Theory of Electromagnetics (4.0credits) (電磁理論)

Course Type	Basic Courses		
Division at course	Master's Course		
Class Format	Lecture		
Course Name	Electrical Engineering	Electronics	Information and Communication Engineering
Starts 1	1 Spring Semester	1 Spring Semester	1 Spring Semester
Lecturer	Associated Faculty	Associated Faculty	Associated Faculty

●Course Purpose

The purpose is not only to deeply understand electromagnetics as fundamentals of broad applications to energy, electronics and so on, but also to learn utilization techniques for "practical elecromagnetics". Group works on different subjects without guidelines will be done. Through repetitive consideration, investigation, presentation and discussion based on electromagnetic theory, the solution of the selected subject is pursued.

●Prerequisite Subjects

Electromagnetic theory, Vacuum electronics, High voltage engineering, Plasma physics and engineering, Computer literacy, Electric circuits

●Course Topics

1. Introduction, grouping, subject selection
2. Investigations on basic theory and related references to the selected subject
3. Interim report and discussion on investigations
4. Analysis and verification using different approaches
5. Final presentation

●Textbook

Textbook will be introduced in class.

●Additional Reading

Reference will be introduced in class.

●Grade Assessment

Report and/or presentation
100-90:S, 89-80:A, 79-70:B, 69-60:C, <59:F

●Notes

not imposed

●Contacting Faculty

Questions will be taken after class.

Theory of Quantum Systems (4.0credits) (量子理論)

Course Type	Basic Courses		
Division at course	Master's Course		
Class Format	Lecture		
Course Name	Electrical Engineering	Electronics	Information and Communication Engineering
Starts 1	1 Spring Semester	1 Spring Semester	1 Spring Semester
Lecturer	Associated Faculty	Associated Faculty	Associated Faculty

●Course Purpose

In order to deepen the understanding of quantum mechanics for the students who mastered elementary quantum mechanics, this lecture provide the knowledge from basic concept to advanced contents of the quantum mechanics, and is designed to acquire applied skills in actual electronic materials. Moreover, this lecture is designed to acquire the skills to predict the physical phenomenon in actual electronic materials by visualizing the electron transport and the wave function based on the computer simulation.
After successfully studying this lecture, students will be able to:
1. Understand and Describe quantization phenomena in actual electronic materials and devices.
2. Cultivate the skills to visualize wave functions in simple quantum devices.

●Prerequisite Subjects

Quantum mechanics, Solid state electronics, Magnetic materials, Electromagnetics

●Course Topics

1. Basic quantum theory (Wave-particle duality in photon and electron, Schrodinger equation, Uncertainty principle, etc.)
2. Matrix and state vector (Matrix element, Diagonalization, Heisenberg representation)
3. Electron spin and angular momentum (Spin operator, spin-orbit interaction, etc.
4. Electron scattering and tunnel effect (Rutherford scattering, Matrix element in scattering problem, etc.)
5. Perturbation theory (Electron scattering, Absorption and emission of photons)
6. Many-particle system and many-body problem (Bose particles, Fermi particles, Second quantization, etc.)
7. Quantum device (Optical devices, Electron devices)

●Textbook

Quantum mechanics I, II: Shoichiro Koide, Shokabo Co., Ltd

●Additional Reading

Elements of Advanced Quantum Theory: J. M. Ziman, Cambridge Univ. Press

●Grade Assessment

Evaluation will be based on the report or final examination.
<enrolled student after 2020.4>
A+: 100-95, A: 94-80, B: 79-70, C: 69-65, C-: 64-60, F: 59-
<enrolled student before 2020.3>
S:100-90, A:89-80, B:79-70, C:69-60, F:59-

●Notes

No special requirements for attending the course.

●Contacting Faculty

Questions will be asked diromg the lecture or in the office hour. If necessary, students should book an appointment for your questions in advance via e-mail.

Contact:
Hiroshi Amano 3321 amano@nuee.nagoya-u.ac.jp
Kodo Kawase 4211 kawase@nuee.nagoya-u.ac.jp
Satoshi Iwata3303 iwata@nuee.nagoya-u.ac.jp

Takeshi Kato3304 takeshik@nuee.nagoya-u.ac.jp
Yoshio Honda5275 honda@nuee.nagoya-u.ac.jp
Kiichi Niitsu2794 niitsu@nuee.nagoya-u.ac.jp

Thermodynamics and Statistical Mechanics (4.0credits) (熱・統計力学)

Course Type	Basic Courses		
Division at course	Master's Course		
Class Format	Lecture		
Course Name	Electrical Engineering	Electronics	Information and Communication Engineering
Starts 1	1 Spring Semester	1 Spring Semester	1 Spring Semester
Lecturer	Associated Faculty	Associated Faculty	Associated Faculty

●Course Purpose

Thermal and statistical dynamics is a branch of physics and provides us important fundamental concepts in various fields including energy, plasma and electric materials at the heart of electronics. The purpose of this course is not only to understand basics of thermal and statistical dynamics but also to learn how to use them in various applications with gaining a computer simulation skill. Students can acquire the above issues.

●Prerequisite Subjects

Mathematics 1, Fundamentals of Electric Energy with Exercises, Fundamental Computer Programing with Exercises. You should take the above subjects, but you can take this subject even if you have not taken above subjects.

●Course Topics

1. basics of thermal dynamics (ideal gas, entropy, thermal cycle)
2. thermal dynamics on material science
3. microscopic expressions of equilibrium system
4. molecular dynamics
5. energy distribution functions and density of energy state
6. Boltzmann transport equation and scattering, transition process
7. thermal transportation in fluid mediums
8. basics of numerical calculation on thermal transportation

As homework will be assigned during or after class, submit as a report each time or by the designated date.

●Textbook

to be introduced in the lecture.
In a lecture on molecular dynamics, you need to prepare UNIX, g++ and make environment on your own computer.

●Additional Reading

to be introduced in the lecture.

●Grade Assessment

Grading by Exercises, Reports and Examinations.
(enrolled student after 2020.4)
A+:100-95, A:94-85, B:84-75, C:74-65, C-:65-60, F: 59
(enrolled student after 2011.4)
S:100-90, A:89-80, B:79-70, C:69-60, F:59-
(enrolled student before 2011.3)
A:100-80, B:79-70, C:69-60, D:59-

●Notes

No course requirements

●Contacting Faculty

We handle student questions during and after class.
If you ask questions after-class hour, contact by telephone or e-mail.

Mathematical Methods in Electrical and Electronic Engineering (4.0credits) (電気物理数学)

Course Type	Basic Courses		
Division at course	Master's Course		
Class Format	Lecture		
Course Name	Electrical Engineering	Electronics	Information and Communication Engineering
Starts 1	1 Spring Semester	1 Spring Semester	1 Spring Semester
Lecturer	Associated Faculty	Associated Faculty	Associated Faculty

●Course Purpose

The purpose is to understand the various physical phenomena related to electrical and electronic engineering and the principles of mathematical methods used for them,and to cultivate the basic skills necessary for research in this field through the following items.
1. To develop the ability of making good use of major mathematical methods for analyzing physical phenomena in electrical and electronic engineering:
2. To understand the universality and physical meanings of major mathematical methods by applying the methods in various physical phenomena:
3. To study how to model physical phenomena for analysis using mathematical methods:
4. To obtain intuitive understanding of physical phenomena through exercises using computer simulation and visualization

In this lecture, the goal is for students to have the following knowledge and skills at the end of the lecture.
1. Students can visualize and theoretically explain physical phenomena.
2. Students can simulate electronic circuit by optimum modeling
3. Students can formulate surface and interface phenomena and evaluate them quantitatively.
4. Students can can understand quantum effects and run device simulation based on numerical computing.

●Prerequisite Subjects

Mathematics 1 and 2, Electromagnetic Theory, Fundamentals of Electronic Materials, Linear Circuit Theory, Electronic Circuits, Quantum mechanics

●Course Topics

Visualization of phenomena in electric circuit and its theoretical understanding
Moeling of device and numerical solutions of algebraic equations and ordinary differential equations (linear, non-linear)
Theoritical understanding and formulation of surface and interface phenomena, such as photoelectric effect
Fundamentals of semiconductor device simulation: Semiconductor equations and numerical analysis methods
. Optical beam propagation and spectral analysis based on fast Fourier
transform (FFT)

Review the contents of the previous lesson and understand the principles of each process.

●Textbook

Lecture materials are handed out as needed.

●Additional Reading

References will be assigned as needed.

●Grade Assessment

Degree of achievement is examined by the submitted report.
The minimum acceptance criterion is to correctly understand and discuss the physical phenomena related to electrical and electronic engineering and principles and characteristics of mathematical methods.
The report at each class is scored out of 100, and 60 of average score of all reports is appraised as passable.
The grade evaluation criteria are as follows,

Students enrolled in or after the 2020 school year:
100~95: A+, 94~80: A, 79~70: B69~65: C, 64~60: C-, 59~0: F

Students enrolled in or before the 2019 school year:
100~90: S, 89~80: A, 79~70: B69~60: C, 59~0: F

●Notes

Students should have studied in electromagnetics, mathematics I and tutorial AB, and mathematics II and tutorial AB, but can take this course if they have not already done so.

●Contacting Faculty

Questions are always invited at the class, and also available out of the class.

Theory of Discrete Systems (4.0credits) (離散システム論)

Course Type	Basic Courses		
Division at course	Master's Course		
Class Format	Lecture		
Course Name	Electrical Engineering	Electronics	Information and Communication Engineering
Starts 1	1 Spring Semester	1 Spring Semester	1 Spring Semester
Lecturer	Associated Faculty Tetsu IWATA Associate Professor	Associated Faculty	Associated Faculty

●Course Purpose

With the growth of information and communications technology, the amount of data that systems need to collect and process increases. Then, the processing and modelling technologies of a vast amount of data, and analysis and design techniques using computers become more important.

The purpose of this course is to review several basic topics listed as 1 to 7 in the following list, and practice their application topics with some exercises.

Students understand and explain the following topics:
1. An example of control system, design flow of the "system" method of modeling, simulation, analysis and design techniques and understanding
2. Algorithm techniques for programming
3. Architectures of distributed systems that integrate computers and networks, and protocols for communication, synchronization, and maintaining consistency
4. Minimization of boolean functions by the Quine–McCluskey algorithm
5. Data analysis algorithms and analysis tools
6. Basic discrete mathematics and its applications
7. Fundamentals of interactive systems such as robots, and techniques for expressing their movements

●Prerequisite Subjects

Discrete Mathematics with Exercise, Fundamental Computer Programing with Exercises, Digital Circuits with Exercises

●Course Topics

1. Modeling, analysis and design of system
2. Algorithm techniques
3. Architectures of distributed systems and protocols
4. Boolean function minimization
5. Data analysis algorithms and tools
6. Basic discrete mathematics and its application
7. Fundamentals of interactive systems and techniques for expression

For each topic, students will submit reports or there will be oral presentation.

●Textbook

Will be specified during the lecture when necessary.

●Additional Reading

David A. Patterson and John L. Hennessy. "Computer Organization and Design", Morgan Kaufmann

●Grade Assessment

Evaluate the degree of achievement with reports, oral presentation and discussion. Pass if it is greater than or equal to 60%.

●Notes
None.

●Contacting Faculty
During and after lectures.

Theory of Signal Processing and Waveform Transmission (4.0credits) (信号処理・波形伝送論)

Course Type	Basic Courses		
Division at course	Master's Course		
Class Format	Lecture		
Course Name	Electrical Engineering	Electronics	Information and Communication Engineering
Starts 1	1 Spring Semester	1 Spring Semester	1 Spring Semester
Lecturer	Associated Faculty	Associated Faculty	Associated Faculty

●Course Purpose

Image media systems and communication networks are technical bases of the modern society. The aims of the course are to learn the fundamental principles of information theory, signal/image processing, and communication systems, and to obtain the essential knowledge of the current ICT society.

Goal
- To understand the basics of signal processing and waveform transmission.
- To implement a simple system that performs signal processing and waveform transmission.

●Prerequisite Subjects

●Course Topics

Lectures:
- Fundamentals of image signal processing
- Fundamentals of information networking
- Fundamentals of wireless communication systems

Exercises and final presentation:
- Implementation of image signal processing and wireless communication systems on a pair of laptop PCs with C language.
- For the final presentation, a poster presentation on the above systems and a demonstration with it will be requested.

All the reports should be submitted without delay.

●Textbook

Books of lectures will be suggested during the lectures whenever necessary.

●Additional Reading

References will be suggested during the lectures whenever necessary.

●Grade Assessment

The judgement will be conducted based on the quality of submitted reports and that of the final presentation. All of the reports should be submitted without delay.

●Notes

No requirement.

●Contacting Faculty

Questions are accepted after each lecture and via emails.

Theory of Data Analysis and Processing (4.0credits) (データ解析処理論)

Course Type	Basic Courses		
Division at course	Master's Course		
Class Format	Lecture		
Course Name	Electrical Engineering	Electronics	Information and Communication Engineering
	Automotive Engineering		
Starts 1	1 Spring Semester	1 Spring Semester	1 Spring Semester
	1 Spring Semester		
Lecturer	Associated Faculty	Associated Faculty	Associated Faculty

●Course Purpose

The purpose of this seminar is to understand the principle of the main method and the evaluation method of the error on the signal measurement of the voltage / current etc. in the experiment of the electronic information system. In addition, we will be able to process and analyze measured data using software (LabView and SCILAB). These are aimed at understanding the techniques necessary for acquisition and analysis of experimental data and training of practical skills.

●Prerequisite Subjects

electromagnetics, electric circuits, electronics Circuits, mathmatics1 & 2, programming, probability / statistics

●Course Topics

1. Signal measurement
1.1 Measuring instrument definition and specification
1.2 Basics of circuit design
1.3 Voltage measurement, current measurement, resistance measurement
1.4 Error source in measurement
1.5 Configuration of PC-based instrument
1.6 Collection and programming of experiment data
2. Data analysis
2.1 Statistical analysis (sampling and population, basic statistics, statistical error, test)
2.2 Time series analysis (FT, FFT, WT, transfer function, chaos)
2.3 Correlation analysis (autocorrelation, cross-correlation)
2.4 Spectral analysis (Fourier analysis, Fourier transform, spectral density function)
2.5 Simulation · Observation Experimental Data Analysis (Basic)
2.6 Simulation / Observation Experimental Data Analysis (Application)

●Textbook

"Low Level Measurements Handbook (6th Ed.), Keithley" will be distributed,
Distribution of data analysis print

●Additional Reading

LabView Programming Guide ASCII
Piersol, John Wiley & Sons
“Random Data: Analysis and Measurement Procedures” by J. S. Bendat and A. G. Piersol (John Wiley and Sons)
“Atarashii Gosa-Ron (in Japanese)” by K. Yoshizawa (Kyoritsu)
“Spectral Analysis (in Japanese)” by M. Hino (Asakura)

●Grade Assessment

Evaluate the target achievement level by comprehensively summarizing the presentation content of the seminar, the degree of understanding of the lecture, and the analysis result report of the exercise. Pass score of 60 points or more with 100 full marks.

●Notes

No requirement for attending this course.

●Contacting Faculty

Basically, it is accepted in the classroom during lecture time or at the end.
For questions beyond the time, arrange time in advance by telephone or e-mail to the teacher in charge.

Seminar on High Power Engineering 1A (2.0credits) (大電流エネルギー工学セミナー1A)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Seminar	
Course Name	Electrical Engineering	
Starts 1	1 Spring Semester	
Lecturer	TomokazuFUKUTSUKA Professor	Seiji KATAKURA Assistant Professor

●Course Purpose

This course deals with the electrochemistry about battery. By reading and presenting the text and latest literature, skills to understand the energy conversion devices is acquired. By the end of the course, students should be able to understand the concept of batteries.

●Prerequisite Subjects

No special subjects are specified because this is a seminar.

●Course Topics

Read textbooks and articles on electrochemistry and batteries. Resume is required and comprehensive discussion is conducted.

●Textbook

Texts and papers are selected.

●Additional Reading

Texts and papers are introduced if need.

●Grade Assessment

The degree of achievement is evaluated by presentations, questions and answers, and discussions. A score of 60 is criteria for pass.

●Notes

No course requirements

●Contacting Faculty

During the seminar and after seminar.

Seminar on High Power Engineering 1B (2.0credits) (大電流エネルギー工学セミナー1B)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Seminar	
Course Name	Electrical Engineering	
Starts 1	1 Autumn Semester	
Lecturer	TomokazuFUKUTSUKA Professor	Seiji KATAKURA Assistant Professor

●Course Purpose
This course deals with the electrochemistry about battery. By reading and presenting the text and latest literature, skills to understand the energy conversion devices is acquired. By the end of the course, students should be able to understand the concept of batteries.

●Prerequisite Subjects
No special subjects are specified because this is a seminar.

●Course Topics
Read textbooks and articles on electrochemistry and batteries. Resume is required and comprehensive discussion is conducted.

●Textbook
Texts and papers are selected.

●Additional Reading
Texts and papers are introduced if need.

●Grade Assessment
The degree of achievement is evaluated by presentations, questions and answers, and discussions. A score of 60 is criteria for pass.

●Notes
No course requirements

●Contacting Faculty
During the seminar and after seminar.

Seminar on High Power Engineering 1C (2.0credits) (大電流エネルギー工学セミナー1C)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Seminar	
Course Name	Electrical Engineering	
Starts 1	1 Spring Semester	
Lecturer	TomokazuFUKUTSUKA Professor	Seiji KATAKURA Assistant Professor

●Course Purpose
This course deals with the electrochemistry about battery. By reading and presenting the text and latest literature, skills to understand the energy conversion devices is acquired. By the end of the course, students should be able to understand the concept of batteries.

●Prerequisite Subjects
No special subjects are specified because this is a seminar.

●Course Topics
Read textbooks and articles on electrochemistry and batteries. Resume is required and comprehensive discussion is conducted.

●Textbook
Texts and papers are selected.

●Additional Reading
Texts and papers are introduced if need.

●Grade Assessment
The degree of achievement is evaluated by presentations, questions and answers, and discussions. A score of 60 is criteria for pass.

●Notes
No course requirements

●Contacting Faculty
During the seminar and after seminar.

