Course number	G-ENE01 76104 LJ28		
Course title (and course title in English)	エネルギー社会工学特論 Social Engineering of Energy, Adv.	Instructor's name, job title, and department of affiliation	Graduate School of Energy Science Associate Professor,OKUMURA HIDEYUKI Graduate School of Energy Science Associate Professor,OGAWA TAKAYA

Target year	Doctoral students	Number of credits	2	Year/semesters	2024/Intensive, Second semester

Days and periods	Intensive	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese and English

[Overview and purpose of the course]

The methodology and application of Energy Social Engineering will be given. Then, students deepen their understanding through practicing to solve the current problems.

[Course objectives]

To understand the methods and techniques to solve the energy related issues

[Course schedule and contents]

Discuss using text on sustainable development

Discuss the location of the problem (3 sessions)
Discuss the framework for solution (4 sessions)
Attempt to build a model on actual problems (4 sessions)
Discuss the consideration and development on the validity of the model (3 sessions)
Discuss and comprehensively discuss (1 sessions)

[Course requirements]

None

[Evaluation methods and policy]

According to the Graduate School of Energy Science's grade evaluation policy, the class's presentation and writing assignments will evaluate.

[Textbooks]

Instructed during class

[References, etc.]

（Reference books）

Introduced during class

[Study outside of class (preparation and review)]

Preparing the presentation based on reading assignments

（Other information (office hours, etc.)）

*Please visit KULASIS to find out about office hours.

Course number	G-ENE01 76110 SJ80　G-ENE01 76110 SJ28		
Course title (and course title in English)	エネルギーエコシステム学特論 Energy Ecosystems, Adv.	Instructor's name, job title, and department of affiliation	Graduate School of Energy Science Professor,KAWAMOTO HARUO Graduate School of Energy Science Associate Professor,MINAMI EIJI

Target year	Doctoral students	Number of credits	2	Year/semesters	2024/Intensive, First semester

Days and periods	Intensive	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese and English

[Overview and purpose of the course]

This course provides the state of the art of the methodology, scientific research, and their application relating to "Energy Ecosystems".

[Course objectives]

To understand the state of the art of the methodology, scientific research, and their application relating to "Energy Ecosystems" through reading literature and workshop of the relating topics.

[Course schedule and contents]

Student picks up a specific subject regarding the following topics and summarizes the literature information to prepare a report. Student is also required to present the report with power point slides and discuss with other members. Through these practices, student understands the state of the art of scientific information relating to "Energy Ecosystems".

- Status of earth environment and biomass resources
- Status of world energy utilization and bio-fuels
- Biomass conversion technologies
  (supercritical fluid method, pyrolysis, gasification, hydrolysis, biological conversion, etc.)
- Liquid bio-fuels (Bioethanol, biodiesel)
- Bio-chemicals, bio-materials

1）Pick up a specific subject （2 weeks）
2）Literature survay and summary （10 weeks）
3）Presentation and discussion（3 weeks）

[Course requirements]

None

[Evaluation methods and policy]

Evaluation will be based on resentation and discussion (80%) and class performance (20%).

[Textbooks]

Handout is delivered in the class.

Continue to エネルギーエコシステム学特論(2)↓↓↓

エネルギーエコシステム学特論(2)

[References, etc.]

（Reference books）

[Study outside of class (preparation and review)]

Preparation of report and presentation slide

（Other information (office hours, etc.)）

*Please visit KULASIS to find out about office hours.

Course number	G-ENE01 76113 LJ12		
Course title (and course title in English)	エネルギー情報学特論 Energy and Information, Adv.	Instructor's name, job title, and department of affiliation	Graduate School of Energy Science Professor,SHIMODA HIROSHI Graduate School of Energy Science Associate Professor,ISHII HIROTAKE Part-time Lecturer,OOBAYASHI FUMIAKI

Target year	Doctoral students	Number of credits	2	Year/semesters	2024/Intensive, First semester

Days and periods	Intensive	Class style	lecture and seminar (Face-to-face course)	Language of instruction	Japanese and English

[Overview and purpose of the course]

The research methodology of energy and information is introduced focusing on human-machine interface and deep understanding is promoted by exercise and reading papers and books. In addition, advanced research studies are introduced.

