科目ナンバリング			
Course title <English>	Socio-Environmental Energy Science, Adv. Advanced Seminar on Socio-Environmental Energy Science	Affiliated department, Job title,Name	Graduate School of Energy Science 社会・環境教員全員 Graduate School of Energy Science Associate Professor,OGATA SEIICHI

Target year	Doctoral students	Number of credits	2	Course offered year/period	2019/Second semester
Day/period	Fri.2	Class style	Lecture	Language	English

[Outline and Purpose of the Course]

To solve various problems of energy and environment, it is necessary to have broad knowledge and perspectives to analyze problems in a comprehensive and multifaceted manner. In this seminar, the professors and associate professors in the Department of Socio-environmental Energy Science provide omnibus lectures on wide-ranging leading research topics related to socio-environmental energy science.

[Course Goals]

By the end of the course, students will have advanced knowledge and a high level understanding of leading research topics related to socio-environmental energy science, and will be able to analyze various energy problems from engineering, sociological, political, economical, biological and environmental perspectives.

[Course Schedule and Contents]

The course will cover the following topics. The order will be announced on the first day of class.
1. Ecology, Economy, and Environmental Consciousness (Prof. Keiichi Ishihara)
2. Energy Environmental Issues and Technology (Assoc. Prof. Hideyuki Okumura)
3. Introduction to "Energy Systems Study" (Prof. Tetsuo Tezuka)
4. Critical Materials and Unconventional Resources for Energy (Assoc. Prof. Benjamin McLellan)
5. Pyrolysis Mechanism as an Underlying Principle of Thermochemical Conversion of Biomass (Assoc. Prof. Haruo Kawamoto)
6. Risk Communication (Prof. Hiroshi Shimoda)
7. Advanced Technologies for Design, Operation and Maintenance of Power Plants (Assoc. Prof. Hirotake Ishii)
8. Atmospheric Environmental Problems in Asia I (Prof. Susumu Tohno)
9. Atmospheric Environmental Problems in Asia II (Assoc. Prof. Takayuki Kameda)
10. Energy Policy of Japan and Other Leading Countries (Prof. Hirotoshi Unesaki)
11. Strategy of Earthquake Disaster Mitigation (Prof. Katsuhiro Kamae)
12. Earthquake Motions and Earthquake Resistant Design (Assoc. Prof. Hirotoshi Uebayashi)
13. Risk Management of Information Society (Prof. Jun Yoshida)

[Class requirement]

No requirements

Continue to Socio-Environmental Energy Science, Adv.(2)↓↓↓

Socio-Environmental Energy Science, Adv.(2)

[Method, Point of view, and Attainment levels of Evaluation]

The evaluation is based upon these factors. Out of a possible 100 points:
1.Short reports (80 points). The report subject will be provided in each lecture.
2.Class participation (20 points).

[Textbook]

Textbook (Advanced Seminar on Socio-Environmental Energy Science) will be distributed on the first day of class. Additional handouts may be distributed in class.

[Reference books, etc.]

（Reference books）

Reference books will be introduced in class.

[Regarding studies out of class (preparation and review)]

Students are recommended to read the textbook in advance of the lectures.

（Others (office hour, etc.)）

*Please visit KULASIS to find out about office hours.

科目ナンバリング			
Course title <English>	Zero-emission Social System Zero-emission Social System	Affiliated department, Job title,Name	Graduate School of Energy Science Related instructor Graduate School of Energy Science Associate Professor,OGATA SEIICHI

Target year	Doctoral students	Number of credits	2	Course offered year/period	2019/Intensive, year-round
Day/period	Intensive	Class style		Language	English

[Outline and Purpose of the Course]

Acquiring the basic thinking to design the social system through studying the zero-emission society from fundamental to application.

[Course Goals]

To understand the basic knowledge of Zero-emission system and the measures for realizing Zero-emission society.