Seminar on High Power Engineering 1D (2.0credits) (大電流エネルギー工学セミナー1D)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Seminar	
Course Name	Electrical Engineering	
Starts 1	1 Autumn Semester	
Lecturer	TomokazuFUKUTSUKA Professor	Seiji KATAKURA Assistant Professor

●Course Purpose
This course deals with the electrochemistry about battery. By reading and presenting the text and latest literature, skills to understand the energy conversion devices is acquired. By the end of the course, students should be able to understand the concept of batteries.

●Prerequisite Subjects
No special subjects are specified because this is a seminar.

●Course Topics
By reading and presenting the text and latest literature about battery, understanding the energy conversion devices that convert chemical energy into electrical energy. The purpose of this lecture is to understand the concept of batteries.

●Textbook
Texts and papers are selected.

●Additional Reading
Texts and papers are introduced if need.

●Grade Assessment
The degree of achievement is evaluated by presentations, questions and answers, and discussions. A score of 60 is criteria for pass.

●Notes
No course requirements

●Contacting Faculty
During the seminar and after seminar.

Seminar on Energy System and Environment 1A (2.0credits) (エネルギー環境システムセミナー1A)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Seminar	
Course Name	Electrical Engineering	
Starts 1	1 Spring Semester	
Lecturer	Yasunobu YOKOMIZU Professor	Naoto KODAMA Assistant Professor

●Course Purpose

This class is aimed at understanding transmission and distribution technologies of electricity on the basis of recent engineering literatures with details about physical and electrical phenomena on electricity.
The goals are listed below.
1. To understand fundamental physics and physical chemistry for high-temperature gas.
2. To perform calculation on the basis of research method in electrical engineering.
3. To explain various phenomena on high current control and application technology.

●Prerequisite Subjects

Electrical circuit theory, Electromagnetic theory, Gas discharge, Electrical Insulation, Fundamental of electric energy.

●Course Topics

1. High-temperature gas engineering
2. Distribution technology of electricity
3. Energy and current controls

Students who take the course should do research beforehand to understand contents described in a textbook on the basis of the subjects listed above and should distribute the summarized contents in the class.

●Textbook

Textbooks are selected in accordance with the progress of the seminar.

●Additional Reading

It will be introduced if necessary.

●Grade Assessment

Grade is assessed from the various viewpoints of explanations, questions and discussions during the seminar.

●Notes

No course requirement.

●Contacting Faculty

During the seminar.

Seminar on Energy System and Environment 1B (2.0credits) (エネルギー環境システムセミナー1B)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Seminar	
Course Name	Electrical Engineering	
Starts 1	1 Autumn Semester	
Lecturer	Yasunobu YOKOMIZU Professor	Naoto KODAMA Assistant Professor

●Course Purpose

This class is aimed at understanding transmission and distribution technologies of electricity on the basis of recent engineering literatures with details about physical and electrical phenomena on electricity. The goals are listed below. 1. To understand fundamental physics and physical chemistry for high-temperature gas.2. To perform calculation on the basis of research method in electrical engineering.3. To explain various phenomena on high current control and application technology.

●Prerequisite Subjects

Electrical circuit theory, Electromagnetic theory, Gas discharge, Electrical Insulation, Fundamental of electric energy.

●Course Topics

1. High-temperature gas engineering2. Distribution technology of electricity3. Energy and current controls Students who take the course should do research beforehand to understand contents described in a textbook on the basis of the subjects listed above and should distribute the summarized contents in the class.

●Textbook

Textbooks are selected in accordance with the progress of the seminar.

●Additional Reading

It will be introduced if necessary.

●Grade Assessment

Grade is assessed from the various viewpoints of explanations, questions and discussions during the seminar.

●Notes

No course requirement.

●Contacting Faculty

During the seminar.

Seminar on Energy System and Environment 1C (2.0credits) (エネルギー環境システムセミナー1C)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Seminar	
Course Name	Electrical Engineering	
Starts 1	1 Spring Semester	
Lecturer	Yasunobu YOKOMIZU Professor	Naoto KODAMA Assistant Professor

●Course Purpose

This class is aimed at understanding transmission and distribution technologies of electricity on the basis of recent engineering literatures with details about physical and electrical phenomena on electricity.
The goals are listed below.
1. To understand fundamental physics and physical chemistry for high-temperature gas.
2. To perform calculation on the basis of research method in electrical engineering.
3. To explain various phenomena on high current control and application technology.

●Prerequisite Subjects

Electrical circuit theory, Electromagnetic theory, Gas discharge, Electrical Insulation, Fundamental of electric energy.

●Course Topics

1. High-temperature gas engineering
2. Distribution technology of electricity
3. Energy and current controls

Students who take the course should do research beforehand to understand contents described in a textbook on the basis of the subjects listed above and should distribute the summarized contents in the class.

●Textbook

Textbooks are selected in accordance with the progress of the seminar.

●Additional Reading

It will be introduced if necessary.

●Grade Assessment

Grade is assessed from the various viewpoints of explanations, questions and discussions during the seminar.

●Notes

No course requirement.

●Contacting Faculty

During the seminar.

Seminar on Energy System and Environment 1D (2.0credits) (エネルギー環境システムセミナー1D)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Seminar	
Course Name	Electrical Engineering	
Starts 1	1 Autumn Semester	
Lecturer	Yasunobu YOKOMIZU Professor	Naoto KODAMA Assistant Professor

●Course Purpose

This class is aimed at understanding transmission and distribution technologies of electricity on the basis of recent engineering literatures with details about physical and electrical phenomena on electricity.
The goals are listed below.
1. To understand fundamental physics and physical chemistry for high-temperature gas.
2. To perform calculation on the basis of research method in electrical engineering.
3. To explain various phenomena on high current control and application technology.

●Prerequisite Subjects

Electrical circuit theory, Electromagnetic theory, Gas discharge, Electrical Insulation, Fundamental of electric energy.

●Course Topics

1. High-temperature gas engineering
2. Distribution technology of electricity
3. Energy and current controls

Students who take the course should do research beforehand to understand contents described in a textbook on the basis of the subjects listed above and should distribute the summarized contents in the class.

●Textbook

Textbooks are selected in accordance with the progress of the seminar.

●Additional Reading

It will be introduced if necessary.

●Grade Assessment

Grade is assessed from the various viewpoints of explanations, questions and discussions during the seminar.

●Notes

No course requirement.

●Contacting Faculty

During the seminar.

Functional Materials & Devices for Electrical and Information Engineering 1A (2.0credits) (機能電気・情報材料セ

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Electrical Engineering		
Starts 1	1 Spring Semester		
Lecturer	Naoki HAYAKAWA Professor	Hiroki KOJIMA Associate Professor	Akimori TABATA Associate Professor

●Course Purpose

Fundamental theory and application technology on functional materials and devices for electrical and information engineering will be studied and discussed.

Goal:
1. To understand fundamental theory on functional materials and devices for electrical and information engineering
2. To understand application technology on functional materials and devices for electrical and information engineering
3. To investigate, present and discuss fundamental theory and application technology on functional materials and devices for electrical and information engineering

●Prerequisite Subjects

Electromagnetic theory

●Course Topics

Study and discuss fundamental theory and application technology on functional materials and devices for electrical and information engineering

●Textbook

distribution of handout

●Additional Reading

Some books will be introduced in the seminar.

●Grade Assessment

Presentation and R&D at seminar: Against a full mark of 100, a mark of more than 60 is passing.

●Notes

It is preferable to understand the basis of electromagnetic theory.

●Contacting Faculty

nhayakaw@nuee.nagoya-u.ac.jp
kojima@nuee.nagoya-u.ac.jp
tabata@nuee.nagoya-u.ac.jp

Functional Materials & Devices for Electrical and Information Engineering 1B (2.0credits) (機能電気・情報材料セ

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Electrical Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Naoki HAYAKAWA Professor	Hiroki KOJIMA Associate Professor	Akimori TABATA Associate Professor

●Course Purpose

Fundamental theory and application technology on functional materials and devices for electrical and information engineering will be studied and discussed.

Goal:
1. To understand fundamental theory on functional materials and devices for electrical and information engineering
2. To understand application technology on functional materials and devices for electrical and information engineering
3. To investigate, present and discuss fundamental theory and application technology on functional materials and devices for electrical and information engineering

●Prerequisite Subjects

Electromagnetic theory

●Course Topics

Study and discuss fundamental theory and application technology on functional materials and devices for electrical and information engineering

●Textbook

distribution of handout

●Additional Reading

Some books will be introduced in the seminar.

●Grade Assessment

Presentation and R&D at seminar: Against a full mark of 100, a mark of more than 60 is passing.

●Notes

It is preferable to understand the basis of electromagnetic theory.

●Contacting Faculty

nhayakaw@nuee.nagoya-u.ac.jp
kojima@nuee.nagoya-u.ac.jp
tabata@nuee.nagoya-u.ac.jp

Functional Materials & Devices for Electrical and Information Engineering 1C (2.0credits) (機能電気・情報材料セ

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Electrical Engineering		
Starts 1	1 Spring Semester		
Lecturer	Naoki HAYAKAWA Professor	Hiroki KOJIMA Associate Professor	Akimori TABATA Associate Professor

●Course Purpose

Fundamental theory and application technology on functional materials and devices for electrical and information engineering will be studied and discussed.

Goal:
1. To understand fundamental theory on functional materials and devices for electrical and information engineering
2. To understand application technology on functional materials and devices for electrical and information engineering
3. To investigate, present and discuss fundamental theory and application technology on functional materials and devices for electrical and information engineering

●Prerequisite Subjects

Electromagnetic theory

●Course Topics

Study and discuss fundamental theory and application technology on functional materials and devices for electrical and information engineering

●Textbook

distribution of handout

●Additional Reading

Some books will be introduced in the seminar.

●Grade Assessment

Presentation and R&D at seminar: Against a full mark of 100, a mark of more than 60 is passing.

●Notes

It is preferable to understand the basis of electromagnetic theory.

●Contacting Faculty

nhayakaw@nuee.nagoya-u.ac.jp
kojima@nuee.nagoya-u.ac.jp
tabata@nuee.nagoya-u.ac.jp

Functional Materials & Devices for Electrical and Information Engineering 1D (2.0credits) (機能電気・情報材料セ

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Electrical Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Naoki HAYAKAWA Professor	Hiroki KOJIMA Associate Professor	Akimori TABATA Associate Professor

●Course Purpose

Fundamental theory and application technology on functional materials and devices for electrical and information engineering will be studied and discussed.

Goal:
1. To understand fundamental theory on functional materials and devices for electrical and information engineering
2. To understand application technology on functional materials and devices for electrical and information engineering
3. To investigate, present and discuss fundamental theory and application technology on functional materials and devices for electrical and information engineering

●Prerequisite Subjects

Electromagnetic theory

●Course Topics

Study and discuss fundamental theory and application technology on functional materials and devices for electrical and information engineering

●Textbook

distribution of handout

●Additional Reading

Some books will be introduced in the seminar.

●Grade Assessment

Presentation and R&D at seminar: Against a full mark of 100, a mark of more than 60 is passing.

●Notes

It is preferable to understand the basis of electromagnetic theory.

●Contacting Faculty

nhayakaw@nuee.nagoya-u.ac.jp
kojima@nuee.nagoya-u.ac.jp
tabata@nuee.nagoya-u.ac.jp

ar on Highly Efficient Energy Apparatus and Systems 1A (2.0credits) (環境調和型電気エネルギーシステムセミナ

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Electrical Engineering		
Starts 1	1 Spring Semester		
Lecturer	Takeyoshi KATOH Professor	Shigeyuki SUGIMOTO Professor	Muneaki KURIMOTO Associate Professor
	Masaki IMANAKA Assistant Professor		

●Course Purpose

This seminar examines fundamentals of highly efficient and environmental friendly energy system and related technologies by reading latest books and papers. The seminar also aims to improve students ability such as basic skills, applied skills, creativity, comprehensive knowledge, and wide point of view, so that students can think about future energy systems.

●Prerequisite Subjects

Electric Power Apparatus, Electric Power Transmission Systems, Electric Energy Conversion Engineering, High Voltage Engineering, Materials for Electrical and Electronic Engineering

●Course Topics

1. Fundamentals of systems and apparatuses for electrical energy conversion, transport and storage. 2. Assessment of energy systems. 3. Materials for electric power systems and apparatuses. 4. Diagnostic techniques for electric power systems. Etc.Students are requested to read the textbook and understand the summary for the next class.

●Textbook

Textbooks are selected in the year beginning. Papers are selected properly according to the progress of the seminar.

●Additional Reading

Many books on energy system and equipment are available.

●Grade Assessment

Evaluated based on presentations, questions and answers during the seminar. Entrance Year: 2020 or later 100 - 95:A+, 94 - 80:A, 79 - 70:B, 69 - 65:C, 64 - 60:C-, < 59:F Entrance Year: 2019 or before 100 - 90:S, 89 - 80:A, 79 - 70:B, 69 - 60:C, < 59:F

●Notes

No course requirements

●Contacting Faculty

After the lecture.

ar on Highly Efficient Energy Apparatus and Systems 1B (2.0credits) (環境調和型電気エネルギーシステムセミナ

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Electrical Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Takeyoshi KATOH Professor	Shigeyuki SUGIMOTO Professor	Muneaki KURIMOTO Associate Professor
	Masaki IMANAKA Assistant Professor		

●Course Purpose

This seminar examines fundamentals of highly efficient and environmental friendly energy system and related technologies by reading latest books and papers. The seminar also aims to improve students ability such as basic skills, applied skills, creativity, comprehensive knowledge, and wide point of view, so that students can think about future energy systems.

●Prerequisite Subjects

Electric Power Apparatus, Electric Power Transmission Systems, Electric Energy Conversion Engineering, High Voltage Engineering, Materials for Electrical and Electronic Engineering

●Course Topics

1. Fundamentals of systems and apparatuses for electrical energy conversion, transport and storage. 2. Assessment of energy systems. 3. Materials for electric power systems and apparatuses. 4. Diagnostic techniques for electric power systems. Etc.Students are requested to read the textbook and understand the summary for the next class.

●Textbook

Textbooks are selected in the year beginning. Papers are selected properly according to the progress of the seminar.

●Additional Reading

Many books on energy system and equipment are available.

●Grade Assessment

Evaluated based on presentations, questions and answers during the seminar. Entrance Year: 2020 or later 100 - 95:A+, 94 - 80:A, 79 - 70:B, 69 - 65:C, 64 - 60:C-, < 59:F Entrance Year: 2019 or before 100 - 90:S, 89 - 80:A, 79 - 70:B, 69 - 60:C, < 59:F

●Notes

No course requirements

●Contacting Faculty

After the lecture.

ar on Highly Efficient Energy Apparatus and Systems 1C (2.0credits) (環境調和型電気エネルギーシステムセミナ

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Electrical Engineering		
Starts 1	1 Spring Semester		
Lecturer	Takeyoshi KATOH Professor	Shigeyuki SUGIMOTO Professor	Muneaki KURIMOTO Associate Professor
	Masaki IMANAKA Assistant Professor		

●Course Purpose

This seminar examines fundamentals of highly efficient and environmental friendly energy system and related technologies by reading latest books and papers. The seminar also aims to improve students ability such as basic skills, applied skills, creativity, comprehensive knowledge, and wide point of view, so that students can think about future energy systems.

●Prerequisite Subjects

Electric Power Apparatus, Electric Power Transmission Systems, Electric Energy Conversion Engineering, High Voltage Engineering, Materials for Electrical and Electronic Engineering

●Course Topics

1. Fundamentals of systems and apparatuses for electrical energy conversion, transport and storage. 2. Assessment of energy systems. 3. Materials for electric power systems and apparatuses. 4. Diagnostic techniques for electric power systems. Etc.

●Textbook

Textbooks are selected in the year beginning. Papers are selected properly according to the progress of the seminar.

●Additional Reading

Many books on energy system and equipment are available.

●Grade Assessment

Evaluated based on presentations, questions and answers during the seminar. Entrance Year: 2020 or later 100 - 95:A+, 94 - 80:A, 79 - 70:B, 69 - 65:C, 64 - 60:C-, < 59:F Entrance Year: 2019 or before 100 - 90:S, 89 - 80:A, 79 - 70:B, 69 - 60:C, < 59:F

●Notes

No course requirements

●Contacting Faculty

After the lecture.

ar on Highly Efficient Energy Apparatus and Systems 1D (2.0credits) (環境調和型電気エネルギーシステムセミナ

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Electrical Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Takeyoshi KATOH Professor	Shigeyuki SUGIMOTO Professor	Muneaki KURIMOTO Associate Professor
	Masaki IMANAKA Assistant Professor		

●Course Purpose

This seminar examines fundamentals of highly efficient and environmental friendly energy system and related technologies by reading latest books and papers. The seminar also aims to improve students ability such as basic skills, applied skills, creativity, comprehensive knowledge, and wide point of view, so that students can think about future energy systems.

●Prerequisite Subjects

Electric Power Apparatus, Electric Power Transmission Systems, Electric Energy Conversion Engineering, High Voltage Engineering, Materials for Electrical and Electronic Engineering

●Course Topics

1. Fundamentals of systems and apparatuses for electrical energy conversion, transport and storage. 2. Assessment of energy systems. 3. Materials for electric power systems and apparatuses. 4. Diagnostic techniques for electric power systems. Etc.Students are requested to read the textbook and understand the summary for the next class.

●Textbook

Textbooks are selected in the year beginning. Papers are selected properly according to the progress of the seminar.

●Additional Reading

Many books on energy system and equipment are available.

●Grade Assessment

Evaluated based on presentations, questions and answers during the seminar. Entrance Year: 2020 or later 100 - 95:A+, 94 - 80:A, 79 - 70:B, 69 - 65:C, 64 - 60:C-, < 59:F Entrance Year: 2019 or before 100 - 90:S, 89 - 80:A, 79 - 70:B, 69 - 60:C, < 59:F

●Notes

No course requirements

●Contacting Faculty

After the lecture.