[Course objectives]

The goal is to understand the research methodology of energy and information through exercise and reading papers and books.

[Course schedule and contents]

Example of lectures/exercises:
1. Psychological and physiological evaluation for energy and information research
  Human information behavior measurement on human-machine interface and its exercise.
2. Research studies on energy and information, and its important points
  Human centered designs of human-machine interface and their research cases and exercises.
3. Service network and energy management
  Fundamental technique of service network and its application to energy management.
4. Feedback
  Feedback of lectures and exercises.

[Course requirements]

They should have learned the subject related to human-machine interface in masters course.

[Evaluation methods and policy]

The grade will be evaluated according to the grade evaluation policy of the Graduate School of Energy Science.
The concrete evaluation method however depends on the lecture contents.
In the above example, they are based on active participation in the classes (20%), assignment/exercise given in the classes (30%) and report subject (50%).

Continue to エネルギー情報学特論(2)↓↓↓

エネルギー情報学特論(2)

[Textbooks]

Lecture materials will be given in the class.

[References, etc.]

（Reference books）

Introduced during class

[Study outside of class (preparation and review)]

Preparation, review and assignment will be given in the class.

（Other information (office hours, etc.)）

*Please visit KULASIS to find out about office hours.

Course number	G-ENE01 76116 SJ14 G-ENE01 76116 SJ16 G-ENE01 76116 SJ15		
Course title (and course title in English)	エネルギー環境学特論 Energy and Environment, Adv.	Instructor's name, job title, and department of affiliation	Graduate School of Energy Science Professor,TAKAYUKI KAMEDA Graduate School of Energy Science Associate Professor,AU Ka Man

Target year	Doctoral students	Number of credits	2	Year/semesters	2024/Intensive, Second semester

Days and periods	Intensive	Class style	lecture and seminar (Face-to-face course)	Language of instruction	Japanese and English

[Overview and purpose of the course]

Some subjects on energy environmental issues and international efforts are introduced. Students set their theme not related to their doctoral theses and make presentations about achievements based on literature survey on the themes with their discussions. Discussions are made on points at issues and prospects by all attendees in the form of intensive seminar .Students deepen knowledge and understanding of energy environmental issues.

[Course objectives]

Students will deepen knowledge and understanding regarding the environmental issues beyond their specialties. They will be able to look at energy and environmental issues from multifaceted viewpoints.

[Course schedule and contents]

1. Lecture on topics of energy and environment; "rapid increase in energy consumption and the associated atmospheric environment problems in Asia", "international response to those problems", "sustainable production, consumption and indices", etc. (3 classes)
2. Each student deals with an academic or practical subject on energy and environment, investigates and reads materials. (5 classes)
3. Each student presents a report on the subject. Then, Q&A as well as mutual discussions are conducted between all attendees. (6 classes)
4. Feedback (1 class)

[Course requirements]

None

[Evaluation methods and policy]

Final reports for investigation contents (70%) , attendance and class participation (30%)
Class participation includes presentation and Q&A skills.

Continue to エネルギー環境学特論(2)↓↓↓

エネルギー環境学特論(2)

[Textbooks]

Not used

[References, etc.]

（Reference books）

Introduced during class

Reference books are introduced in class.

[Study outside of class (preparation and review)]

To be announced in class.

（Other information (office hours, etc.)）

*Please visit KULASIS to find out about office hours.

Course number	G-ENE01 78023 LE28		
Course title (and course title in English)	Socio-Environmental Energy Science, Adv. Advanced Seminar on Socio-Environmental Energy Science	Instructor's name, job title, and department of affiliation	Graduate School of Energy Science 社会・環境教員全員 Graduate School of Energy Science Professor,MCLELLAN, Benjamin Graduate School of Energy Science Professor,SHIMODA HIROSHI Graduate School of Energy Science Professor,KAWAMOTO HARUO Graduate School of Energy Science Professor,TAKAYUKI KAMEDA Institute for Integrated Radiation and Nuclear Science Professor,UNESAKI HIRONOBU Graduate School of Energy Science Professor,KUROSAKI KEN Graduate School of Energy Science Associate Professor,OKUMURA HIDEYUKI Graduate School of Energy Science Associate Professor,OGAWA TAKAYA Graduate School of Energy Science Associate Professor,OGATA SEIICHI Graduate School of Energy Science Associate Professor,MINAMI EIJI Graduate School of Energy Science Associate Professor,ISHII HIROTAKE Institute for Integrated Radiation and Nuclear Science Associate Professor,UEBAYASHI HIROTOSHI Graduate School of Energy Science Associate Professor,AU Ka Man