[Course Schedule and Contents]

Spring Semester:
Attend the course, "Environmental Leadership A", given by the International Environmental Management Program of the Graduate School of Global environmental Studies (GSGES)）
No.1 “Guidance” (Fujii) and “Agricultural activities and environmental problems under different climatic conditions” (Funakawa)
After the guidance of this lecture, the linkage of agricultural activities and generation of environmental problems are discussed with special reference to climatic conditions and respective ecological processes.
No.2 “Waste problems and International cooperation” (Fujii)
The current situation of global waste problems is surveyed. Additionally the case studies of international cooperation in this field in Asia-Pacific region will be shown and discussed.
No.3 "Domestic Wastewater Treatment Technology and Management in Thailand" (Boontanon)
The water quality of rivers in Thailand varies from low to extremely low. This lecture will provide the current situation and existing challenges of domestic wastewater treatment technology and management in Thailand.
No.4 “Water and Sanitation Management in Developing Countries” (Fujii)
Water is one of fundamental elements for human daily life, and UN MGDs (United Nation’s millennium development goals) include sustainable access to an improved water source and improved sanitation. However, introduction of current latest systems used in developed countries is practically impossible, and sometimes improper in developing countries. It is needed to introduce appropriate systems meeting the requirements in local conditions. This lecture gives fundamental factors for water use and discharge, and some examples of water use in developing countries.
No.5 “Energy and Environment” (Tezuka)
The issues of the energy supply and demand and those of the energy-related environmental damage are discussed from the perspectives of systems study and international relationship. The history and current situations of the issues are explained as well as the ways of thinking for mitigating the problems.
No.6 “Global Environmental Changes and Health” (Takano)
Global environmental changes can affect health and diseases. You will learn about the health effects of a variety of environmental factors related to global environmental changes.
No.7 “Student presentations and discussions” (All)
Students give presentations on topics related to the above contents, and discuss them each other.

Continue to Zero-emission Social System(2)↓↓↓

Zero-emission Social System(2)

Fall Semester:
No. 9-15 Advanced Energy Seminar
Requirement is to attend the special lectures and submit the reports about the lectures.

[Class requirement]

Nothing

[Method, Point of view, and Attainment levels of Evaluation]

Reports and Presentations (Report should include the original ideas based on the study.)

[Textbook]

Nothing

[Reference books, etc.]

（Reference books）
Rajib Shaw and R.R. Krishnamurthy 『Global Challenges, Local Solutions』 （University Press, 2009）
The other books will be announced at the class.

[Regarding studies out of class (preparation and review)]

Preparation homework is not required, but homework is recommended to follow up each lecture's contents.

（Others (office hour, etc.) ）

*Please visit KULASIS to find out about office hours.

科目ナンバリング	G-ENE02 76214 LE59				
Course title <English>	Plasma Simulation Methodology Plasma Simulation Methodology	Affiliated department, Job title,Name	Graduate School of Energy Science Professor,KISHIMOTO YASUAKI		
Target year	Doctoral students	Number of credits	2	Course offered year/period	2019/Second semester
Day/period	Wed.5	Class style	Lecture	Language	English

[Outline and Purpose of the Course]

This lecture aims at formally introducing basic statistical description of wide class of plasma. Characteristics of individual and collective behaviors of plasmas and that of associated fluctuation and dissipation are studied following kinetic modeling, which are the basis of numerical simulation of plasmas in magnetically confined fusion plasmas, laser-plasma interaction, space plasmas and astrophysical physics.

[Course Goals]

1.Understanding of plasma as the fourth state of matter based on kinetic and fluid models
2.Understanding of the dispersion relation in plasma and specifically wave-particle interaction emphasizing on Landau damping.
3.Understanding of the characteristics of fluctuation and dissipation in plasmas based on the statistical approach and the role on plasma numerical simulation.

[Course Schedule and Contents]

The class will be arranged as a seminar style according to following subjects.
1.Definition of plasma and the concept as the fourth state of the matter (2 weeks)
2.The role of plasma in nature and laboratory and the concept of confinement (2 weeks)
3.Fluid and kinetic description of plasma (2 weeks)
4. Statistical characteristics of plasma characterizing individual and collective dynamics (2 weeks)
4. Basics of plasma simulation and the methodology (3 weeks)
5. Large scale simulation of turbulence transport in fusion plasma (3 weeks)

[Class requirement]

None

[Method, Point of view, and Attainment levels of Evaluation]

report

[Textbook]

Instructed during class

[Reference books, etc.]

（Reference books）

・S.Ichimaru, Basic Principle of Plasma Physics:A Statistical Approach, Frontiers in Physics Lecture Note

Continue to Plasma Simulation Methodology(2)↓↓↓

Plasma Simulation Methodology(2)

Series

- L. Landau,"On the vibration of the Electric Plasma", J.Phys.U.S.S.R.10, 25 (1946)

[Regarding studies out of class (preparation and review)]

Basic knowledge: Electromagnetics; Fundamental course of plasma physics.