Seminar on Plasma Energy 1A (2.0credits) (プラズマエネルギーセミナー1A)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Electrical Engineering		
Starts 1	1 Spring Semester		
Lecturer	Noriyasu ONO Professor	Hiroaki NAKAMURA Professor	Shin KAJITA Associate Professor
	HirohikoTANAKA Assistant Professor		

●Course Purpose

Deep understanding of fundamental plasma science and engineering by referring the text and papers on the following topics::Edge and divertor plasma phenomena, plasma particle and heat transport, stability of magnetized plasmas, plasma heatingParticipants will be able to understand following contents after this seminar1. They will be able to understand and explain issues in the edge plasmas in fusion devices2. They will be able to understand and explain the plasma material interaction researches in fusion devices3. They will be able to understand the physics of plasma detachment in fusion devices4. They will be able to understand the reactions in materials via plasma material interactions

●Prerequisite Subjects

Electromagnetics, Plasma Engineering, Mechanics, Related Fundamental Physics

●Course Topics

1)Plasma transport along magnetic field line2)Magnetic configuration of divertor3)Velocity distribution function4)Plasma particle collision processes5)Particle and heat transport in toroidal magnetized plasma6) MHD equilibrium and stability

●Textbook

●Additional Reading

M. A. Lebermann "Principles of Plasma Discharges and Materials Processing" (Wiley-Interscience)

●Grade Assessment

Report and/or oral examination.

●Notes

●Contacting Faculty

Questions will be asked after the seminar or during the office hour. If necessary, students can book an appointment for your questions in advance via e-mail.

Seminar on Plasma Energy 1B (2.0credits) (プラズマエネルギーセミナー1B)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Electrical Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Noriyasu ONO Professor	Hiroaki NAKAMURA Professor	Shin KAJITA Associate Professor
	HirohikoTANAKA Assistant Professor		

●Course Purpose

Deep understanding of fundamental plasma science and engineering by referring the text and papers on the following topics::Edge and divertor plasma phenomena, plasma particle and heat transport, stability of magnetized plasmas, plasma heatingParticipants will be able to understand following contents after this seminar1. They will be able to understand and explain issues in the edge plasmas in fusion devices2. They will be able to understand and explain the plasma material interaction researches in fusion devices3. They will be able to understand the physics of plasma detachment in fusion devices4. They will be able to understand the reactions in materials via plasma material interactions

●Prerequisite Subjects

Electromagnetics, Plasma Engineering, Mechanics, Related Fundamental Physics

●Course Topics

1)Hydrogen recycling2)Control of particle and heat transport3)Plasma-surface interactions4)Erosion of plasma-facing material surface and impurity generation5)Joule heating6)Beam injection plasma heating

●Textbook

●Additional Reading

M. A. Lebermann "Principles of Plasma Discharges and Materials Processing" (Wiley-Interscience)

●Grade Assessment

Report and/or oral examination:

●Notes

●Contacting Faculty

Questions will be asked after the seminar or during the office hour. If necessary, students can book an appointment for your questions in advance via e-mail.

Seminar on Plasma Energy 1C (2.0credits) (プラズマエネルギーセミナー1C)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Electrical Engineering		
Starts 1	1 Spring Semester		
Lecturer	Noriyasu ONO Professor	Hiroaki NAKAMURA Professor	Shin KAJITA Associate Professor
	HirohikoTANAKA Assistant Professor		

●Course Purpose

Deep understanding of fundamental plasma science and engineering by referring the text and papers on the following topics::Edge and divertor plasma phenomena, plasma particle and heat transport, stability of magnetized plasmas, plasma heatingParticipants will be able to understand following contents after this seminar1. They will be able to understand and explain issues in the edge plasmas in fusion devices2. They will be able to understand and explain the plasma material interaction researches in fusion devices3. They will be able to understand the physics of plasma detachment in fusion devices4. They will be able to understand the reactions in materials via plasma material interactions

●Prerequisite Subjects

Electromagnetics, Plasma Engineering, Mechanics, Related Fundamental Physics

●Course Topics

1)Role of edge stochastic magnetic field, electric field and current on edge plasma phenomena2)Equilibrium and its control of tokamak plasmas3)Plasma profile control by plasma heating and magnetic field modifications4)Adiabatic compression and wave propagation5) Interaction between plasma and wall.

●Textbook

●Additional Reading

Tokamaks (International Series of Monographs on Physics) 4th Editionby John Wesson

●Grade Assessment

Report and/or oral examination.

●Notes

●Contacting Faculty

Questions will be asked after the seminar or during the office hour. If necessary, students can book an appointment for your questions in advance via e-mail.

Seminar on Plasma Energy 1D (2.0credits) (プラズマエネルギーセミナー1D)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Electrical Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Noriyasu ONO Professor	Hiroaki NAKAMURA Professor	Shin KAJITA Associate Professor
	HirohikoTANAKA Assistant Professor		

●Course Purpose

Deep understanding of fundamental plasma science and engineering by referring the text and papers on the following topics::Edge and divertor plasma phenomena, plasma particle and heat transport, stability of magnetized plasmas, plasma heatingParticipants will be able to understand following contents after this seminar1. They will be able to understand and explain issues in the edge plasmas in fusion devices2. They will be able to understand and explain the plasma material interaction researches in fusion devices3. They will be able to understand the physics of plasma detachment in fusion devices4. They will be able to understand the reactions in materials via plasma material interactions

●Prerequisite Subjects

Electromagnetics, Plasma Engineering, Mechanics, Related Fundamental Physics

●Course Topics

1) Interactions between plasma and neutral particles2) Plasma transport theory3) Plasma confinement in fusion devices4) Energy exchange between plasma waves and particles5) Momentum exchange between plasma waves and particles, and plasma current drive

●Textbook

●Additional Reading

Tokamaks (International Series of Monographs on Physics) 4th Editionby John Wesson

●Grade Assessment

Report and/or oral examination.

●Notes

●Contacting Faculty

Questions will be asked after the seminar or during the office hour. If necessary, students can book an appointment for your questions in advance via e-mail.

Seminar on Low Temperature Energy Materials 1A (2.0credits) (低温エネルギー材料セミナー1A)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Seminar	
Course Name	Electrical Engineering	
Starts 1	1 Spring Semester	
Lecturer	"YOSHIDA Yutaka" Professor	Yuji TSUCHIYA Assistant Professor

●Course Purpose

This class aims to study about the properties in the superconducting for application of the energy efficient system. Recent studies and experimental methods will be introduced by the participants according to the selected textbook. Furthermore, the fundamental knowledge and the applied skills will be acquired for the research about the energy efficient materialsGoals:1. To understand the physical properties and fabrication methods of energy materials such as superconducting materials2. To understand recent researches and various experimental methods.3. To understand crystal growth mechanism and physical properties4. To understand applications of superconducting materials

●Prerequisite Subjects

Electromagnetic Theory with Exercises, Solid-state Electronics and Tutorial, Fundamentals of Electric Energy with Exercises, Electronic Device Engineering

●Course Topics

1. Electrons in solid materials 2. Transport properties 3. Superconductivity 4. Energy conversion, storing technologyRead the designated part of the textbook before each class

●Textbook

Textbooks will be selected each year.

●Additional Reading

to be introduced in the lecture.

●Grade Assessment

Depends on the oral presentation (60%) and the question and answers (40%) in the seminar.A+:100-95, A:94-85, B:84-75, C:74-65, C-:65-60, F: 59

●Notes

Electromagnetic Theory with Exercises, Solid-state Electronics and Tutorial, Fundamentals of Electric Energy with Exercises, Electronic Device EngineeringIt is desirable to take the above courses, but you can take them even if you have not taken them.

●Contacting Faculty

We handle student questions during and after class.

Seminar on Low Temperature Energy Materials 1B (2.0credits) (低温エネルギー材料セミナー1B)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Seminar	
Course Name	Electrical Engineering	
Starts 1	1 Autumn Semester	
Lecturer	"YOSHIDA Yutaka" Professor	Yuji TSUCHIYA Assistant Professor

●Course Purpose

This class aims to study about the properties in the superconducting for application of the energy efficient system. Recent studies and experimental methods will be introduced by the participants according to the selected textbook. Furthermore, the fundamental knowledge and the applied skills will be acquired for the research about the energy efficient materialsGoals:1. To understand the physical properties and fabrication methods of energy materials such as superconducting materials2. To understand recent researches and various experimental methods.3. To understand crystal growth mechanism and physical properties4. To understand applications of superconducting materials

●Prerequisite Subjects

Electromagnetic Theory with Exercises, Solid-state Electronics and Tutorial, Fundamentals of Electric Energy with Exercises, Electronic Device EngineeringIt is desirable to take the above courses, but you can take them even if you have not taken them.

●Course Topics

1. Electrons in solid materials 2. Transport properties 3. Superconductivity 4. Energy conversion, storing technologyRead the designated part of the textbook before each class

●Textbook

Textbooks will be selected each year.

●Additional Reading

to be introduced in the lecture.

●Grade Assessment

Depends on the oral presentation (60%) and the question and answers (40%) in the seminar.A+:100-95, A:94-85, B:84-75, C:74-65, C-:65-60, F: 59

●Notes

Electromagnetic Theory with Exercises, Solid-state Electronics and Tutorial, Fundamentals of Electric Energy with Exercises, Electronic Device EngineeringIt is desirable to take the above courses, but you can take them even if you have not taken them.

●Contacting Faculty

We handle student questions during and after class.

Seminar on Low Temperature Energy Materials 1C (2.0credits) (低温エネルギー材料セミナー1C)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Seminar	
Course Name	Electrical Engineering	
Starts 1	1 Spring Semester	
Lecturer	"YOSHIDA Yutaka" Professor	Yuji TSUCHIYA Assistant Professor

●Course Purpose

This class aims to study about the properties in the superconducting for application of the energy efficient system. Recent studies and experimental methods will be introduced by the participants according to the selected textbook. Furthermore, the fundamental knowledge and the applied skills will be acquired for the research about the energy efficient materialsGoals:1. To understand the physical properties and fabrication methods of energy materials such as superconducting materials2. To understand recent researches and various experimental methods.3. To understand crystal growth mechanism and physical properties4. To understand applications of superconducting materials

●Prerequisite Subjects

Electromagnetic Theory with Exercises, Solid-state Electronics and Tutorial, Fundamentals of Electric Energy with Exercises, Electronic Device EngineeringIt is desirable to take the above courses, but you can take them even if you have not taken them.

●Course Topics

1. Electrons in solid materials 2. Transport properties 3. Superconductivity 4. Energy conversion, storing technologyRead the designated part of the textbook before each class

●Textbook

Textbooks will be selected each year.

●Additional Reading

to be introduced in the lecture.

●Grade Assessment

Depends on the oral presentation (60%) and the question and answers (40%) in the seminar.A+:100-95, A:94-85, B:84-75, C:74-65, C-:65-60, F: 59

●Notes

Electromagnetic Theory with Exercises, Solid-state Electronics and Tutorial, Fundamentals of Electric Energy with Exercises, Electronic Device EngineeringIt is desirable to take the above courses, but you can take them even if you have not taken them.

●Contacting Faculty

We handle student questions during and after class.

Seminar on Low Temperature Energy Materials 1D (2.0credits) (低温エネルギー材料セミナー1D)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Seminar	
Course Name	Electrical Engineering	
Starts 1	1 Autumn Semester	
Lecturer	"YOSHIDA Yutaka" Professor	Yuji TSUCHIYA Assistant Professor

●Course Purpose

This class aims to study about the properties in the superconducting for application of the energy efficient system. Recent studies and experimental methods will be introduced by the participants according to the selected textbook. Furthermore, the fundamental knowledge and the applied skills will be acquired for the research about the energy efficient materialsGoals:1. To understand the physical properties and fabrication methods of energy materials such as superconducting materials2. To understand recent researches and various experimental methods.3. To understand crystal growth mechanism and physical properties4. To understand applications of superconducting materials

●Prerequisite Subjects

Electromagnetic Theory with Exercises, Solid-state Electronics and Tutorial, Fundamentals of Electric Energy with Exercises, Electronic Device EngineeringIt is desirable to take the above courses, but you can take them even if you have not taken them.

●Course Topics

1. Electrons in solid materials 2. Transport properties 3. Superconductivity 4. Energy conversion, storing technologyRead the designated part of the textbook before each class

●Textbook

Textbooks will be selected each year.

●Additional Reading

to be introduced in the lecture.

●Grade Assessment

Depends on the oral presentation (60%) and the question and answers (40%) in the seminar.A+:100-95, A:94-85, B:84-75, C:74-65, C-:65-60, F: 59

●Notes

Electromagnetic Theory with Exercises, Solid-state Electronics and Tutorial, Fundamentals of Electric Energy with Exercises, Electronic Device EngineeringIt is desirable to take the above courses, but you can take them even if you have not taken them.

●Contacting Faculty

We handle student questions during and after class.

Seminar on Space Observation 1A (2.0credits) (宇宙電磁観測セミナー1A)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Electrical Engineering		
Starts 1	1 Spring Semester		
Lecturer	Kazuo SHIOKAWA Professor	Nozomu NISHITANI Associate Professor	Masahito NOSE Associate Professor
	Taku Nakajima Assistant Professor		

●Course Purpose

Reading fundamental textbooks and literature to understand the electromagnetic and plasma environment in space and to learn data analysis and modeling techniques.

●Prerequisite Subjects

Electromagnetic wave, computer technique, plasma science, geophysics

●Course Topics

For the following four topics, attendees should read fundamental textbooks and literature, make presentations of their own researches, and join discussion. (1) Electromagnetic environment of interplanetary space, the magnetosphere and the ionosphere (2) Space plasma environment (3) Earth's atmospheric environment (4) Relation between near-earth space environment and atmospheric environment

●Textbook

Suitable textbooks and scientific papers will be selected according to the progress of the research topics

●Additional Reading

(1) Introduction to Plasma Theory, D. R. Nicholson (2) Introduction to Plasma Physics, F. F. Chen (3) Introduction to Space Physics, M. G. Kivelson and C. T. Russell, Cambridge University Press (4) The Earth's Ionosphere (2nd Edition), M. C. Kelley, Academic Press (5) Basic Space Plasma Physics, W. Baumjohann and R. A. Treumann, Imperial College Press (6) Space Physics, M.-B. Kallenrode, Springer (7) Advanced Space Plasma Physics, R. A. Treumann and W. Baumjohann, Imperial College Press

●Grade Assessment

Oral examination (more than 60% for total evaluation)

●Notes

university level mathmatics and physics knowledge

●Contacting Faculty

Questions are welcome during the class.

Seminar on Space Observation 1B (2.0credits) (宇宙電磁観測セミナー1B)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Electrical Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Kazuo SHIOKAWA Professor	Nozomu NISHITANI Associate Professor	Masahito NOSE Associate Professor
	Taku Nakajima Assistant Professor		

●Course Purpose

Reading fundamental textbooks and literature to understand the electromagnetic and plasma environment in space and to learn data analysis and modeling techniques.

●Prerequisite Subjects

Electromagnetic wave, computer technique, plasma science, geophysics

●Course Topics

For the following four topics, attendees should read fundamental textbooks and literature, make presentations of their own researches, and join discussion. (1) Electromagnetic environment of interplanetary space, the magnetosphere and the ionosphere (2) Space plasma environment (3) Earth's atmospheric environment (4) Relation between near-earth space environment and atmospheric environment

●Textbook

Suitable textbooks and scientific papers will be selected according to the progress of the research topics

●Additional Reading

(1) Introduction to Plasma Theory, D. R. Nicholson (2) Introduction to Plasma Physics, F. F. Chen (3) Introduction to Space Physics, M. G. Kivelson and C. T. Russell, Cambridge University Press (4) The Earth's Ionosphere (2nd Edition), M. C. Kelley, Academic Press (5) Basic Space Plasma Physics, W. Baumjohann and R. A. Treumann, Imperial College Press (6) Space Physics, M.-B. Kallenrode, Springer (7) Advanced Space Plasma Physics, R. A. Treumann and W. Baumjohann, Imperial College Press

●Grade Assessment

Oral examination (more than 60% for total evaluation)

●Notes

university level mathmatics and physics knowledge

●Contacting Faculty

Questions are welcome during the class.

Seminar on Space Observation 1C (2.0credits) (宇宙電磁観測セミナー1C)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Electrical Engineering		
Starts 1	1 Spring Semester		
Lecturer	Kazuo SHIOKAWA Professor	Nozomu NISHITANI Associate Professor	Masahito NOSE Associate Professor
	Taku Nakajima Assistant Professor		

●Course Purpose

Reading fundamental textbooks and literature to understand the electromagnetic and plasma environment in space and to learn data analysis and modeling techniques.

●Prerequisite Subjects

Electromagnetic wave, computer technique, plasma science, geophysics

●Course Topics

For the following four topics, attendees should read fundamental textbooks and literature, make presentations of their own researches, and join discussion. (1) Electromagnetic environment of interplanetary space, the magnetosphere and the ionosphere (2) Space plasma environment (3) Earth's atmospheric environment (4) Relation between near-earth space environment and atmospheric environment

●Textbook

Suitable textbooks and scientific papers will be selected according to the progress of the research topics

●Additional Reading

(1) Introduction to Plasma Theory, D. R. Nicholson (2) Introduction to Plasma Physics, F. F. Chen (3) Introduction to Space Physics, M. G. Kivelson and C. T. Russell, Cambridge University Press (4) The Earth's Ionosphere (2nd Edition), M. C. Kelley, Academic Press (5) Basic Space Plasma Physics, W. Baumjohann and R. A. Treumann, Imperial College Press (6) Space Physics, M.-B. Kallenrode, Springer (7) Advanced Space Plasma Physics, R. A. Treumann and W. Baumjohann, Imperial College Press

●Grade Assessment

Oral examination (more than 60% for total evaluation)

●Notes

university level mathmatics and physics knowledge

●Contacting Faculty

Questions are welcome during the class.

Seminar on Space Observation 1D (2.0credits) (宇宙電磁観測セミナー1D)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Electrical Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Kazuo SHIOKAWA Professor	Nozomu NISHITANI Associate Professor	Masahito NOSE Associate Professor
	Taku Nakajima Assistant Professor		

●Course Purpose

Reading fundamental textbooks and literature to understand the electromagnetic and plasma environment in space and to learn data analysis and modeling techniques.

