School of Earth, Energy and Environmental Engineering

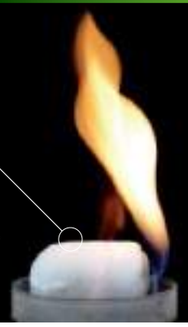
Course Programs:

- Applied Energy
- Environment Protection and Disaster Prevention
- Advanced Materials

Today solving global environmental problems is an indispensable task in various industrial fields in various industrial fields in human society.
Being able to deal with such tasks requires the training of engineers who can act on their own initiative.
The traditional vertical division in educational research organizations in each specialized field makes it difficult to adequately deal with the tasks and solve issues related to the global environment.
At this school the three fields of energy, environment protection and disaster prevention, and advanced materials are combined to promote characteristic research from a new angle which is globally applicable through comprehensive efforts of cooperating faculty members in these fields. In addition, by teaching students to acquire knowledge, skills and technology that can contribute to solving global environmental problems from various aspects centered on the above three fields, the school aims to train students who can independently discover the process from "excavation" to "solution" of the tasks and who can solve not only national issues, but also global issues in the fields of energy, resources, global environment etc.

Applied Energy Course Program

In this course, students gain a comprehensive understanding of energy engineering, which is closely related to machinery, electrics/electronics and chemistry, with topics ranging from gas hydrates, renewable energy and decentralized energy and energy-saving systems.



Faculty Interview

Continue taking on challenges
despite setbacks.
Doing so will surely
lead to new discoveries and
forge a new future for you.

Mayumi Takeyama Professor

◎Profile／Graduated from the Department of Electronic Engineering, Faculty of Engineering, Kitami Institute of Technology, before obtaining a doctoral degree in engineering from Hokkaido University. Engaged in a wide range of research areas such as three-dimensional integrated circuits, next-generation supercomputers, a project to visualize specialty goods of the Okhotsk region and a plant factory in space.

The Applied Energy Course has no equal in Japan, allowing students to comprehensively learn about electric, mechanical and chemical aspects of energy. In addition to essential subjects necessary for learning about electricity, including electric circuits, electromagnetism and electronic devices, this course includes basic lectures on machinery such as those involving heat and fluids. In addition, subjects dealing comprehensively with energy such as bioethanol, methane hydrate serve as a pillar of the curriculum. Along with expanded experiments and hands-on learning, students are encouraged to learn and think on their own. Human resources with electricity, machinery and chemistry know-how are in high demand by companies in various fields, including power, automobile, semiconductor, communications, civil engineering and construction. We support students taking on various challenges committed to accomplishing their goals.

Curriculum

Basic Thermodynamics	Integrated Engineering for Applied Energy I	Experiments of Energy Engineering II	Robotics
Basic Fluid Mechanics	Applied Thermodynamics	Integrated Engineering for Applied Energy II	Practical English
Basic Chemical Energy	Applied Fluid Mechanics	Applied Energy Conversion	Bachelor's Thesis
Electromagnetics	Applied Chemical Energy	Control Engineering	System Control Theory
Fundamentals of Power Circuit	Electrical Energy Application	High Speed Thermal Fluid	Biochemical Engineering
Mechanics of Materials I	Applied Power Circuit	Bio-measurement Engineering	Introduction to Gas Hydrate Research
Dynamics of Machine Systems I	Fundamentals of Energy Conversion	Electric Power System Engineering	Electricity Related Laws and Facility Maintenance
Computer Programming I	Transfer of Thermal Energy	Basic Electronics	Laboratory on Electrical Energy
Fourier Analysis	Electronic Devices	Electrical and Electronics Material Engineering	Design of Electric Machinery
Design and Drawing	Power Electronics	Aeronautical Fluid Dynamics	
Experiments of Energy Engineering I	Energy and Environmental Engineering	Engineering of Automobile Engine	

*The description refers to the 2020 academic year curriculum and is thus subject to change.

Lecture

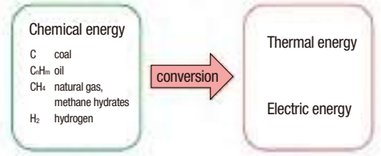
Basic Thermodynamics

Students will learn about thermal energy conversion based on thermodynamics. This technology is applied to power generation and heat supply systems.

A cogeneration system

Basic Chemical Energy

Study of chemical energy conversion, based on chemical thermodynamics and electrochemistry, which is appliable to fuel cells and power storage systems.



Environment Protection and Disaster Prevention Course Program

This course's curriculum consists of basic subjects on earth environment, cold region nature and environmental engineering and disaster prevention.

Faculty Interview

Never regret not having
done something you wanted to do.
Setbacks are fine;
continue moving forward
with a sense of purpose.

Satoshi Yamashita Professor

◎Profile: Graduated from the Department of Civil and Environmental Engineering, Faculty of Engineering, Kitami Institute of Technology, before obtaining a doctoral degree in engineering from Hokkaido University. Research interests include the deformation and strength properties of ground materials, earthquake-triggered liquefaction and evaluation of the stability of submarine ground containing methane hydrate.