（Others (office hour, etc.)）

*Please visit KULASIS to find out about office hours.

科目ナンバリング			
Course title <English>	Advanced Energy Conversion Science Advanced Energy Conversion Science	Affiliated department, Job title,Name	Graduate School of Energy Science 変換科学専攻教員全員 Graduate School of Energy Science Associate Professor,KINOSHITA KATSUYUKI

Target year	修士・博士	Number of credits	2	Course offered year/period	2019/Second semester
Day/period	Wed.3	Class style	Lecture	Language	English

[Outline and Purpose of the Course]

Subjects on the conversion, control and utilization of various kinds of energy from viewpoints of science and engineering are offered.

[Course Goals]

To understand subjects on the conversion, control and utilization of various kinds of energy

[Course Schedule and Contents]

Latest topics about energy conversion systems and their functional design are lectured in an omnibus class.
- Thermal Efficiency and Pollutant Emissions in Internal Combustion Engines
- Fundamental Research for Advanced Combustion Systems
- Laser Diagnostics for Combustion Research
- Ceramics and Their Applications to Energy-Related Machineries
- Energy Components and High Temperature Machine Design
- Nondestructive Evaluation for Energy Equipment and Materials
- Fusion Energy Conversion
- High temperature liquids for energy conversion
- Energy Conversion System for Electromagnetic Waves and Particle Beam
- Modeling of Radiation Damage Processes in Fusion Materials

[Class requirement]

None

[Method, Point of view, and Attainment levels of Evaluation]

Attendance and report

[Textbook]

Additional articles and documents are delivered if necessary.

[Reference books, etc.]

（Reference books）

Introduced during class

[Regarding studies out of class (preparation and review)]

To be announced in class.

（Others (office hour, etc.)）

*Please visit KULASIS to find out about office hours.

科目ナンバリング			
Course title <English>	Advanced Energy Science and Technology Advanced Energy Science and Technology	Affiliated department, Job title,Name	Graduate School of Energy Science 応用科学専攻教員全員

Target year	修士・博士	Number of credits	2	Course offered year/period	2019/Second semester

Day/period	Wed.3	Class style	Lecture	Language	English

[Outline and Purpose of the Course]

This subject covers the essences of advanced energy science & technology. The basic principles are lectured of mineral resources and energy exploitation, physical chemistry, metallurgy and material science, fluid dynamics and heat transfer, mechanics, metallurgy and recycling, energy conversion and storage, fusion reactor materials design, microelectronics, laser engineering and space energy and resources. Attention is given to focus to establish environmentally friendly process technologies to sustain the development of our society. Each lecture ends with a requirement of report assignment.

[Course Goals]

・To study scientific and technical knowledge
on various researches related to the energy science and technology
and examples of approaches from science and engineering viewpoints
in energy- and environment-issues
・To establish basement of experise relevant to the Energy Science through report assignment

[Course Schedule and Contents]

Research topics in various research fields of the department are provided
in omnibus style. Contents and order of lectures depend on situation in each academic year,
and details of this subject, such as lecture schedule and lecturers, are posted and announced.

Example of contents:
・Energy Materials Research and Crystal Orientation Techniques
・Thermal Science in Advanced Energy System
・Recent R&D on Light Metallic Materials
・Recycling of Steel
・Recent Recycling Issues
・Plasticity of Environmentally-Friendly Metals
・Material Behavior under combined corrosion and tribological loading (tribocorrosion)
・Physics of Energy Materials and Its Application to Advanced Energy Systems
・Advanced Laser Development and Applications
・Generation and Application of Quantum Radiation Energy

[Class requirement]

None

[Method, Point of view, and Attainment levels of Evaluation]

I estimate it as a report problem to impose by each lecture by a normal point.
I include evaluations such as the situation present about the normal point evaluation, and there is explanation

Continue to Advanced Energy Science and Technology(2)↓↓↓

about the details of the evaluation than each lecture person in charge separately.
I assume the thing which averaged the evaluation point of the student attending a lecture in each lecture a global assessment point.

[Textbook]

I distribute a document as needed.

[Reference books, etc.]

（Reference books）

I introduce distribution and the reference book of reference materials more as needed than a lecture charge teacher.

[Regarding studies out of class (preparation and review)]

There is no designation

（Others (office hour, etc.)）

I publicize it by notices for more information about lecture contents and the schedule.
For more information about office hours, please confirm it in KULASIS.

*Please visit KULASIS to find out about office hours.