●Prerequisite Subjects

Electromagnetic wave, computer technique, plasma science, geophysics

●Course Topics

For the following four topics, attendees should read fundamental textbooks and literature, make presentations of their own researches, and join discussion. (1) Electromagnetic environment of interplanetary space, the magnetosphere and the ionosphere (2) Space plasma environment (3) Earth's atmospheric environment (4) Relation between near-earth space environment and atmospheric environment

●Textbook

Suitable textbooks and scientific papers will be selected according to the progress of the research topics

●Additional Reading

(1) Introduction to Plasma Theory, D. R. Nicholson (2) Introduction to Plasma Physics, F. F. Chen (3) Introduction to Space Physics, M. G. Kivelson and C. T. Russell, Cambridge University Press (4) The Earth's Ionosphere (2nd Edition), M. C. Kelley, Academic Press (5) Basic Space Plasma Physics, W. Baumjohann and R. A. Treumann, Imperial College Press (6) Space Physics, M.-B. Kallenrode, Springer (7) Advanced Space Plasma Physics, R. A. Treumann and W. Baumjohann, Imperial College Press

●Grade Assessment

Oral examination (more than 60% for total evaluation)

●Notes

university level mathmatics and physics knowledge

●Contacting Faculty

Questions are welcome during the class.

Seminar on Space Information Engineering 1A (2.0credits) (宇宙情報処理セミナー1A)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Electrical Engineering		
Starts 1	1 Spring Semester		
Lecturer	Yoshizumi MIYOSHI Professor	Takayuki UMEDA Associate Professor	Shinsuke IMADA Lecturer

●Course Purpose

We discuss on the individual topics and subjects that form the basis of master's thesis on the space information engineering and solar-terrestrial physics.
It is also intended to learn how to express and present one’s research results at research meetings or the meetings of academic society, etc.

●Prerequisite Subjects

Basic and applied mathematics
Computer programming
Electromagnetism
Plasma physics

●Course Topics

Present the progress and latest achievements of the research of each student, explaining the method and background of the research in a way to be understood by everyone.
Further, we discuss on the methods and how to solve the problems to deepen our understandings on the research subjects.
Although it is basically designed to report on his or her research, it is also possible to give a review talk on the latest research papers to organize and consider about the contents and possibility of one’s research.

●Textbook

The Solar-Terrestrial Environment: An Introduction to Geospace - the Science of the Terrestrial Upper Atmosphere, Ionosphere, and Magnetosphere, Hargreaves, Cambridge University Press

●Additional Reading

We will introduce them if necessary.

●Grade Assessment

We evaluate based on the achievement in presentation and attendance to the class, but we also consider positive attitude at the seminar.
A score of more than 60 points is assumed to be “passed”. More specifically, a score from 60 to 69 points is C, a score from 70 to 79 points is B, and that over 80 points is A.

●Notes

Study about electromagnetics is suggested

●Contacting Faculty

We do not stipulate for office hours. But students who wish to talk directly with us out of the lecture hours can contact with us. We will respond them as much as possible.
miyoshi@isee.nagoya-u.ac.jp
umeda@isee.nagoya-u.ac.jp
imada@isee.nagoya-u.ac.jp

Seminar on Space Information Engineering 1B (2.0credits) (宇宙情報処理セミナー1B)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Electrical Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Yoshizumi MIYOSHI Professor	Takayuki UMEDA Associate Professor	Shinsuke IMADA Lecturer

●Course Purpose

We discuss on the individual topics and subjects that form the basis of master's thesis on the space information engineering and solar-terrestrial physics.
It is also intended to learn how to express and present one’s research results at research meetings or the meetings of academic society, etc.

●Prerequisite Subjects

Basic and applied mathematics
Computer programming
Electromagnetism
Plasma physics

●Course Topics

Present the progress and latest achievements of the research of each student, explaining the method and background of the research in a way to be understood by everyone.
Further, we discuss on the methods and how to solve the problems to deepen our understandings on the research subjects.
Although it is basically designed to report on his or her research, it is also possible to give a review talk on the latest research papers to organize and consider about the contents and possibility of one’s research.his or her research, it is also possible to give a review talk on the latest research papers to organize and consider about the contents and possibility of one’s research.

●Textbook

The Solar-Terrestrial Environment: An Introduction to Geospace - the Science of the Terrestrial Upper Atmosphere, Ionosphere, and Magnetosphere, Hargreaves, Cambridge University Press

●Additional Reading

We will introduce them if necessary.

●Grade Assessment

We evaluate based on the achievement in presentation and attendance to the class, but we also consider positive attitude at the seminar.
A score of more than 60 points is assumed to be “passed”. More specifically, a score from 60 to 69 points is C, a score from 70 to 79 points is B, and that over 80 points is A.

●Notes

Study about electromagnetics is suggested

●Contacting Faculty

We do not stipulate for office hours. But students who wish to talk directly with us out of the lecture hours can contact with us. We will respond them as much as possible.
miyoshi@isee.nagoya-u.ac.jp
umeda@isee.nagoya-u.ac.jp
imada@isee.nagoya-u.ac.jp

Seminar on Space Information Engineering 1C (2.0credits) (宇宙情報処理セミナー1C)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Electrical Engineering		
Starts 1	1 Spring Semester		
Lecturer	Yoshizumi MIYOSHI Professor	Takayuki UMEDA Associate Professor	Shinsuke IMADA Lecturer

●Course Purpose

We discuss on the individual topics and subjects that form the basis of master's thesis on the space information engineering and solar-terrestrial physics.
It is also intended to learn how to express and present one’s research results at research meetings or the meetings of academic society, etc.

●Prerequisite Subjects

Basic and applied mathematics
Computer programming
Electromagnetism
Plasma physics

●Course Topics

Present the progress and latest achievements of the research of each student, explaining the method and background of the research in a way to be understood by everyone.
Further, we discuss on the methods and how to solve the problems to deepen our understandings on the research subjects.
Although it is basically designed to report on his or her research, it is also possible to give a review talk on the latest research papers to organize and consider about the contents and possibility of one’s research.his or her research, it is also possible to give a review talk on the latest research papers to organize and consider about the contents and possibility of one’s research.

●Textbook

The Solar-Terrestrial Environment: An Introduction to Geospace - the Science of the Terrestrial Upper Atmosphere, Ionosphere, and Magnetosphere, Hargreaves, Cambridge University Press

●Additional Reading

We will introduce them if necessary.

●Grade Assessment

We evaluate based on the achievement in presentation and attendance to the class, but we also consider positive attitude at the seminar.
A score of more than 60 points is assumed to be “passed”. More specifically, a score from 60 to 69 points is C, a score from 70 to 79 points is B, and that over 80 points is A.

●Notes

Study about electromagnetics is suggested

●Contacting Faculty

We do not stipulate for office hours. But students who wish to talk directly with us out of the lecture hours can contact with us. We will respond them as much as possible.
miyoshi@isee.nagoya-u.ac.jp
umeda@isee.nagoya-u.ac.jp
imada@isee.nagoya-u.ac.jp

Seminar on Space Information Engineering 1D (2.0credits) (宇宙情報処理セミナー1D)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Electrical Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Yoshizumi MIYOSHI Professor	Takayuki UMEDA Associate Professor	Shinsuke IMADA Lecturer

●Course Purpose

We discuss on the individual topics and subjects that form the basis of master's thesis on the space information engineering and solar-terrestrial physics.
It is also intended to learn how to express and present one’s research results at research meetings or the meetings of academic society, etc.

●Prerequisite Subjects

Basic and applied mathematics
Computer programming
Electromagnetism
Plasma physics

●Course Topics

Present the progress and latest achievements of the research of each student, explaining the method and background of the research in a way to be understood by everyone.
Further, we discuss on the methods and how to solve the problems to deepen our understandings on the research subjects.
Although it is basically designed to report on his or her research, it is also possible to give a review talk on the latest research papers to organize and consider about the contents and possibility of one’s research.his or her research, it is also possible to give a review talk on the latest research papers to organize and consider about the contents and possibility of one’s research.

●Textbook

The Solar-Terrestrial Environment: An Introduction to Geospace - the Science of the Terrestrial Upper Atmosphere, Ionosphere, and Magnetosphere, Hargreaves, Cambridge University Press

●Additional Reading

We will introduce them if necessary.

●Grade Assessment

We evaluate based on the achievement in presentation and attendance to the class, but we also consider positive attitude at the seminar.
A score of more than 60 points is assumed to be “passed”. More specifically, a score from 60 to 69 points is C, a score from 70 to 79 points is B, and that over 80 points is A.

●Notes

Study about electromagnetics is suggested

●Contacting Faculty

We do not stipulate for office hours. But students who wish to talk directly with us out of the lecture hours can contact with us. We will respond them as much as possible.
miyoshi@isee.nagoya-u.ac.jp
umeda@isee.nagoya-u.ac.jp
imada@isee.nagoya-u.ac.jp

Seminar on Power Electronics 1A (2.0credits) (パワーエレクトロニクスセミナー1A)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Seminar	
Course Name	Electrical Engineering	
Starts 1	1 Spring Semester	
Lecturer	YAMAMOTO Masayoshi Professor	Jun IMAOKA Assistant Professor

●Course Purpose

We will discuss Latest Trend of Automotive Application, Latest Trend of Green Energy Application and Latest Trend of Aircraft Application.

●Prerequisite Subjects

Power Semiconductor Engineering, Electric Circuit

●Course Topics

1. Latest Trend of Automotive Application2. Latest Trend of Green Energy Application3. Latest Trend of Aircraft Application4. Future Trend of Automotive ApplicationSubmit the report for the assignment due at the end of lecture.

●Textbook

Print distribution as appropriate

●Additional Reading

Print distribution as appropriate

●Grade Assessment

ReportEntrance Year: 2020 or later　100 - 95:A+, 94 - 80:A, 79 - 70:B, 69 - 65:C, 64 - 60:C-, < 59:F
Entrance Year: 2019 or before　100 - 90:S, 89 - 80:A, 79 - 70:B, 69 - 60:C, < 59:F

●Notes

No condition.

●Contacting Faculty

Respond after lecture is over.

Seminar on Power Electronics 1B (2.0credits) (パワーエレクトロニクスセミナー1B)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Seminar	
Course Name	Electrical Engineering	
Starts 1	1 Autumn Semester	
Lecturer	YAMAMOTO Masayoshi Professor	Jun IMAOKA Assistant Professor

●Course Purpose

We will discuss Latest Trend of Automotive Application, Latest Trend of Green Energy Application and Latest Trend of Aircraft Application.

●Prerequisite Subjects

Power Semiconductor Engineering, Electric Circuit

●Course Topics

1. Latest Trend of Automotive Application2. Latest Trend of Green Energy Application3. Latest Trend of Aircraft Application4. Future Trend of Automotive ApplicationSubmit the report for the assignment due at the end of lecture.

●Textbook

Print distribution as appropriate

●Additional Reading

Print distribution as appropriate

●Grade Assessment

ReportEntrance Year: 2020 or later　100 - 95:A+, 94 - 80:A, 79 - 70:B, 69 - 65:C, 64 - 60:C-, < 59:F
Entrance Year: 2019 or before　100 - 90:S, 89 - 80:A, 79 - 70:B, 69 - 60:C, < 59:F

●Notes

No condition.

●Contacting Faculty

Respond after lecture is over.

Seminar on Power Electronics 1C (2.0credits) (パワーエレクトロニクスセミナー1C)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Seminar	
Course Name	Electrical Engineering	
Starts 1	1 Spring Semester	
Lecturer	YAMAMOTO Masayoshi Professor	Jun IMAOKA Assistant Professor

●Course Purpose

We will discuss Latest Trend of Automotive Application, Latest Trend of Green Energy Application and Latest Trend of Aircraft Application.

●Prerequisite Subjects

Power Semiconductor Engineering, Electric Circuit

●Course Topics

1. Latest Trend of Automotive Application2. Latest Trend of Green Energy Application3. Latest Trend of Aircraft Application4. Future Trend of Automotive ApplicationSubmit the report for the assignment due at the end of lecture.

●Textbook

Print distribution as appropriate

●Additional Reading

Print distribution as appropriate

●Grade Assessment

ReportEntrance Year: 2020 or later 100 - 95:A+, 94 - 80:A, 79 - 70:B, 69 - 65:C, 64 - 60:C-, < 59:F
Entrance Year: 2019 or before 100 - 90:S, 89 - 80:A, 79 - 70:B, 69 - 60:C, < 59:F

●Notes

No condition.

●Contacting Faculty

Respond after lecture is over.

Seminar on Power Electronics 1D (2.0credits) (パワーエレクトロニクスセミナー1D)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Seminar	
Course Name	Electrical Engineering	
Starts 1	1 Autumn Semester	
Lecturer	YAMAMOTO Masayoshi Professor	Jun IMAOKA Assistant Professor

●Course Purpose
We will discuss Latest Trend of Automotive Application, Latest Trend of Green Energy Application and Latest Trend of Aircraft Application.

●Prerequisite Subjects
Power Semiconductor Engineering, Electric Circuit

●Course Topics
1. Latest Trend of Automotive Application2. Latest Trend of Green Energy Application3. Latest Trend of Aircraft Application4. Future Trend of Automotive ApplicationSubmit the report for the assignment due at the end of lecture.

●Textbook
Print distribution as appropriate.

●Additional Reading
Print distribution as appropriate

●Grade Assessment
ReportEntrance Year: 2020 or later　100 - 95:A+, 94 - 80:A, 79 - 70:B, 69 - 65:C, 64 - 60:C-, < 59:F
Entrance Year: 2019 or before　100 - 90:S, 89 - 80:A, 79 - 70:B, 69 - 60:C, < 59:F

●Notes
No condition.

●Contacting Faculty
Respond after lecture is over.

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	
Lecturer	Associated Faculty		

●Course Purpose

The aim of this course is to expand the student’s ability as a researcher by studying in an abroad laboratory and learn different methods and ways of thinking, as well as communicate on a daily base with foreign researchers.

By completing the course, the students are expected to acquire various research methods and ways of thinking, gain the ability to tackle research problems from multiple angles, and acquire a broad international perspective.

●Prerequisite Subjects

Basic and specialized subjects related to the research subject, English, Advanced Lectures on Scientific English

●Course Topics

Students will stay in an abroad laboratory that will be chosen based on the participant’s research field and interest. The course consists of the following contents.

1. Theme setting and literature review
2. Formulating a research plan
3. Analyzing the results and discussion
4. Presentation of the results

After the class, students should review the analyzing processes of the research results and investigate related literatures.

●Textbook
Will be introduced at the host laboratory depending on the research subject

●Additional Reading
Will be introduced at the host laboratory if necessary

●Grade Assessment
Conducting research in an abroad laboratory for one semester and submitting a report is a prerequisite. Evaluation will be based on the student's report (50%) and oral presentation (50%). To pass, the students have to demonstrate that they have the capacity to adequately analyze the results and have acquired the basic knowledge to interpret the results.

●Notes
Nothing particularly needed

●Contacting Faculty
Questions will be answered by the supervisors at the host laboratory during the course.

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	
Lecturer	Associated Faculty		

●Course Purpose

The aim of this course is to expand the student’s ability as a researcher by studying in an abroad laboratory and learn different methods and ways of thinking, as well as communicate on a daily base with foreign researchers.

By completing the course, the students are expected to acquire various research methods and ways of thinking, gain the ability to tackle research problems from multiple angles, and acquire a broad international perspective.

●Prerequisite Subjects

Basic and specialized subjects related to the research subject, English, Advanced Lectures on Scientific English

●Course Topics

Students will stay in an abroad laboratory that will be chosen based on the participant’s research field and interest. The course consists of the following contents.

1. Theme setting and literature review
2. Formulating a research plan
3. Analyzing the results and discussion
4. Presentation of the results

After the class, students should review the analyzing processes of the research results and investigate related literatures.

●Textbook
Will be introduced at the host laboratory depending on the research subject

●Additional Reading
Will be introduced at the host laboratory if necessary

●Grade Assessment
Conducting research in an abroad laboratory for two semesters and submitting a report is a prerequisite. Evaluation will be based on the student's report (50%) and oral presentation (50%). To pass, the students have to demonstrate that they have the capacity to adequately analyze the results and have acquired the basic knowledge to interpret the results.

●Notes
Nothing particularly needed

●Contacting Faculty
Questions will be answered by the supervisors at the host laboratory during the course.

Advanced Lectures on Power System Engineering (2.0credits) (エネルギーシステム工学特論)

Course Type	Specialized Courses
Division at course	Master's Course
Class Format	Lecture
Course Name	Electrical Engineering
Starts 1	Spring Semester ,every other year
Lecturer	Yasunobu YOKOMIZU Professor

●Course Purpose
A lecture on fundamental theory and physical phenomenon related to energy system and equipment

●Prerequisite Subjects
Electrical circuit theory, Electomagnetic theory, Fundamentals of Electric Energy and Electric Power Transmission Engineering,

●Course Topics
1. Kind of energy
2. Essential factor of electric power transmission
3. Theory of Energy conversion and generation
4. Charateristics related to above
5. Discretization of electrical circuit equation

●Textbook
Distribution of handout

●Additional Reading
It is introduced if necessary.

●Grade Assessment
Grade is assessed on the basis of reports and exercises.

●Notes
It is preferable to understand electromagnetic theory and electric circuit theory.

●Contacting Faculty
During or after the class.

Advanced Lectures on Power Apparatus (2.0credits) (エネルギー機器工学特論)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Lecture	
Course Name	Electrical Engineering	
Starts 1	1 Autumn Semester	
Lecturer	Shigeyuki SUGIMOTO Professor	Muneaki KURIMOTO Associate Professor

●Course Purpose

Based on the understanding of energy related issues of the 21st century. Students can learn about electrical energy systems, from electrical energy generation to transportation, and can master the basics power apparatus engineering. Moreover, students can gain an understanding of the mechanisms of power apparatus, as well as the material technologies that constitute the parts of each apparatus.

The goal of this lecture is to enable students to:
1. Understand and explain about measures against the issues on energy.
2. Understand and explain about electric power systems and the mechanism and features of related apparatus.
3. Understand and explain about the materials that constitute the parts of power apparatus, the necessary material characteristics and the latest materials technology.

●Prerequisite Subjects

Fundamentals of Electric Energy, Electric Energy Conversion Engineering,
Electric Power Transmission Systems, Electric Power Apparatus,
High Voltage Engineering, Electrical and Electronic Materials Engineering

●Course Topics

1. Issues on energy in the 21st century
2. Theory of energy generation, conversion and transmission
3. Electric energy system with distributed power supply and renewable energy
4. Characteristics of electric power apparatus
5. Material technologies constituting each electric power apparatus

Four reports are required, and the answer must be stated and submitted.

●Textbook

Handouts are distributed at each lecture.

●Additional Reading

Students will be notified if necessary.

●Grade Assessment

Four reports are required. Reports carry the same importance and are evaluated on a 100 points scale. The passing grade is over 60 points, the average score from all reports.

