from Overseas

Education: We welcome students from overseas. We offer a program taught entirely in English, so a student can get a Master's or Doctoral degree by taking classes only in English. Nevertheless, we recommend that international students learn Japanese, and the Institute for the Advancement of Higher Education, Hokkaido University prepares Japanese language courses.

Admission: Entrance examinations are held in August and February each year. The academic year starts in April, but some Doctoral and Master's courses also start in October. Applicants are strongly advised to contact faculty members in their research field of interest before applying for entrance examinations.

Scholarship and exchange programs: Scholarships from Hokkaido University, the Japanese government and other organizations are available for international students. For more information about

scholarship, visit Hokkaido University Website (English Main site) https://www.global.hokudai.ac.jp/admissions/scholarships/ scholarships-for-prospective-students/ We also have international exchange programs with other universities. The list of partner institutions is shown at https://www.global.hokudai.ac.jp/global/overseas-partnerships/international-agreements/

#### Information

Graduate School of Environmental Science, Hokkaido University https://www.ees.hokudai.ac.jp/en/

International Agreements https://www.global.hokudai.ac.jp/ global/overseas-partnerships/ international-agreements/



Scholarships for Prospective Students https://www.global.hokudai.ac.jp/ admissions/scholarships/ scholarships-for-prospective-students/

Graduate Admissions https://www.global.hokudai.ac.jp/ admissions/graduate-admissions/











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