Target year	Doctoral students	Number of credits	2	Year/semesters	2024/Second semester
Days and periods	Fri.2	Class style	Lecture (Face-to-face course)	Language of instruction	English

[Overview 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 objectives]

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. Critical Materials and Unconventional Resources for Energy (Prof. Benjamin McLellan)

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

Socio-Environmental Energy Science, Adv.(2)

2. Energy Environmental Issues and Technology (Assoc. Prof. Hideyuki Okumura)
3. Porous Materials for Water Remediation (Assoc. Prof. Ka Man Au)
4. Social Economics of Renewable Energy (Assoc. Prof. Seiichi Ogata)
5. Recent research progress of portable fuels (Assoc. Prof. Takaya Ogawa)
6. Pyrolysis Mechanism as an Underlying Principle of Thermochemical Conversion of Biomass (Prof. Haruo Kawamoto)
7. Risk Communication (Prof. Hiroshi Shimoda)
8. Advanced Technologies for Design, Operation and Maintenance of Power Plants (Assoc. Prof. Hirotake Ishii)
9. Energy and Atmospheric Environment (Prof. Takayuki Kameda)
10. Energy Policy of Japan and Other Leading Countries (Prof. Hirotoshi Unesaki)
11. Thermoelectrics-Material and Applications-(Prof. Ken Kurosaki)
12. Earthquake Motions and Earthquake Resistant Design (Assoc. Prof. Hirotoshi Uebayashi)
13. Risk Management of Information Society (Prof. Jun Yoshida)
14. Biorefinery with supercritical fluid and plasma technology(Assoc. Prof. Eiji Minami)

[Course requirements]

No requirements

[Evaluation methods and policy]

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).

[evaluation policy]
Will be evaluated according to the grade evaluation policy of the Graduate School of Energy Science

[Textbooks]

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

[References, etc.]

（Reference books）
Reference books will be introduced in class.

[Study outside of class (preparation and review)]

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

（Other information (office hours, etc.)）

*Please visit KULASIS to find out about office hours.

Course number	G-ENE20 68022 LE28　G-ENE20 68022 LE77		
Course title (and course title in English)	Advanced Energy Conversion Science Advanced Energy Conversion Science	Instructor's name, job title, and department of affiliation	Graduate School of Energy Science 変換科学専攻教員全員 Graduate School of Energy Science Professor,Jun HAYASHI Graduate School of Energy Science Professor,KAWANABE HIROSHI Graduate School of Energy Science Professor,SUMIGAWA TAKASHI Graduate School of Energy Science Professor,IMATANI SHIYOUJI Institute of Advanced Energy Professor,NAGASAKI KAZUNOBU Graduate School of Energy Science Associate Professor,HORIBE NAOTO Graduate School of Energy Science Associate Professor,ABE MASATAKA Graduate School of Energy Science Associate Professor,KINOSHITA KATSUYUKI Institute of Advanced Energy Associate Professor,YAGI JURO Institute of Advanced Energy Associate Professor,KOBAYASHI SHINJI Institute of Advanced Energy Associate Professor,MORISHITA KAZUNORI

Target year	修士・博士	Number of credits	2	Year/semesters	2024/Second semester
Days and periods	Wed.3	Class style	Lecture (Face-to-face course)	Language of instruction	English

[Overview and purpose of the course]

Electricity, power and heat required for our daily life are provided by the conversion of primal energy sources such as petroleum, coal, natural gas and uranium. In this lecture, graduate students will learn advanced energy conversion technologies and their principles to prevent environmental destruction and depletion of natural resources.