●Notes

No additional course requirements.

●Contacting Faculty

Questions will be accepted at the end of each lecture.
Teacher contact information:
Sugimoto, extension 2098, s.sugimoto@imass.nagoya-u.ac.jp
Kurimoto, extension 4422, kurimoto@nuee.nagoya-u.ac.jp

Advanced Lectures on Energy System and Environment (2.0credits) (エネルギー環境工学特論)

Course Type	Specialized Courses
Division at course	Master's Course
Class Format	Lecture
Course Name	Electrical Engineering
Starts 1	Spring Semester ,every other year
Lecturer	Takeyoshi KATOH Professor

●Course Purpose
To study fundamental knowledge and analysis method to discuss energy and environmental issue from a wide point of view.

●Prerequisite Subjects
Electric Power Apparatus
Electric Power Transmission Systems
Electric Energy Conversion Engineering
High Voltage Engineering
Materials for Electrical and Electronic Engineering

●Course Topics
1. Energy and environment issues
2. Economics of energy supply and demand
3. Modeling of energy system
4. CO2 mitigation technologies in Japan

Obtain background knowledge on each topic. Investigate the points of particular interest in detail based on newspaper articles, etc.

●Textbook
Supporting materials are provided.

●Additional Reading
Many books on energy system and equipment are available.

●Grade Assessment
Total score is evaluated by Report.

Entrance Year: 2020 or later
10095:A+, 9480:A, 7970:B, 6965:C, 6460:C-, <59:F
Entrance Year: 2019 or before
10090:S, 8980:A, 7970:B, 6960:C, <59:F

●Notes
No course requirements

●Contacting Faculty
After the lecture, or e-mail.
Address: tkato@nuee.nagoya-u.ac.jp

Advanced Lectures on Materials for Electrical Engineering and Systems (2.0credits) (エネルギー材料工学特論)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Lecture	
Course Name	Electrical Engineering	
Starts 1	1 Autumn Semester	
Lecturer	TomokazuFUKUTSUKA Professor	Akimori TABATA Associate Professor

●Course Purpose
The aim of this course is to help students acquire basics of materials used in energy conversion devices (especially secondary batteries). At the end of the course, participants are expected to design batteries from the viewpoint of materials.

●Prerequisite Subjects
Solid-state electronics

●Course Topics
1. Overview of secondary batteries
2. Lithium-ion battery positive electrode
3. Lithium-ion battery negative electrode
4. Lithium-ion battery electrolyte
5. Lithium-ion battery kinetics
6. Overview of next-generation secondary batteries

●Textbook
Printed materials are provided as needed.

●Additional Reading

●Grade Assessment
Grading will be decided based on the report examination. Regarding secondary battery materials, argument based on one's own ideas will be required to pass.

●Notes
No course requirements

●Contacting Faculty
Contact by email.

Basic Plasma Physics and Engineering (2.0credits) (プラズマ物性工学)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Lecture	
Course Name	Electrical Engineering	
Starts 1	1 Spring Semester	
Lecturer	Noriyasu ONO Professor	Shin KAJITA Associate Professor

●Course Purpose

To understand magnetohydrodynamics and kinetic properties of plasmas (ionized gaseous substance) and basic properties of particle, collective, and statistical aspects of plasma.
Major contents are as follows:
- Velocity distribution of charged particles
- Collisions with neutral and charged particles
- Fluid behaviors of plasmas
- Drift of plasmas
- Atomic and molecular processes in plasmas

●Prerequisite Subjects

Electromagnetics, Mechanics, Statistical Mechanics

●Course Topics

1. Fundamental theory of gas
2. Fundamental processes of charged particles
3. Transport process of charged particles
4. Fundamental processes of plasma production
5. discharge process
6. Plasma diagnostics and applications

●Textbook

●Additional Reading

Basic Plasma Physics(V.E.Golant,Gendai KogakuSha Inc) Introduction to Plasma Physics (F. F. Chen, Springer Inc) \ Basic Principle of Plasma Physics(S. Ichimaru,W.A.Benjamin.Inc), Physical Kinetics(E.M.Landau,Pergamon Press)

●Grade Assessment

Evaluated by reports (60 points) and a final exam (40 points)
Minimum requirement is 60 points in total

●Notes

●Contacting Faculty

Advanced Lectures on Physics of Thermal Fluid (2.0credits) (熱流体物理特論)

Course Type	Specialized Courses
Division at course	Master's Course
Class Format	Lecture
Course Name	Electrical Engineering
Starts 1	Autumn Semester ,every other year
Lecturer	Hiroaki NAKAMURA Professor

●Course Purpose

Understanding the non-equilibrium steady state process of thermoelectric phenomena in semiconductors. Typically the following theories will be introduced. 1. Fundamental of non-equilibrium steady state physics in semiconductors.2. Linear transport equation of electric and heat current.3. Boltzmann equation in the relaxation time approximation.

●Prerequisite Subjects

Classical and Quantum Mechanics, Thermodynamics, Solid State Physics

●Course Topics

In this lecture, the basic transport theory of non-equilibrium steady state will be introduced. After it, the following topics will be introduced.1. The band structures in solid.2. How to solve the Boltzmann equation.3. Quantum transport theory of the carriers in the nano-devices.In this lecture, I'd like the students to master the estimation of transport coefficients theoretically.

●Textbook

Nothing special.

●Additional Reading

Herbert B. Callen, “Thermodynamics and an Introduction to Thermostatistics ,” Wiley(1985).

●Grade Assessment

Your nal grade will be calculated according to the following process: Mid-term report 4 times (100%).

●Notes

In this course, it is desirable to have knowledge of equilibrium statistical mechanics for . This course will be taught in Japanese.

●Contacting Faculty

Please send me an e-mail (hnakamura@nifs.ac.jp).

Fundamentals on Superconducting Engineering (2.0credits) (超伝導工学基礎論)

Course Type	Specialized Courses
Division at course	Master's Course
Class Format	Lecture
Course Name	Electrical Engineering
Starts 1	Autumn Semester ,every other year
Lecturer	"YOSHIDA Yutaka" Professor

●Course Purpose

Superconductivity has interesting phenomena and promising materials for transmission and utilization of electric power and energy. In this lecture low-temperature technologies related to superconductivity fundamental theories on superconductivity useful features of superconducting materials and its applications to energy engineering will be studied.

Goal:

1. to understand low-temperature technologies related to superconductivity
2. to understand fundamental theories on superconductivity
3. to understand features of superconducting materials
4. To understand superconducting applications to energy engineering

●Prerequisite Subjects

Electromagnetic Theory Solid State Electric Fundamentals of Electric Energy

You should take the above subjects but you can take this subject even if you have not taken above subjects.

●Course Topics

1.General survey on superconductivity
2.Superconducting materials
3.Low temperature technics and materials
4.Superconductor power devices
5.Application of superconductivity

As homework will be assigned during or after class submit as a report each time or by the designated date.

●Textbook

to be introduced in the lecture.

●Additional Reading

to be introduced in the lecture.

●Grade Assessment

Grading by exercises reports and term-end examinations.

In the term-end examination you can be brought in one handwritten paper with A4 size both sides possible. (enrolled student after 2020.4)

A+:100-95 A:94-85 B:84-75 C:74-65 C-:65-60 F: 59

●Notes

No course requirements

●Contacting Faculty

We handle student questions during and after class.

If you ask questions after-class hour contact by telephone or e-mail.

Advanced Lectures on Superconducting Application Engineering (2.0credits) (超伝導応用工学特論)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Lecture	
Course Name	Electrical Engineering	
Starts 1	1 Spring Semester	
Lecturer	Naoki HAYAKAWA Professor	Hiroki KOJIMA Associate Professor

●Course Purpose

In the generation, transmission, and utilization of electric power and energy, superconductivity is one of the promising techniques. In this lecture, fundamentals on superconductivity and its application to electric power and energy will be studied.

Goal:
1. To understand principle and examples of applied superconductivity to elecric power and energy
2. To understand R&D of superconducting power apparatus and systems
3. To understand future problems on applied superconductivity

●Prerequisite Subjects

Electric power devices

●Course Topics

1.General survey on superconductivity
2.Superconducting materials
3.Low temperature techniques and materials
4.Superconductor power devices
5.Application of superconductivity

Students should make a preparation of next lectures for understanding the terms etc.

●Textbook

distribition of handout

●Additional Reading

Some books will be introduced in the lectures.

●Grade Assessment

By report or presentation, an understanding of R&D and future problems of superconducting power apparatus and systems will be evaluated.
Against a full mark of 100, a mark of more than 60 is passing.

●Notes

It is preferable to understand the basis of electric power engineering.

●Contacting Faculty

Students are encouraged to ask questions during and after lectures.
Hayakawa: nhayakaw@nuee.nagoya-u.ac.jp, Kojima: kojima@nuee.nagoya-u.ac.jp

Advanced Lectures on Space Electromagnetic Environment (2.0credits) (宇宙電磁環境学特論)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Lecture		
Course Name	Electrical Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Kazuo SHIOKAWA Professor	Nozomu NISHITANI Associate Professor	Masahito NOSE Associate Professor

●Course Purpose

This class deals with the sun-earth system (space electromagnetic environment) by lecturing sun, interplanetary space, geospace environment and behavior of electromagnetic fields and charged particles. The lecture is focused on understanding the following topics:
(1) space electromagnetic environment as a extension of the earth's environment
(2) effect of space electromagnetic environment changes on the earth environment
(3) effect of space electromagnetic environment changes on the human activities in space

●Prerequisite Subjects

Electromagnetism, plasma science, upper atmosphere physics

●Course Topics

1. Basic Concepts of Plasma
1.1. Degree of Ionization
1.2. Debye Shielding
1.3. Plasma Parameter
1.4. Plasma Oscillation
2. Single Particle Motion
2.1. Cyclotron Motion
2.2. Particle Drift
2.2.1. Drift by General Force
2.2.2. Electric Drift
2.2.3. Polarization Drift
2.2.4. Gradient B Drift
2.2.5. Curvature Drift
2.2.6. Mirror Force
2.3. Adiabatic Invariant
2.3.1. Temporally Variable Magnetic Field
2.3.2. First, Second, and Third Adiabatic Invariants
3. Magneto-Hydro Dynamics
3.1. Phase Space Density
3.2. Boltzmann Equation, Vlasov Equation
3.3. Maxwellian Distribution
3.4. Macroscopic Quantity
3.5. Two Fluid Equation
3.5.1. Equation of Continuity
3.5.2. Equation of Motion
3.5.3. Equation of State
3.6. One Fluid Equation
3.6.1. Equation of Continuity
3.6.2. Equation of Motion
3.6.3. Equation of State
3.6.4. Generalized Ohm’s Law
3.7. Plasma Beta

3.8. Diffusion and Frozen-in of Magnetic Field
4. Structure and Dynamics of the Heliosphere, Magnetosphere, and Ionosphere
4.1. Waves in Plasma
4.2. Shocks in Plasma
4.3. Instabilities in Plasma
4.4. Heliosphere
4.5. Magnetosphere
4.6. Ionosphere

●Textbook

Prints for lecture

●Additional Reading

(1) Plasma physics
* Introduction to Plasma Theory, D. R. Nicholson (John Wiley and Sons)
* Introduction to Plasma Physics, F. F. Chen (Plenum Press)
(2) Solar-Terrestrial Physics
* The Earth's Ionosphere (2nd Edition), M. C. Kelley, Academic Press
* Introduction to Space Physics, M. G. Kivelson and C. T. Russell, Cambridge University Press
* Basic Space Plasma Physics, W. Baumjohann and R. A. Treumann, Imperial College Press
* Space Physics, M.-B. Kallenrode (Springer)

●Grade Assessment

Evaluation by Report. Understanding of Basic plasma physics and solar-terrestrial coupling process is mandatory to pass the course.

●Notes

university level mathmatics knowledge

●Contacting Faculty

Questions are welcome during the class.

Advanced Lectures on Space Information Engineering (2.0credits) (宇宙情報処理特論)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Lecture	
Course Name	Electrical Engineering	
Starts 1	1 Spring Semester	
Lecturer	Yoshizumi MIYOSHI Professor	Takayuki UMEDA Associate Professor

●Course Purpose

An overview of the space and solar-terrestrial system, and basic space plasma physics including charged particle motion, MHD theory, and plasma waves will be given.

●Prerequisite Subjects

Electromagnetic theory, Electromagnetic wave engineering, Plasma physics and engineering, Mechanics, Thermodynamics, Statistical mechanics

●Course Topics

1. Basics of space plasma physics
Study about basic concepts of space plasma such as collisionless
2. Charged particle motion
Study about equation of motion and drift motions of particles
3. Basics of magneto-hydro dynamics
Derivation of equation system of magneto-hydro dynamics and several wave phenomana
4. Basics of plasma waves
Study about dispersion-relation of plasma waves with cold plasma approximation

Reading related text books is suggested.

●Textbook

The text for this course will not be specified, but in addition to the reference books, references will be introduced as needed.

●Additional Reading

Solar-Terrestrial and Space Plasma Physics, T. Ono and Y. Miyoshi (Kyoritsu)
Introduction to Plasma Theory, D. R. Nicholson (Weily)
Introduction to Plasma Physics, F. F. Chen (Springer)

●Grade Assessment

Reports are evaluated by 100 points full marks.

●Notes

Basic knowledge of electromagnetic theory is required.

●Contacting Faculty

Feel free to ask during or after the class.
Contact via email:
Institute for Space-Earth Environmental Research
miyoshi@isee.nagoya-u.ac.jp

Advanced Lectures on Power Electronics Applications (2.0credits) (パワーエレクトロニクス応用特論)

Course Type	Specialized Courses
Division at course	Master's Course
Class Format	Lecture
Course Name	Electrical Engineering
Starts 1	1 Autumn Semester
Lecturer	YAMAMOTO Masayoshi Professor

●Course Purpose
We will discuss the power semiconductor device, its gate driver circuit and its application.

●Prerequisite Subjects
Power Semiconductor Engineering, Electric Circuit

●Course Topics
1. Poser Electronics and Power Semiconductor Device2. Several Power Semiconductor Device3. Gate Drive circuit4. Several Gate Drive circuit5. Gate Drive circuit for SiC6. Gate Drive circuit for GaN-HEMT7. Design method of Gate Drive circuit for GaN-HEMT8. Latest Trend of Automotive Application9. Latest Trend of Green Energy Application10. Latest Trend of Aircraft Application11. Future Trend of Automotive ApplicationSubmit the report for the assignment due at the end of lecture.

●Textbook
Print distribution as appropriate.

●Additional Reading
Print distribution as appropriate.

●Grade Assessment
Report and ExaminationEntrance Year: 2020 or later　100 - 95:A+, 94 - 80:A, 79 - 70:B, 69 - 65:C, 64 - 60:C-, < 59:F Entrance Year: 2019 or before　100 - 90:S, 89 - 80:A, 79 - 70:B, 69 - 60:C, < 59:F

●Notes
No condition

●Contacting Faculty
Respond after lecture is over.

ected Topics in Electrical/Electronic/and Information Engineering (2.0credits) (電気／電子／情報・通信工学特別講

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Lecture		
Course Name	Electrical Engineering	Electronics	Information and Communication Engineering
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
Lecturer	Part-time Faculty	Part-time Faculty	Part-time Faculty

●Course Purpose

Lectures by instructors who are active in various fields on the latest research and development trends in electrical engineering, electronic engineering, and information and communication engineering, are aimed at cultivating creativity, comprehensive power, and oversight.The objective of this course is to gain a deep understanding of the attractiveness and trends of research and development in this field, and to utilize it in future courses and research.

●Prerequisite Subjects

No specific requirements.

●Course Topics

Each time, lecturers who are active in related field will introduce the latest research and development contents.Before each lecture, check the web page about the company to which the lecturers belongs. After the lecture, a report will be imposed every time, so submit the contents that you understood.

●Textbook

Textbooks are not specified, but some materials will be distributed as needed.

●Additional Reading

Some books will be introduced in the lecture.

●Grade Assessment

Evaluation will be based on the submitted report.Pass if the goal is achieved

●Notes

No specific requirements.

●Contacting Faculty

Each lecturer will answer your questions during the break time after the lecture.

Advanced Experiments and Exercises in Electric Engineering (2.0credits) (電気工学特別実験及び演習)

Course Type	Specialized Courses
Division at course	Master's Course
Class Format	Experiment and Exercise
Course Name	Electrical Engineering
Starts 1	1 Spring and Autumn Semester
Lecturer	Associated Faculty

●Course Purpose

Perform experiments and exercises on the latest issues in the field. The aim is to acquire skills related to these issues through experiments and exercises, deepen understanding through exercises, and acquire basic and applied skills to carry out research in this field.Through this experiment and practice, the goal is to be able to learn and utilize the related technologies required for conducting one's own research.

●Prerequisite Subjects

Although there is nothing in particular, general subjects of this department are the background.

●Course Topics

In each belonging laboratory, for a given research theme, conduct experiments and exercises.At that time, if necessary, a literature search and its consideration are expected. In addition, perform some computer simulations and experiments for evaluate the contents and the your ideas.Read textbooks and documents in related fields to facilitate experiments and exercises on your own. In addition, discussions on the contents research will be conducted as appropriate. Therefore, the contents should be organized and compiled according to the progress of the research.

●Textbook

Specified when necessary.

●Additional Reading

Specified when necessary.

●Grade Assessment

Evaluate the degree of achievement for achievement goals based on daily experiments and exercises, the report and the presentations. Pass if the goal is achieved.

●Notes

No specific requirements

●Contacting Faculty

Staffs in your lab will answer your questions appropriately.

Innovation Practice Course (4.0credits) (イノベーション体験プロジェクト)

Course Type	Comprehensive engineering courses		
Division at course	Master's Course		
Class Format	Experiment and Exercise		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	
Lecturer	Hiroshi IKUTA Professor		

●Course Purpose

Under the instruction of the company engineer (DP, Directing Professor), I carry out the project for the problem solution by the team of several people consisting of different specialisms. In this way, it is intended to let you sense ability for problem discovery, the importance of the general intellectual power of compound eyes on the basis of real world bodily.
I know a point of view, the plan as the company and perform a discussion, exchange of opinions between the different specialty and aim for the breeding of the viewpoint general, to see engineering by examining it as the problem solution person concerned from different angles.