Taking advantage of the favorable location of KIT, situated in nature-rich Hokkaido's Okhotsk region, students learn the basics in the environmental domain. In the practicum, they learn about how the Okhotsk area is tackling issues related to environmental protection and disaster prevention, identify problems and work as a team to explore solutions. The campus is a place of self-formation as students deepen their specialized knowledge. To do this requires a broad perspective with wide interests. Initial goals may be vague and are subject to change, but that is fine. Do not be afraid of setbacks and take on challenges in whatever you are interested in. Doing so will bear fruit in your life.

Curriculum

- Environmental Earth Science
- Glaciology
- Introduction to Environmental Studies
- Geotechnical Engineering I
- Hydraulics I
- Structural Mechanics I
- City Planning
- Integrated Study in Environment and Disaster Prevention I
- Practical English
- Introduction to Gas Hydrate Research
- Water Environmental Engineering
- Integrated Study in Environment and Disaster Prevention II
- Experiments on Environment and Disaster Prevention Engineering I
- Experiments on Environment and Disaster Prevention Engineering II
- Bachelor's Thesis
- Analytical Chemistry I
- Environmental Materials
- Surveying
- Exercise in Computer Aided Drawing for Disaster Prevention and Environmental Engineering
- Remote Sensing
- Analytical Chemistry II
- Cold Regions Rock Mechanics
- Geotechnical Engineering II
- Hydraulics II
- Structural Mechanics II
- Reinforced Concrete Structure
- Mathematical Methods for Planning
- GIS Practice for Environment and Disaster Prevention
- Surveying Practice and Drafting
- Introduction to Ice Physics
- Meteorology
- Water and Wastewater Treatment Engineering
- Measurement Science in Environmental Analyses
- Introduction to Ecology
- Analyses for Geo-disasters
- Geo-environmental and Geo-disaster Prevention Engineering
- River Engineering
- Coastal Engineering
- Snow and Ice Disaster Prevention Engineering
- Ice Covered Sea Engineering
- Experiments in Environmental Chemistry
- Integrated Study of Career Advance
- Applied Ecological Engineering
- Hydrology
- Earthquake Disaster-Mitigation Engineering
- Explosives Engineering

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Lecture

Introduction to Gas Hydrate Research

Methane hydrate, often referred to as "fiery ice" and regarded as a future energy source, stores a massive volume of global warming gases. Students learn their properties and importance from the viewpoints of environmental studies and environmental earth science.

Geotechnical Engineering I

Students learn through lectures and practical work about the basic properties and phenomena of soil essential to mitigate or prevent disasters involving the ground, such as slope collapse due to torrential rain and melted snow, earthquake-triggered liquefaction, and frost heave unique to cold regions.

Advanced Materials Course Program

It is a top-priority task for humans to develop useful materials and technologies to solve problems related to the global environment. Students in this course learn necessary basic and applied sciences to take on this task and acquire knowledge and experimental techniques to develop materials to save energy and protect the environment as well as eco-friendly synthesis processes.

Faculty Interview

No challenge, no success.
Take the first step forward,
believing in eventual success.

Tomoya Ohno Professor

◎Profile: Graduated from the Graduate School of Science and Technology at Shizuoka University, majoring in Materials Science. Primary research interests include ceramic materials, powder technology and rechargeable batteries.

In the Advanced Materials Course Program, students acquire knowledge necessary for designing, generating and analyzing materials, which are the most basic element of excellent equipment and machinery indispensable for today's convenient lifestyle and for providing an environment for a stable supply of large amounts of energy. There are still uncharted territories in materials development. One characteristic of this course is learning how to approach unresolved questions. Many students who have taken this course have secured jobs in the automobile, electronic machinery and other manufacturing sectors after graduation, supporting the development of Japan's key industries. Faculty members work closely with students, who are encouraged to seek assistance and guidance from their professors. Tackling advanced research matters in an easygoing atmosphere is ideal. Make your time at KIT one of the most enjoyable periods of your life.

Curriculum

- Environmental Materials Science I, II
- Advanced Materials Engineering
- Advanced Materials Engineering Experiments I, II
- Materials Physics I, II
- Inorganic Materials Science
- Analytical Chemistry I
- Organic Chemistry I
- Physical Chemistry I
- Practical English
- Bachelor's Thesis
- Chemistry for Biomaterials
- Separation Chemistry
- Superconducting Engineering
- Physics of Semiconductor Devices
- Materials Surface Chemistry
- Applied Physics
- Process Engineering
- Thin Film Materials Engineering
- Polymer Materials
- Metallic Materials
- Optical Materials
- Modern Ceramic Engineering
- Structural Analysis of Inorganic Materials
- Structural Analysis of Organic Compounds
- Organic Synthesis
- Polymer Synthesis
- Introduction to Manufacturing Processes
- Analytical Chemistry II
- Organic Chemistry II, III
- Physical Chemistry II
- Seminar in Materials Science
- Seminar
- English for Science and Technology
- Topics in Materials Science I, II

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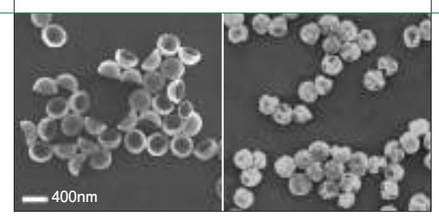
Lecture

Environmental Material Science 1

In this course, students learn about the latest knowledge and challenges in key areas (energy-saving materials, environmental analyses, environmental catalysis and solar cells, etc.) subject to research and development as essential science and technology to solve problems related to the earth environment.