[Course objectives]

・Graduate students can understand subjects associated with the conversion, control and utilization of energy
・Graduate students can understand issues on advanced energy conversion technologies and their principles

[Course schedule and contents]

Latest topics about energy conversion systems and their functional design are lectured in an omnibus class. The following is a guide to what will be covered during the 15 weeks of the semester.

1. Combustion and power system [3-5 weeks](Kawanabe, Hayashi, Horibe)
・Thermal Efficiency and Pollutant Emissions in Internal Combustion Engines
・Hydrogen Energy System

Continue to Advanced Energy Conversion Science(2)↓↓↓

Advanced Energy Conversion Science(2)

・Engines and Fuels
・Laser Diagnostics for Combustion Research

2. Material design [3-5 weeks](Abe, Imatani, Kinoshita, Sumigawa)
・Functional Materials for Energy Conversion
・Energy Components and High Temperature Machine Design
・Nondestructive Evaluation for Energy Equipment and Materials
・Strength Evaluation of Nano-/Micro-materials for Energy Equipment

3. Nuclear fusion [4-6 weeks] (Yagi, Nagasaki, Kobayashi, Morishita)
・Fusion Energy Conversion
・High temperature liquids for energy conversion
・Energy Conversion System for Electromagnetic Waves in high temperature fusion plasmas
・Modeling of Radiation Damage Processes in Fusion Materials
・Energy conversion system for particle beam in high temperature fusion plasmas

4. Feedback [1 week]

[Course requirements]

None

[Evaluation methods and policy]

Attendance and report

[Textbooks]

Additional articles and documents are delivered if necessary.

[References, etc.]

（Reference books）

Introduced during class
Reference books are introduced in class.

[Study outside of class (preparation and review)]

To be announced in class.

（Other information (office hours, etc.)）

*Please visit KULASIS to find out about office hours.

Course number	G-ENE04 68026 LE28		
Course title (and course title in English)	Advanced Energy Science and Technology Advanced Energy Science and Technology	Instructor's name, job title, and department of affiliation	Graduate School of Energy Science Professor,DOI TOSHIYA Graduate School of Energy Science Professor,MABUCHI MAMORU Graduate School of Energy Science Professor,HAMA TAKAYUKI Graduate School of Energy Science Professor,FUJIMOTO HITOSHI Institute of Advanced Energy Professor,OOGAKI HIDEAKI Institute of Advanced Energy Professor,Yuhei Miyauchi Graduate School of Energy Science Associate Professor,KAWANISHI SAKIKO Graduate School of Energy Science Associate Professor,IWAO KAWAYAMA Graduate School of Energy Science Professor,MIYAKE MASAO Graduate School of Energy Science Associate Professor,HASEGAWA MASAKATSU Graduate School of Energy Science Associate Professor,HAKAMADA MASATAKA Graduate School of Energy Science Associate Professor,KUSUDA HIROMU Institute of Advanced Energy Associate Professor,NAKAJIMA TAKASHI

Target year	修士・博士	Number of credits	2	Year/semesters	2024/Second semester

Days and periods	Wed.3	Class style	Lecture (Face-to-face course)	Language of instruction	English

[Overview and purpose of the course]

Purpose: 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 objectives]

・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 assignments

[Course schedule and contents]

Research topics in various research fields of the department are provided 15 times.

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

Advanced Energy Science and Technology(2)

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:

- Synthesis and Processing of High-Temperature Superconductors
- Applied Superconductivity to Energy Apparatus
- Advanced Rechargeable Batteries
- H2 Utilization and Reduction of CO2 Emission in Iron and Steelmaking Field
- Recent R&D on Light Metallic Materials
- Plasticity of Environmentally-Friendly Metals
- Physics of Liquid Jet Cooling to Hot Materials
- Physics of Energy Materials and Its Application to Advanced Energy Systems
- Advanced Laser Development and Applications
- Generation and Application of Quantum Radiation Energy

[Course requirements]

None

[Evaluation methods and policy]

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 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.

[Textbooks]

I distribute a document as needed.

[References, etc.]

（Reference books）

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

[Study outside of class (preparation and review)]

There is no designation

（Other information (office hours, 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.