●Prerequisite Subjects

It is strongly recommended to take the industry-university joint educational courses such as Focus on Venture Business and ,etc.

●Course Topics

I organize different specialty, the team (several/team) consisting of the students of the department several sets, and DP is the instruction in each each team. Based on the project theme that DP determined, I set the problem that a student carries out concretely. For 75 hours (principle one day a week), I accomplish the project for the problem solution.
Prior lecture to affect a project theme by the DP
Setting (opinion, information exchange, allied investigation, examination, discussion) of the concrete problem by the student
Enforcement of the problem solution project
Summary, report of the result

I assume this a main component.
In addition, I may be given an investigation and the consideration in conjunction with the theme as a problem from DP. Report it in a date (the next time lectures) when it was appointed, and announce it; and a thing corresponding to the exchange of opinions in the team.

●Textbook

documents that a lecturer (DP) introduces it and shows.

●Additional Reading

documents that a lecturer (DP) introduces it and shows.

●Grade Assessment

I evaluate it through accomplishment, the discussion of the project, result announcement. If a consideration power, the adjustability for the problem solution, the expansion of the field of vision are accepted, it is said that I pass.

●Notes

There are no prerequisites

●Contacting Faculty

A lecturer (DP) and this project staff of the university accept questions at any time.

Research Internship１ U2 (2.0credits) (研究インターンシップ１ U2)

Course Type	Comprehensive engineering courses		
Division at course	Master's Course		
Class Format	Practice		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	
Lecturer	Hiroshi IKUTA Professor		

●Course Purpose

Through the training to affect technology development, the study of the company in the company is advanced, and experience the challenge to a practical problem. In this way, it is aimed for upbringing of human resources tying engineering to creation of the social value.
It is wider in a technique and a study, and a consciousness, ability to catch in a general viewpoint (utility, economy) and communication power is bred and aims for what is reflected by a study, the study at the university.

●Prerequisite Subjects

It is strongly recommended to take the industry-university joint educational courses such as Focus on Venture Business and ,etc.

●Course Topics

In the company accepting an intern, I make the training (study) about the study theme that a company shows.
Orientation to affect the overall company concerned and the training medium
Enforcement (including cooperation, the adjustment with the company staff) of the training theme
Summary, report of the training result
I assume a report (presentation) of the training result to the university a main component.
As the associated document, documents investigation may not support during the working hours that a company sets, I do the attendance of the lecture about "the handling, a point to keep in mind by basic knowledge and the study internship of intellectual property rights" to need what I study in the training overtime by oneself, and to perform on the university side prior to the company training again with

requisiteness.

●Textbook
documents that the staff instructing the training in the company introduces it and shows

●Additional Reading
documents that the staff instructing the training in the company introduces it and shows

●Grade Assessment
I am given in the following on 20th in the total days that engaged in the training in the company.
I do that I announce the result to the university in a result briefing session to perform after the training if essential.
I evaluate it based on result announcement contents and an evaluation book of the training staff making. I recognize an experience-based effect in the training by oneself, and will to plan reflection to a study, the study at the university does it with a pass if admitted.

●Notes
The studnt that I subscribed for the training theme of the company, and acceptance was accepted.

●Contacting Faculty
The training staff of the company and the study internship staff of the university accept questions at any time.

Research Internship１ U3 (3.0credits) (研究インターンシップ１ U3)

Course Type	Comprehensive engineering courses		
Division at course	Master's Course		
Class Format	Practice		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	
Lecturer	Hiroshi IKUTA Professor		

●Course Purpose

Through the training to affect technology development, the study of the company in the company is advanced, and experience the challenge to a practical problem. In this way, it is aimed for upbringing of human resources tying engineering to creation of the social value.
It is wider in a technique and a study, and a consciousness, ability to catch in a general viewpoint (utility, economy) and communication power is bred and aims for what is reflected by a study, the study at the university.

●Prerequisite Subjects

It is strongly recommended to take the industry-university joint educational courses such as Focus on Venture Business and ,etc.

●Course Topics

In the company accepting an intern, I make the training (study) about the study theme that a company shows.
Orientation to affect the overall company concerned and the training medium
Enforcement (including cooperation, the adjustment with the company staff) of the training theme
Summary, report of the training result
I assume a report (presentation) of the training result to the university a main component.
As the associated document, documents investigation may not support during the working hours that a company sets, I do the attendance of the lecture about "the handling, a point to keep in mind by basic knowledge and the study internship of intellectual property rights" to need what I study in the training overtime by oneself, and to perform on the university side prior to the company training again with

requisiteness.

●Textbook

documents that the staff instructing the training in the company introduces it and shows

●Additional Reading

documents that the staff instructing the training in the company introduces it and shows

●Grade Assessment

The credits will be given to the students who have had the working days between 21 and 40 days in the internship company.

●Notes

The studnt that I subscribed for the training theme of the company, and acceptance was accepted.

●Contacting Faculty

The training staff of the company and the study internship staff of the university accept questions at any time.

Research Internship１ U4 (4.0credits) (研究インターンシップ１ U4)

Course Type	Comprehensive engineering courses		
Division at course	Master's Course		
Class Format	Practice		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	
Lecturer	Hiroshi IKUTA Professor		

●Course Purpose

Through the training to affect technology development, the study of the company in the company is advanced, and experience the challenge to a practical problem. In this way, it is aimed for upbringing of human resources tying engineering to creation of the social value.
It is wider in a technique and a study, and a consciousness, ability to catch in a general viewpoint (utility, economy) and communication power is bred and aims for what is reflected by a study, the study at the university.

●Prerequisite Subjects

It is strongly recommended to take the industry-university joint educational courses such as Focus on Venture Business and ,etc.

●Course Topics

In the company accepting an intern, I make the training (study) about the study theme that a company shows.
Orientation to affect the overall company concerned and the training medium
Enforcement (including cooperation, the adjustment with the company staff) of the training theme
Summary, report of the training result
I assume a report (presentation) of the training result to the university a main component.
As the associated document, documents investigation may not support during the working hours that a company sets, I do the attendance of the lecture about "the handling, a point to keep in mind by basic knowledge and the study internship of intellectual property rights" to need what I study in the training overtime by oneself, and to perform on the university side prior to the company training again with

requisiteness.

●Textbook
documents that the staff instructing the training in the company introduces it and shows

●Additional Reading
documents that the staff instructing the training in the company introduces it and shows

●Grade Assessment
The credits will be given to the students who have had the working days between 41 and 60 days in the internship company.

●Notes
The studnt that I subscribed for the training theme of the company, and acceptance was accepted.

●Contacting Faculty
The training staff of the company and the study internship staff of the university accept questions at any time.

Research Internship１ U6 (6.0credits) (研究インターンシップ１ U6)

Course Type	Comprehensive engineering courses		
Division at course	Master's Course		
Class Format	Practice		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	
Lecturer	Hiroshi IKUTA Professor		

●Course Purpose

Through the training to affect technology development, the study of the company in the company is advanced, and experience the challenge to a practical problem. In this way, it is aimed for upbringing of human resources tying engineering to creation of the social value.
It is wider in a technique and a study, and a consciousness, ability to catch in a general viewpoint (utility, economy) and communication power is bred and aims for what is reflected by a study, the study at the university.

●Prerequisite Subjects

It is strongly recommended to take the industry-university joint educational courses such as Focus on Venture Business and ,etc.

●Course Topics

In the company accepting an intern, I make the training (study) about the study theme that a company shows.
Orientation to affect the overall company concerned and the training medium
Enforcement (including cooperation, the adjustment with the company staff) of the training theme
Summary, report of the training result
I assume a report (presentation) of the training result to the university a main component.
As the associated document, documents investigation may not support during the working hours that a company sets, I do the attendance of the lecture about "the handling, a point to keep in mind by basic knowledge and the study internship of intellectual property rights" to need what I study in the training overtime by oneself, and to perform on the university side prior to the company training again with

requisiteness.

●Textbook

documents that the staff instructing the training in the company introduces it and shows

●Additional Reading

documents that the staff instructing the training in the company introduces it and shows

●Grade Assessment

The credits will be given to the students who have had the working days between 61 and 80 days in the internship company.

●Notes

The studnt that I subscribed for the training theme of the company, and acceptance was accepted.

●Contacting Faculty

The training staff of the company and the study internship staff of the university accept questions at any time.

Research Internship１ U8 (8.0credits) (研究インターンシップ１ U8)

Course Type	Comprehensive engineering courses		
Division at course	Master's Course		
Class Format	Practice		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	
Lecturer	Hiroshi IKUTA Professor		

●Course Purpose

Through the training to affect technology development, the study of the company in the company is advanced, and experience the challenge to a practical problem. In this way, it is aimed for upbringing of human resources tying engineering to creation of the social value.
It is wider in a technique and a study, and a consciousness, ability to catch in a general viewpoint (utility, economy) and communication power is bred and aims for what is reflected by a study, the study at the university.

●Prerequisite Subjects

Students attending Research Internship are strongly recommended to take short-term Patent Laws and Focus on Venture Business I or II before the attendance.

●Course Topics

In the company accepting an intern, I make the training (study) about the study theme that a company shows.
Orientation to affect the overall company concerned and the training medium
Enforcement (including cooperation, the adjustment with the company staff) of the training theme
Summary, report of the training result
I assume a report (presentation) of the training result to the university a main component.
As the associated document, documents investigation may not support during the working hours that a company sets, I do the attendance of the lecture about "the handling, a point to keep in mind by basic knowledge and the study internship of intellectual property rights" to need what I study in the training overtime by oneself, and to perform on the university side prior to the company training again with

requisiteness.

●Textbook

documents that the staff instructing the training in the company introduces it and shows

●Additional Reading

documents that the staff instructing the training in the company introduces it and shows

●Grade Assessment

The credits will be given to the students who have had the working days more than or equal to 81 daysin the internship company.

●Notes

The studnt that I subscribed for the training theme of the company, and acceptance was accepted.

●Contacting Faculty

The training staff of the company and the study internship staff of the university accept questions at any time.

Advanced Lectures on Frontier Technologies and Sciences (1.0credits) (最先端理工学特論)

Course Type	Comprehensive engineering courses		
Division at course	Master's Course		
Class Format	Lecture		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	
Lecturer	Syusaku NAGANO Associate Professor		

●Course Purpose

To research in advanced engineering, it is necessary to learn the latest research trends through practice. Through symposium-style academic discussions, students will be able to study cutting-edge science and engineering research and discuss the latest trends in the subject areas.

●Prerequisite Subjects

Knowledge of the subject areas.

●Course Topics

Participated in special lectures set every year from the fields of biochemistry, analysis, semiconductors, polymers, and startups related to cutting-edge science and engineering, and participated in a symposium where research presentations on cutting-edge engineering were presented. By participating, students will study cutting-edge science and engineering research and discuss the latest trends in the subject areas. After taking the course, study and study the relevant field in detail.

●Textbook

Distribute as appropriate.

●Additional Reading

Distribute as appropriate.

●Grade Assessment

Report. A score of 60 or more out of 100 will be passed. Pass if you have a broad understanding of the subject area. Highly appreciate the point of contact with your own research, new business and research

proposals.

●Notes

There are no special requirements. Students who are interested in startups are preferred.

●Contacting Faculty

Arranging the schedules by e-mail and etc.

Course Type	Comprehensive engineering courses		
Division at course	Master's Course		
Class Format	Experiment		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	
Lecturer	Syusaku NAGANO Associate Professor		

●Course Purpose

To research in advanced engineering, it is necessary to learn the latest research trends through practice. The purpose of this experiment is to find the research issues on one's own and conduct research experiments using the latest experimental equipment and molecular simulation technology.
Through this experiment, you will be able to understand the principles of the Raman spectrometer, ionization potential measurement, X-ray diffraction etc. and molecular simulation software and learn how to use them practically. The goal is to comprehensively acquire the knowledge, skills, and presentation techniques related to advanced experiments necessary for conducting the research that was the subject.

●Prerequisite Subjects

it is advisable to acquire basic knowledge on the subject research.

●Course Topics

When students choose the prepared subject, students perform the curriculum using one of a Raman spectrometer, an ionization potential measurement and an X-ray diffractometer and learn the principles and practical and advanced usage of these equipment. In the case of an experiment proposed by students (original experiment), students proposes a molecular simulation experiment or research using the above-described equipment, and conduct the experiment with the instructor to produce results. Ultimately, students discuss the results, present their results, and learn how to use the advanced equipment and simulation skills.

●Textbook

Distribute as needed. Please check the required documents by yourself.

●Additional Reading

Distribute as needed. Please check the required documents by yourself.

●Grade Assessment

Exercise (50%) and presentation of research results (50%) will be evaluated. Understanding the measurement principle and usage is used as a criterion for acceptance, but the research achievements and new approaches to research are highly evaluated. A score of 60 or more out of 100 is a passing score.

●Notes

No course requirements.

●Contacting Faculty

Arranging the schedules by e-mail and etc.

Introduction to Academic Communication (1.0credits) (コミュニケーション学)

Course Type	Comprehensive engineering courses		
Division at course	Master's Course		
Class Format	Lecture		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	Graduate Chemistry
	Graduate Chemistry	Automotive Engineering	Automotive Engineering
	Civil and Environmental Engineering Graduate		
Starts 1	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester		
Lecturer	ReikoFURUYA Associate Professor		

●Course Purpose

Students will learn presentation skills for academic purposes, which may include giving academic presentations.
Japanese students are expected to present in English and international students in Japanese in the seventh or eighth class meeting.
By taking this class, students are expected to be able to do the following:
-Give a solid presentation with confidence and without hesitance
-Grasp the characteristics of successful presentations
-Use techniques learned in class in their own presentation

●Prerequisite Subjects

English language classes for Japanese students
Japanese language classes for international students

●Course Topics

(1) Ways to convey messages in presentation
(2) The language of a presentation
(3) Tips for making effective slides
(4) Observation and analysis of video-taped presentation by a past student
(5) Paper vs presentation
(6) Preparation for individual presentation
(7) Individual presentations I

(8) Individual presentations

This course requires students to work outside of the classes for individual presentation.

●Textbook

Handouts will be distributed in class

●Additional Reading

1The Japan Times
2:

●Grade Assessment

Individual presentation: 50%
Active class participation: 50%

Grades: A+: 100%-95%, A: 94%-80%, B: 79%-70%, C: 69%-65%, C-: 64%-60%, F: 59%-0%

Grading will be decided based on the ability to give an effective academic presentation.

●Notes

There are no requirements for taking this class.

●Contacting Faculty

Questions will be answered before class, in class, after class or by e-mail.

Latest Advanced Technology and Tasks in Automobile Engineering (3.0credits) (先端自動車工学特論)

Course Type	Comprehensive engineering courses		
Division at course	Master's Course		
Class Format	Lecture		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	Automotive Engineering
	Automotive Engineering		
Starts 1	1 Spring Semester	1 Spring Semester	1 Spring Semester
	1 Spring Semester	1 Spring Semester	1 Spring Semester
	1 Spring Semester	1 Spring Semester	1 Spring Semester
	1 Spring Semester	1 Spring Semester	1 Spring Semester
	1 Spring Semester	1 Spring Semester	1 Spring Semester
	1 Spring Semester	1 Spring Semester	1 Spring Semester
	1 Spring Semester		
Lecturer	Yukio ISHIDA Designated Professor		

●Course Purpose

This course is intended to study the latest advanced technology of automobile engineering from top researchers of universities and industries. The topics of lectures are related to almost all fields of automotive industries, such as hibrid cars, electric cars, automated driving and crash safety. It is asle intended to develop the English hearing/speaking ability. The attainment targets are as follows:

1. Understand the latest technology of automotive engineering.
2. Underatand company's automotive production system.
3. Improve English ability in the field of socience and engineering.
4. Strengthen communication skills and presentation skills in English by studying with international students.

●Prerequisite Subjects

lectures related to fundamental physics, mechanical, electrical and information engineering.

●Course Topics

A. Lectures

1. The Car Industry, Market Trend, Circumstance and Its Future.
2. Overview of Automotive Development Process.
3. Observation and Evaluation of Drivers' Behavior Perspective.
4. Car Materials and Processing.
5. Movements and Control of a Car.
6. Safety Engineering for the Prevention of Accidents.
7. Crash Safety.
8. Automobile Embedded Computing System.
9. Wireless Technologies in ITS.

10.Applications of CAE to Vehicle Development.
11.Energy Saving Technology for Automobiles.
12.Automated Driving.
13.Traffic Flow Characteristics.
14.Cars and Roads in Urban Transportation Context.
15.Automobile in Aging Society.
B. Factory Visits
1.Toyota Motors Corp., 2. Mitsubishi Motors Corp., 3. Toyota Boshoku Corp., 4.Suzuki Museum,
5.Toyota Commemorative Museum, 6. Traffic Safety and Environmental Lab.
C. Group Research Project
Several students form one group and each group selects one topic. They investigate and discuss about this topic and make presentations.
After each lecture is finished, read the handout and write a repor about each lecture with your comments.

●Textbook

Handout delivered in each lecture

●Additional Reading

Introduced in the lectures

●Grade Assessment

Evaluation will be based on (a) Discussions in the lectures 20%, (b) report for each lecture 20%, (c) group presentation 30%. and (d) report on research subject 30%. It is necessary to attend factory visits.In each item, the undastanding of the concepts is especially evaluated.
Summing up the all scores from (a) to (d) and the students with evaluation A, B, or C can pass this subject.

●Notes

1. There are limits of enrollment capacity. Full course student limit is about 10. Auditor limit for each lecture is about 10.
2. English ability is checked before accepted as a student.

●Contacting Faculty

Mainly accepted during each lecture. Other general questions are accepted by Professor Yukio Ishida.
<Contact> TEL: 052-747-6797, Email: ishida@nuem.nagoya-u.ac.jp

Advanced Lectures on Scientific English (1.0credits) (科学技術英語特論)

Course Type	Comprehensive engineering courses		
Division at course	Master's Course		
Class Format	Lecture		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	Automotive Engineering
	Automotive Engineering	Civil and Environmental Engineering Graduate	
Starts 1	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	
Lecturer	Part-time Faculty		

●Course Purpose

This is a course to acquire basic skills to summarize research as a paper in English. By the end of the course, students will be able to …
explain the basic structure of science and technology research paper
list essential components of each section of research paper
type short multiple-paragraph essays with appropriate punctuation
orally express logically structured opinion

●Prerequisite Subjects

Various subjects relating to English

●Course Topics

1. Basics of academic writing in English (1)
2. Basic structure of science & technology research paper (1)
3. Writing (1), feedback and opinion exchange
4. Basics of academic writing in English (2)
5. Basic structure of science & technology research paper (2)
6. Writing (2), feedback and opinion exchange
7. Basic structure of science & technology research paper (3)
8. Writing (3), feedback and opinion exchange

Students are expected to spend a few hours each week reviewing key points of the lecture and working on the writing assignment.