Advanced Materials Engineering

Students gain knowledge about the research frontier of nanotechnology, which holds promise of a better future for humans, in addition to synthesis processes and properties of nanomaterials and eco-friendly materials.



With climate change progressing and the social structure and situation changing drastically,
KIT, as the only technical university located in the Okhotsk region of Hokkaido,
a region which depends strongly on the primary industries, the school aims to challenge
and solve regional problems from an engineering point of view choosing the Okhotsk region as the model area.
The school actively works to achieve results, utilize the results for regional revitalization,
and cultivate skills to create a future design of an attractive region providing "safety and security"
and to be able to expand this globally.
The school reflects these characteristic efforts in its educational setting and concretely
shows students the process from "excavation" to "solution" of the problems.
The school strives to train students who think independently with a sense of purpose
and who apply their skills. Students graduating from the school will have learned various
problem solving processes and acquired skills to not only play an active role in the Okhotsk region
or Hokkaido, but also throughout Japan and the world.

Course Programs:

- Intelligent Machines and Biomechanics
- Information Design and Communication
- Civil Infrastructure
- Biotechnology and Food Chemistry

School of Regional Innovation and Social Design Engineering

Intelligent Machines and Biomechanics Course Program

In addition to dynamics, a basis of mechanical engineering, this program offers applied courses on control engineering, medical engineering, robotics and other areas. It aims at cultivating students capable of identifying and solving problems facing a certain region or society and fostering engineers with broad but specialized perspectives and application skills.

Faculty Interview

Strive to become a superb engineering talent capable of comprehending and accomplishing various things.

Ullah Sharif Professor

◎Profile: Obtained a doctoral degree in mechanical engineering from the Graduate School of Science and Engineering, Kansai University. Conducting research on 3D printing, Industry 4.0, precision processing, development of sustainable products, design theory and the decision-making process.

This course nurtures students' basic academic abilities in mechanics and information-related domains as well as matters related to the living body through such subjects as material mechanics, mechanical dynamics, manufacturing engineering, bionics, medical engineering, robotics, computer science and smart agriculture. Engineers capable of both comprehending and succeeding at challenges are needed today. In this program, students will acquire superb engineering capabilities by learning about artificial intelligence and robot technologies, among others, toward becoming specialists in various fields. Campus life offers you opportunities to take on various challenges. It is my wish to see students grow into adults who can come up with flexible and creative ideas, while brushing up skills through not only engineering studies, but also club activities, part-time work, reading, mastering a foreign language and studying abroad.

Curriculum

Mechanics of Materials I	Comprehensive Engineering on Intelligent Machines and Biomechanics I	Robotics	Introduction to Engineering Materials
Dynamics of Machine Systems I	Mechanics of Materials II	Artificial Intelligence	Introduction to Manufacturing Processes
Basic Thermodynamics	Dynamics of Machine Systems II	Experiments of Intelligent Machines and Biomechanics II	Circuit Engineering for Control
Basic Fluid Mechanics	Basic Electric Engineering	Comprehensive Engineering on Intelligent Machines and Biomechanics II	Introduction to Computer-Aided Manufacturing
Control Engineering	Biomaterials	Biomolecular Engineering	Mechatronics
Mechanical Design I	Computer Programming II	Basics of Image Processing	Agricultural Machine Engineering
Computer Programming I	Introduction to Bioengineering	Essential English Expressions in Scientific Research and Engineering	Laboratory Seminar
Statistical Processing Method	Mechanical Design II	Creative Engineering	Applied Thermodynamics
Fourier Analysis	Introduction to Computer-Aided Design	Computational Mechanics	Applied Fluid Mechanics
Bio-measurement Engineering	Computer Aided Engineering	Theory of Elasticity and Plasticity	Production and Quality Control Engineering
Practical English	Medical Engineering	Practice of Accurate Processing	Bachelor's Thesis
Experiments of Intelligent Machines and Biomechanics I			Topics in Intelligent Machines and Biomechanics

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Lecture

CAE (Computer-aided engineering)

Students learn about CAE technology essential for manufacturing today. This course consists of basic lectures on CAE as well as practical exercises using analysis software actually used in the industry.

Mechatronics

Students learn the basics of actuators, sensors and power transmission. Students are grouped into small teams, and each will make an autonomous mobile robot. Then they compete in a contest with their robot, which is designed to have themdevelop engineering skills.