●Textbook

None. Students will receive handouts in each class session.

●Additional Reading

Glasman-Deal, H. (2010). Science Research Writing For Non-Native Speakers of English. Imperial College Press.
Swales, J.M. & Feak, C.B. (2012). Academic Writing for Graduate Students. The University of Michigan Press.
Wallwork, A. (2013). English for Academic Research: Grammar, Usage and Style. Springer.
Wallwork, A. (2016). English for Writing Research Papers. Springer.

●Grade Assessment

Submitting three short writing assignments that show understanding of research paper structure with appropriate punctuation is required for a passing grade. Speaking English contributing to discussion and opinion exchange, as well as raising questions in class, is strongly encouraged.

●Notes

There are no prerequisites

●Contacting Faculty

Email address to be announced in the first class

Focus on Venture Business I (2.0credits) (ベンチャービジネス特論 I)

Course Type	Comprehensive engineering courses		
Division at course	Master's Course		
Class Format	Lecture		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	
Starts 1	1 Spring Semester	1 Spring Semester	1 Spring Semester
	1 Spring Semester	1 Spring Semester	1 Spring Semester
	1 Spring Semester	1 Spring Semester	1 Spring Semester
	1 Spring Semester	1 Spring Semester	1 Spring Semester
	1 Spring Semester	1 Spring Semester	1 Spring Semester
	1 Spring Semester	1 Spring Semester	
Lecturer	Syusaku NAGANO Associate Professor		

●Course Purpose

People often point out that the layer of startup companies should assume the leading edge is thin. Part of the cause depends on the system, but in many cases, it is due to the difference in perceptions of the entrepreneurship between East and Western researchers. In this course, you study the basic knowledge and goals required as engineers and researchers when commercializing/starting a “university research.” We will show examples of technology development and commercialization based on research results of universities, entrepreneurship in companies and venture startups, and consider venture business utilizing research. Through this lecture, entrepreneurs' mindsets will be formed as well as minimum knowledge of patents.

●Prerequisite Subjects

●Course Topics

●Textbook

Distribute materials as appropriate.

●Additional Reading

●Grade Assessment

Evaluate based on self-made problem report Understanding the problems and solutions for startups that respond to the problems in the lecture is a criterion for success. The contents of the report are comprehensively evaluated, and a score of 60 or more is considered acceptable. New business proposals will be appreciated.

●Notes

Do not have any special requirements. We hope students who are interested in startups.

●Contacting Faculty

the break after the lecture.

Focus on Venture Business II (2.0credits) (ベンチャービジネス特論II)

Course Type	Comprehensive engineering courses		
Division at course	Master's Course		
Class Format	Lecture		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	
Starts 1	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	
Lecturer	Syusaku NAGANO Associate Professor	Akitoshi EDAGAWA Visiting Professor	

●Course Purpose

By referring to the examples of commercialization, in-company entrepreneurship and venture entrepreneurship given in the special lecture on venture business I, you study the specialized knowledge necessary for entrepreneurship and start-up from a public accountant, SME consultant, etc. Talks are held with specialists in Japan to acquire the knowledge needed for venture business management.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Safety and Reliability in Engineering (2.0credits) (安全・信頼性工学)

Course Type	Comprehensive engineering courses		
Division at course	Master's Course		
Class Format	Lecture		
Course Name	Electrical Engineering	Electronics	Information and Communication Engineering
	Mechanical Systems Engineering	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering
	Department of Energy Engineering	Department of Applied Energy	
Starts 1	1 Spring Semester	1 Spring Semester	1 Spring Semester
	1 Spring Semester	1 Spring Semester	1 Spring Semester
	1 Spring Semester	1 Spring Semester	
Lecturer	"YAMAMOTO Akio" Professor	Masahiro Arai Professor	Takaya INAMORI Associate Professor
	Part-time Faculty		

●Course Purpose

Safety and reliability are one of the most important issues in all engineering fields. In this lecture, the aerospace engineering field and nuclear engineering field, which are the symbolic entities of integrated engineering, will be linked, and the lecturers who have many years of experience in the space, aviation, and nuclear industries will understand students from other fields. The aim is to learn the basics and practice of safety and reliability engineering, while giving consideration to it. In addition, by attending this lecture with assignments and exercises, you can acquire the concept of ensuring safety and reliability in all industrial fields, and acquire useful skills regardless of progress in any field in the future.

By learning this lecture, the goal is to acquire the following skills.
(1) Understand and apply basic concepts of safety and reliability.
(2) Understand and apply safety concepts and application examples in the aerospace field.
(3) Understand and apply safety concepts and application examples in the field of nuclear power.

●Prerequisite Subjects

There are no special subjects required to take this course.

●Course Topics

(1) Basics of Safety and reliability engineering including FMEA and FTA
(2) Safety and reliability in aerospace engineering
(3) Safety fundamentals and safety design in nuclear engineering
(4) Hazard assessments in nuclear engineering
(5) Accidents in nuclear facilities and lessons learned

Gather information on relevant areas before each lecture. After the lecture, review the content and work on the examples again. To submit a report assignment in the first and second half, submit it.

●Textbook

Materials will be distributed in each lecture. Introduce textbooks as necessary.

●Additional Reading

References in Japanese, regarding to reliability analysis and FMEA, FTA.

●Grade Assessment

Evaluate the degree of achievement for the achievement target in the report. Understand the basic concepts of safety and reliability in the aerospace and nuclear fields, and pass if applicable.

●Notes

No registration requirements required

●Contacting Faculty

As a general rule, it corresponds to the break time during class hours and after the class ends. In other cases, it is possible to respond at any time.

Ethics and Security in Engineering (2.0credits) (工学のセキュリティと倫理)

Course Type	Comprehensive engineering courses		
Division at course	Master's Course		
Class Format	Lecture		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Chemical Systems Engineering
	Electrical Engineering	Electronics	Information and Communication Engineering
	Mechanical Systems Engineering	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering
	Department of Energy Engineering	Department of Applied Energy	
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	
Lecturer	Tatsuya SUZUKI Professor		

●Course Purpose

The aim of the lecture is to understand ethics, intellectual property rights, information security required at the start of master thesis research. After taking this course, the students are expected to have abilities on:

1. Understanding of Ethics for engineers
2. Understanding of Ethics for researcher
3. Understanding of Intellectual property rights
4. Understanding of Information security

●Prerequisite Subjects

None because this is one of the common basic subject for future activity as a researcher or an engineer.

●Course Topics

1) Introduction,
2)Ethics for engineers,
3)Ethics for researchers,
4)Intellectual property rights,
5)Information security,
6)Summary

Submission of the report after each class is mandatory.

●Textbook

Instead of using textbook, original lecture notes will be provided at each class.

●Additional Reading

Original lecture notes will be provided at each class.

●Grade Assessment

Credits will be awarded to those students who score 'Pass' based on the reports and /or subjects given by each lecture.

●Notes

None because this is one of the common basic subject for future activity as a researcher or an engineer.

●Contacting Faculty

After each class student can ask in person.
Otherwise, contact to:

Pro. Suzuki
Ext. 2700, t_suzuki@nuem.nagoya-u.ac.jp

Internship A (1.0credits) (学外実習A)

Course Type	Comprehensive engineering courses
Division at course	Master's Course
Class Format	Practice
Course Name	Electrical Engineering
Starts 1	1 Spring and Autumn Semester
Lecturer	Associated Faculty

●Course Purpose

Through short-term internships and practical training at companies, etc., students will learn how to proceed with work in society, and at the same time, use them for future courses and research, and aim to foster their comprehensive abilities.The objective of this course is to be able to:1. You can learn the work contents and required abilities of engineers in actual research laboratories and factory floors.2. Understand how graduate courses are useful.

●Prerequisite Subjects

All studies that have been offered in this department

●Course Topics

Training according to the instructor of each company.After the internship/training destination is decided, conduct a sufficient survey on the internship/training destination company for your internship/training. During the internship/training period, preparation for the internship/training and summarization after the internship/training are done according to the instructor of the internship/training destination.

●Textbook

Specified when necessary.

●Additional Reading

Specified when necessary.

●Grade Assessment

Evaluation is based on the report submitted from the internship/training site.Pass if the goal is achieved

●Notes

No special conditions are required, but appropriate actions can be taken in line with social common sense.

●Contacting Faculty

An instructor will respond appropriately at the internship/training site.

Internship B (1.0credits) (学外実習B)

Course Type	Comprehensive engineering courses
Division at course	Master's Course
Class Format	Practice
Course Name	Electrical Engineering
Starts 1	1 Spring and Autumn Semester
Lecturer	Associated Faculty

●Course Purpose

Through short-term internships and practical training at companies, etc., students will learn how to proceed with work in society, and at the same time, use them for future courses and research, and aim to foster their comprehensive abilities.The objective of this course is to be able to:1. You can learn the work contents and required abilities of engineers in actual research laboratories and factory floors.2. Understand how graduate courses are useful.

●Prerequisite Subjects

All studies that have been offered in this department.

●Course Topics

Training according to the instructor of each company.After the internship/training destination is decided, conduct a sufficient survey on the internship/training destination company for your internship/training. During the internship/training period, preparation for the internship/training and summarization after the internship/training are done according to the instructor of the internship/training destination.

●Textbook

Specified when necessary.

●Additional Reading

Specified when necessary.

●Grade Assessment

Evaluation is based on the report submitted from the internship/training site.Pass if the goal is achieved

●Notes

No special conditions are required, but appropriate actions can be taken in line with social common sense.

●Contacting Faculty

An instructor will respond appropriately at the internship/training site.

Overview of space exploration and research (2.0credits) (宇宙研究開発概論)

Course Type	Comprehensive engineering courses		
Division at course	Master's Course		
Class Format	Lecture		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Process Engineering
	Chemical Systems Engineering	Electrical Engineering	Electronics
	Information and Communication Engineering	Mechanical Systems Engineering	Micro-Nano Mechanical Science and Engineering
	Aerospace Engineering	Department of Energy Engineering	Department of Applied Energy
	Civil and Environmental Engineering		
Starts 1	1 Spring Semester	1 Spring Semester	1 Spring Semester
	1 Spring Semester	1 Spring Semester	1 Spring Semester
	1 Spring Semester	1 Spring Semester	1 Spring Semester
	1 Spring Semester	1 Spring Semester	1 Spring Semester
	1 Spring Semester	1 Spring Semester	1 Spring Semester
	1 Spring Semester		
Lecturer	Leading Graduate		

●Course Purpose

This lecture course helps students to acquire a wide-ranging, panoramic knowledge of space research and development given by variety of lecturers from different academic fields.

●Prerequisite Subjects

Basic mathematics, Basic physics

●Course Topics

1. Space Exploration Projects
1.1 Overview of Space Exploration and Research
1.2 Space Projects
1.3 International Satellite and Spacecraft (HTV) Development
1.4 Project Management/Systems Engineering
1.5 Intelectual Properties in Business

2. Space Explorations on Observations
2.1 Space Propulsion Engineering
2.2 Materials Development for Space Applications
2.3 Space Observation Technologies
2.4 Introduction to Radiation Detectors and Electronics

3. Space-related Science
3.1 Foundations of Astrophysics
3.2 Earth and Planetary Science
3.3 Space Environment Science
3.4 Simulation Experiments

Report subject will be given at every lecture. The report should be submitted by the given deadline.

●Textbook

We do not specify the textbook. Lecture notes will be given as necessary.

●Additional Reading

Recommended readings will be give during lectures as necessary.

●Grade Assessment

Report must be submitted for each lecture. Proper understanding of each lecture's contents is evaluated. Passing average point is 60 out of 100.

●Notes

Students in "Leadership program for Space exploration and Research" are required to take this course before the qualifying examination. This course is open to any graduate students in Nagoya University.

●Contacting Faculty

Inquire contact method from the lecturer after the lecture

Advanced Mobility Program Basic Course (4.0credits) (先進モビリティ学基礎)

Course Type	Comprehensive engineering courses		
Division at course	Master's Course		
Class Format	Lecture and Exercise		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	
Starts 1	1 Spring Semester	1 Spring Semester	1 Spring Semester
	1 Spring Semester	1 Spring Semester	1 Spring Semester
	1 Spring Semester	1 Spring Semester	1 Spring Semester
	1 Spring Semester	1 Spring Semester	1 Spring Semester
	1 Spring Semester	1 Spring Semester	1 Spring Semester
	1 Spring Semester	1 Spring Semester	
Lecturer	Faculty of Advanced Mobility Program		

●Course Purpose

To train students who can be active in the mobility industry or research institute. This course is aiming to cultivate comprehensive knowledge not only on specialized technical elements but also service and social impact of the mobility. The class will be provided not only by professors but also by engineers in industry. The course is organized as follows:

1. Understand fundamentals of automobile
2. Understand the trend on electrification of automobile
3. Understand the trend on on intelligence for automobile
4. Understand dependability, safety and human factor
5. Comprehensively study the mobility service
6. Comprehensively study the legal system for mobility

●Prerequisite Subjects

Accepted basic engineering classes at Nagoya University Bachelor's degree, or equivalent knowledge.

●Course Topics

1. Fundamentals of automobile
2. Electrification of automobile
3. Intelligence for automobile
4. Dependability, safety and human factor
5. Mobility service
6. Legal system for mobility
7. Discussion and presentation

Read carefully the textbook before attending each class. After each class, solving the exercises in the

textbook is highly recommended. Submission of the report after each class is mandatory.

●Textbook
Original lecture note will be provided.

●Additional Reading
It will be announced in the class if necessary.

●Grade Assessment
Evaluation is based on total score of reports at each class and final presentation. You need more than mark of 60 out of 100 points. Special certificate will be provided for passed students.

●Notes
No particular requirement.

●Contacting Faculty
Office hour:Wed.13:0014:00 @Green Vehicle Material Research Building 1F
Mail to: o_shimizu@nuem.nagoya-u.ac.jp

ced Mobility Program Practical Training Course(Autonomous Vehicle) (2.0credits) (先進モビリティ学実習（自動運

Course Type	Comprehensive engineering courses		
Division at course	Master's Course		
Class Format	Exercise and Practice		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	
Starts 1	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	
Lecturer	Faculty of Advanced Mobility Program		

●Course Purpose

To train students who can be active in the mobility industry or research institute. This course is aiming to realization of autonomous drive by using 1/10 model car. Students develop the software system for autonomous driving. The course is organized as follows:

1. Understand architecture of autonomous drive
2. Understand the image processing for lane detection, and its implementation
3. Understand the control technique for lane following and its implementation

●Prerequisite Subjects

Accepted basic engineering classes at Nagoya University Bachelor's degree, or equivalent knowledge.

●Course Topics

This course is aiming to realization of autonomous drive by using 1/10 model car. Students develop the software system for autonomous driving. The course is organized as follows:

1. Architecture of autonomous drive
2. Image processing for lane detection, and its implementation
3. Control technique for lane following and its implementation

Class is performed based on group activity.

●Textbook

Original lecture note will be provided.

●Additional Reading

It will be announced in the class if necessary.

ced Mobility Program Practical Training Course(Autonomous Vehicle) (2.0credits) (先進モビリティ学実習（自動運

●Grade Assessment

Evaluate based on attendance at lecture, total score of tasks set at each time, final presentation. Special certificate will be provided for passed students.

●Notes

No particular requirement

●Contacting Faculty

Office hour:Wed.13:0014:00 @Green Vehicle Material Research Building 1F
Mail to: o_shimizu@nuem.nagoya-u.ac.jp

dvanced Mobility Program Practical Training Course(Electric Vehicle) (2.0credits) (先進モビリティ学実習（ＥＶ）

Course Type	Comprehensive engineering courses		
Division at course	Master's Course		
Class Format	Exercise and Practice		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	
Starts 1	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	
Lecturer	Faculty of Advanced Mobility Program		

●Course Purpose

To train students who can be active in the mobility industry or research institute. This course is aiming to design and analysis of EV formula car. In addition, Test drive is carried out. The course is organized as follows:1. Understand the mechanism of electric vehicle2. Understand the characteristics of motor and battery3. Understand the way of analysis and design of vehicle

●Prerequisite Subjects

Accepted basic engineering classes at Nagoya University Bachelor's degree, or equivalent knowledge.

●Course Topics

This course is aiming to design and analysis of EV formula car. In addition, Test drive is carried out. The course is organized as follows:1. Mechanism of electric vehicle2. Characteristics of motor and battery3. Way of analysis and design of vehicle Class is performed based on group activity.

●Textbook

Original lecture note will be provided.

●Additional Reading

It will be announced in the class if necessary.

●Grade Assessment

Evaluate based on attendance at lecture, total score of tasks set at each time, final presentation. You need more than mark of 60 out of 100 points. Special certificate will be provided for passed students.

●Notes

No particular requirement

●Contacting Faculty

Office hour:Wed.13:0014:00 @Green Vehicle Material Research Building 1FMail to: o_shimizu@nuem.nagoya-u.ac.jp

Course Type	Comprehensive engineering courses		
Division at course	Master's Course		
Class Format	Lecture		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	
Lecturer	Associated Faculty		

●Course Purpose

• To design and conduct an original research project
• To develop experience with experimental/numerical/theoretical techniques
• To develop a working knowledge of relevant research literature
• To practice scientific writing and participate in the peer review process
• To be able to discuss the research and topic with other scientists and engineers
The objective of this project is to increase the capability to find and to solve research problems by learning the research approaches and ideas of different research fields.

●Prerequisite Subjects

Basic engineering subjects, English, Technical English

●Course Topics

• Students will develop (with guidance) a research project proposal at the beginning of the semester that will provide initiative, outline and experimental strategy.
• Each student will present oral reports of research progress, relevant readings, and/or challenges at scheduled lab meetings.
• Students will take primary responsibility for conducting research and do so with professional attitudes and time commitments. This is a lab course and you are expected to spend a minimum of 20 hours of productive lab work per week. It is more realistic to expect to spend an average of 25-30 hours per week working and thinking about your project.
• Students will produce a manuscript (with active feedback from the instructor and peers) that can be published in part or whole by a peer reviewed research journal. Publishable manuscripts require many drafts,

reviews, and revisions.
• Students are encouraged to present research results at appropriate scientific meetings.
• Students well be self-motivated and work independently, approaching the instructor for guidance regularly.

●Textbook
Will be designated by each supervisor.

●Additional Reading
Will be designated by each supervisor.

●Grade Assessment
The grade will be calculated according to the following criteria.
Written report following the same format as scientific paper... 50%; Presentation at the Workshop... 50%.
The acceptance standard is to understand the introduced research approaches and ideas.
Evaluation is done by the supervisor(s) at home and visiting universities.

●Notes
No conditions for taking the course

●Contacting Faculty
Supervisor of visiting university basically takes care.

Course Type	Comprehensive engineering courses		
Division at course	Master's Course		
Class Format	Lecture		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	
Lecturer	Associated Faculty		

●Course Purpose

• To design and conduct an original research project
• To develop experience with experimental/numerical/theoretical techniques
• To develop a working knowledge of relevant research literature
• To practice scientific writing and participate in the peer review process
• To be able to discuss the research and topic with other scientists and engineers
The objective of this project is to increase the capability to find and to solve research problems by learning the research approaches and ideas of different research fields.

●Prerequisite Subjects

Basic engineering subjects, English, Technical English

●Course Topics

• Students will develop (with guidance) a research project proposal at the beginning of the semester that will provide initiative, outline and experimental strategy.
• Each student will present oral reports of research progress, relevant readings, and/or challenges at scheduled lab meetings.
• Students will take primary responsibility for conducting research and do so with professional attitudes and time commitments. This is a lab course and you are expected to spend a minimum of 20 hours of productive lab work per week. It is more realistic to expect to spend an average of 25-30 hours per week working and thinking about your project.
• Students will produce a manuscript (with active feedback from the instructor and peers) that can be published in part or whole by a peer reviewed research journal. Publishable manuscripts require many drafts,

reviews, and revisions.
• Students are encouraged to present research results at appropriate scientific meetings.
• Students well be self-motivated and work independently, approaching the instructor for guidance regularly.

●Textbook

Will be designated by each supervisor.

●Additional Reading

Will be designated by each supervisor.

●Grade Assessment

The grade will be calculated according to the following criteria.
Written report following the same format as scientific paper... 50%; Presentation at the Workshop... 50%.
The acceptance standard is to understand the introduced research approaches and ideas.
Evaluation is done by the supervisor(s) at home and visiting universities.

●Notes

No conditions for taking the course

●Contacting Faculty

Supervisor of visiting university basically takes care.

Course Type	Comprehensive engineering courses		
Division at course	Master's Course		
Class Format	Lecture		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	
Lecturer	Associated Faculty		

●Course Purpose

• To design and conduct an original research project
• To develop experience with experimental/numerical/theoretical techniques
• To develop a working knowledge of relevant research literature
• To practice scientific writing and participate in the peer review process
• To be able to discuss the research and topic with other scientists and engineers
The objective of this project is to increase the capability to find and to solve research problems by learning the research approaches and ideas of different research fields.

●Prerequisite Subjects

Basic engineering subjects, English, Technical English

●Course Topics

• Students will develop (with guidance) a research project proposal at the beginning of the semester that will provide initiative, outline and experimental strategy.
• Each student will present oral reports of research progress, relevant readings, and/or challenges at scheduled lab meetings.
• Students will take primary responsibility for conducting research and do so with professional attitudes and time commitments. This is a lab course and you are expected to spend a minimum of 20 hours of productive lab work per week. It is more realistic to expect to spend an average of 25-30 hours per week working and thinking about your project.
• Students will produce a manuscript (with active feedback from the instructor and peers) that can be published in part or whole by a peer reviewed research journal. Publishable manuscripts require many drafts,

reviews, and revisions.
• Students are encouraged to present research results at appropriate scientific meetings.
• Students well be self-motivated and work independently, approaching the instructor for guidance regularly.

●Textbook
Will be designated by each supervisor.

●Additional Reading
Will be designated by each supervisor.

●Grade Assessment
The grade will be calculated according to the following criteria.
Written report following the same format as scientific paper... 50%; Presentation at the Workshop... 50%.
The acceptance standard is to understand the introduced research approaches and ideas.
Evaluation is done by the supervisor(s) at home and visiting universities.

●Notes
No conditions for taking the course

●Contacting Faculty
Supervisor of visiting university basically takes care.

International special lecture (1.0credits) (国際協働教育特別講義)

Course Type	Comprehensive engineering courses		
Division at course	Master's Course		
Class Format	Lecture		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Process Engineering
	Chemical Systems Engineering	Electrical Engineering	Electronics
	Information and Communication Engineering	Mechanical Systems Engineering	Micro-Nano Mechanical Science and Engineering
	Aerospace Engineering	Department of Energy Engineering	Department of Applied Energy
	Civil and Environmental Engineering		
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester		
Lecturer	Associated Faculty		

●Course Purpose

Gain basic knowledge of general engineering through English lectures on various hot research topics and leading technologies. The objective of this lecture is to develop research abilities and communication skills, which are essential to carry out international collaborative researches.

●Prerequisite Subjects

Basic engineering subjects, English, Technical English

●Course Topics

Depends on the lecturer.This course will be divided in 4 chapters as follows:1. Setting theme and reviewing literature2. Designing research plan3. Analysis and discussion of results4. Brief summary and future prospectsHomework will be given after the class and the report is required to be submitted in next class.

●Textbook

Will be designated by the lecturer.

●Additional Reading

Will be designated by the lecturer.

●Grade Assessment

Written report and evaluation by the professors.

●Notes

No conditions for taking the course

●Contacting Faculty

In the class and E-mail.

International language exercise (1.0credits) (国際協働教育外国語演習)

Course Type	Comprehensive engineering courses		
Division at course	Master's Course		
Class Format	Exercise		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Process Engineering
	Chemical Systems Engineering	Electrical Engineering	Electronics
	Information and Communication Engineering	Mechanical Systems Engineering	Micro-Nano Mechanical Science and Engineering
	Aerospace Engineering	Department of Energy Engineering	Department of Applied Energy
	Civil and Environmental Engineering		
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester		
Lecturer	Associated Faculty		

●Course Purpose

The aim of this course is to provide Japanese students with the English classes or provide international students with Japanese classes to improve communication skills for both academic and daily life.

●Prerequisite Subjects

English, Technical English, Japanese

●Course Topics

Wide variety of exercises including speaking, listening, writing, reading, and presentation in Japanese/English.Homework will be given after the class and the report is required to be submitted in next class.

●Textbook

Will be designated by the lecturer.

●Additional Reading

Will be designated by the lecturer.

●Grade Assessment

Report, presentation, participation in discussionGrading will be based on understanding Japanese and English, and communication performance.

●Notes

No conditions for taking the course

●Contacting Faculty

Acceptance and response in the class or through E-mail.

Seminar on High Power Engineering 2A (2.0credits) (大電流エネルギー工学セミナー2A)

Course Type	Specialized Courses	
Division at course	Doctor's Course	
Class Format	Seminar	
Course Name	Electrical Engineering	
Starts 1	1 Spring Semester	
Lecturer	TomokazuFUKUTSUKA Professor	Seiji KATAKURA Assistant Professor

●Course Purpose

This course deals with the state of the art of battery. By reading and presenting the text and latest literature, skills to investigate the energy conversion devices is acquired. By the end of the course, students should be able to acquire the research skill of batteries.

●Prerequisite Subjects

No special subjects are specified because this is a seminar.

●Course Topics

Read articles on electrochemistry and batteries. Resume is required and comprehensive discussion is conducted.

●Textbook

The presenter selects the paper.

●Additional Reading

Texts and papers are introduced if need.

●Grade Assessment

The degree of achievement is evaluated by presentations, questions and answers, and discussions. A score of 60 is criteria for pass.

●Notes

No course requirements

●Contacting Faculty

During the seminar and after seminar.

Seminar on High Power Engineering 2B (2.0credits) (大電流エネルギー工学セミナー2B)

Course Type	Specialized Courses	
Division at course	Doctor's Course	
Class Format	Seminar	
Course Name	Electrical Engineering	
Starts 1	1 Autumn Semester	
Lecturer	TomokazuFUKUTSUKA Professor	Seiji KATAKURA Assistant Professor

●Course Purpose
This course deals with the state of the art of battery. By reading and presenting the text and latest literature, skills to investigate the energy conversion devices is acquired. By the end of the course, students should be able to acquire the research skill of batteries.

●Prerequisite Subjects
No special subjects are specified because this is a seminar.

●Course Topics
Read articles on electrochemistry and batteries. Resume is required and comprehensive discussion is conducted.

●Textbook
The presenter selects the paper.

●Additional Reading
Texts and papers are introduced if need.

●Grade Assessment
The degree of achievement is evaluated by presentations, questions and answers, and discussions. A score of 60 is criteria for pass.

●Notes
No course requirements

●Contacting Faculty
During the seminar and after seminar.

Seminar on High Power Engineering 2C (2.0credits) (大電流エネルギー工学セミナー2C)

Course Type	Specialized Courses	
Division at course	Doctor's Course	
Class Format	Seminar	
Course Name	Electrical Engineering	
Starts 1	2 Spring Semester	
Lecturer	TomokazuFUKUTSUKA Professor	Seiji KATAKURA Assistant Professor

●Course Purpose

This course deals with the state of the art of battery. By reading and presenting the text and latest literature, skills to investigate the energy conversion devices is acquired. By the end of the course, students should be able to acquire the research skill of batteries.

●Prerequisite Subjects

No special subjects are specified because this is a seminar.

●Course Topics

Read articles on electrochemistry and batteries. Resume is required and comprehensive discussion is conducted.

●Textbook

The presenter selects the paper.

●Additional Reading

Texts and papers are introduced if need.

●Grade Assessment

The degree of achievement is evaluated by presentations, questions and answers, and discussions. A score of 60 is criteria for pass.

●Notes

No course requirements

●Contacting Faculty

During the seminar and after seminar.

Seminar on High Power Engineering 2D (2.0credits) (大電流エネルギー工学セミナー2D)

Course Type	Specialized Courses	
Division at course	Doctor's Course	
Class Format	Seminar	
Course Name	Electrical Engineering	
Starts 1	2 Autumn Semester	
Lecturer	TomokazuFUKUTSUKA Professor	Seiji KATAKURA Assistant Professor

●Course Purpose

This course deals with the state of the art of battery. By reading and presenting the text and latest literature, skills to investigate the energy conversion devices is acquired. By the end of the course, students should be able to acquire the research skill of batteries.

●Prerequisite Subjects

No special subjects are specified because this is a seminar.

●Course Topics

Read articles on electrochemistry and batteries. Resume is required and comprehensive discussion is conducted.

●Textbook

The presenter selects the paper.

●Additional Reading

Texts and papers are introduced if need.

●Grade Assessment

The degree of achievement is evaluated by presentations, questions and answers, and discussions. A score of 60 is criteria for pass.

●Notes

No course requirements

●Contacting Faculty

During the seminar and after seminar.

Seminar on High Power Engineering 2E (2.0credits) (大電流エネルギー工学セミナー2E)

Course Type	Specialized Courses	
Division at course	Doctor's Course	
Class Format	Seminar	
Course Name	Electrical Engineering	
Starts 1	3 Spring Semester	
Lecturer	TomokazuFUKUTSUKA Professor	Seiji KATAKURA Assistant Professor

●Course Purpose

This course deals with the state of the art of battery. By reading and presenting the text and latest literature, skills to investigate the energy conversion devices is acquired. By the end of the course, students should be able to acquire the research skill of batteries.

●Prerequisite Subjects

No special subjects are specified because this is a seminar.

●Course Topics

Read articles on electrochemistry and batteries. Resume is required and comprehensive discussion is conducted.

●Textbook

The presenter selects the paper.

●Additional Reading

Texts and papers are introduced if need.

●Grade Assessment

The degree of achievement is evaluated by presentations, questions and answers, and discussions. A score of 60 is criteria for pass.

●Notes

No course requirements

●Contacting Faculty

During the seminar and after seminar.

Seminar on Energy System and Environment 2A (2.0credits) (エネルギー環境システムセミナー2A)

Course Type	Specialized Courses	
Division at course	Doctor's Course	
Class Format	Seminar	
Course Name	Electrical Engineering	
Starts 1	1 Spring Semester	
Lecturer	Yasunobu YOKOMIZU Professor	Naoto KODAMA Assistant Professor

●Course Purpose

This class is aimed at understanding transmission and distribution technologies of electricity on the basis of recent engineering literatures with details about physical and electrical phenomena on electricity.
The goals are listed below.
1. To understand fundamental physics and physical chemistry for high-temperature gas.
2. To perform calculation on the basis of research method in electrical engineering.
3. To explain various phenomena on high current control and application technology.

●Prerequisite Subjects

Electrical circuit theory, Electromagnetic theory, Gas discharge, Electrical Insulation, Fundamental of electric energy.

●Course Topics

1. High-temperature gas engineering
2. Distribution technology of electricity
3. Energy and current controls

Students who take the course should do research beforehand to understand contents described in a textbook on the basis of the subjects listed above and should distribute the summarized contents in the class.

●Textbook

Textbooks are selected in accordance with the progress of the seminar.

●Additional Reading

It will be introduced if necessary.

●Grade Assessment

Grade is assessed from the various viewpoints of explanations, questions and discussions during the seminar.

●Notes

No course requirement.

●Contacting Faculty

During the seminar.

Seminar on Energy System and Environment 2B (2.0credits) (エネルギー環境システムセミナー2B)

Course Type	Specialized Courses	
Division at course	Doctor's Course	
Class Format	Seminar	
Course Name	Electrical Engineering	
Starts 1	1 Autumn Semester	
Lecturer	Yasunobu YOKOMIZU Professor	Naoto KODAMA Assistant Professor

●Course Purpose

This class is aimed at understanding transmission and distribution technologies of electricity on the basis of recent engineering literatures with details about physical and electrical phenomena on electricity.
The goals are listed below.
1. To understand fundamental physics and physical chemistry for high-temperature gas.
2. To perform calculation on the basis of research method in electrical engineering.
3. To explain various phenomena on high current control and application technology.

●Prerequisite Subjects

Electrical circuit theory, Electromagnetic theory, Gas discharge, Electrical Insulation, Fundamental of electric energy.

●Course Topics

1. High-temperature gas engineering
2. Distribution technology of electricity
3. Energy and current controls

Students who take the course should do research beforehand to understand contents described in a textbook on the basis of the subjects listed above and should distribute the summarized contents in the class.

●Textbook

Textbooks are selected in accordance with the progress of the seminar.

●Additional Reading

It will be introduced if necessary.

●Grade Assessment

Grade is assessed from the various viewpoints of explanations, questions and discussions during the seminar.

●Notes

No course requirement.

●Contacting Faculty

During the seminar.

Seminar on Energy System and Environment 2C (2.0credits) (エネルギー環境システムセミナー2C)

Course Type	Specialized Courses	
Division at course	Doctor's Course	
Class Format	Seminar	
Course Name	Electrical Engineering	
Starts 1	2 Spring Semester	
Lecturer	Yasunobu YOKOMIZU Professor	Naoto KODAMA Assistant Professor

●Course Purpose

This class is aimed at understanding transmission and distribution technologies of electricity on the basis of recent engineering literatures with details about physical and electrical phenomena on electricity.
The goals are listed below.
1. To understand fundamental physics and physical chemistry for high-temperature gas.
2. To perform calculation on the basis of research method in electrical engineering.
3. To explain various phenomena on high current control and application technology.

●Prerequisite Subjects

Electrical circuit theory, Electromagnetic theory, Gas discharge, Electrical Insulation, Fundamental of electric energy.

●Course Topics

1. High-temperature gas engineering
2. Distribution technology of electricity
3. Energy and current controls

Students who take the course should do research beforehand to understand contents described in a textbook on the basis of the subjects listed above and should distribute the summarized contents in the class.

●Textbook

Textbooks are selected in accordance with the progress of the seminar.

●Additional Reading

It will be introduced if necessary.

●Grade Assessment

Grade is assessed from the various viewpoints of explanations, questions and discussions during the seminar.

●Notes

No course requirement.

●Contacting Faculty

During the seminar.

Seminar on Energy System and Environment 2D (2.0credits) (エネルギー環境システムセミナー2D)

Course Type	Specialized Courses	
Division at course	Doctor's Course	
Class Format	Seminar	
Course Name	Electrical Engineering	
Starts 1	2 Autumn Semester	
Lecturer	Yasunobu YOKOMIZU Professor	Naoto KODAMA Assistant Professor

●Course Purpose

This class is aimed at understanding transmission and distribution technologies of electricity on the basis of recent engineering literatures with details about physical and electrical phenomena on electricity.
The goals are listed below.
1. To understand fundamental physics and physical chemistry for high-temperature gas.
2. To perform calculation on the basis of research method in electrical engineering.
3. To explain various phenomena on high current control and application technology.

●Prerequisite Subjects

Electrical circuit theory, Electromagnetic theory, Gas discharge, Electrical Insulation, Fundamental of electric energy.

●Course Topics

1. High-temperature gas engineering
2. Distribution technology of electricity
3. Energy and current controls

Students who take the course should do research beforehand to understand contents described in a textbook on the basis of the subjects listed above and should distribute the summarized contents in the class.

●Textbook

Textbooks are selected in accordance with the progress of the seminar.

●Additional Reading

It will be introduced if necessary.

●Grade Assessment

Grade is assessed from the various viewpoints of explanations, questions and discussions during the seminar.

●Notes

No course requirement.

●Contacting Faculty

During the seminar.

Seminar on Energy System and Environment 2E (2.0credits) (エネルギー環境システムセミナー2E)

Course Type	Specialized Courses	
Division at course	Doctor's Course	
Class Format	Seminar	
Course Name	Electrical Engineering	
Starts 1	3 Spring Semester	
Lecturer	Yasunobu YOKOMIZU Professor	Naoto KODAMA Assistant Professor

●Course Purpose

This class is aimed at understanding transmission and distribution technologies of electricity on the basis of recent engineering literatures with details about physical and electrical phenomena on electricity.
The goals are listed below.
1. To understand fundamental physics and physical chemistry for high-temperature gas.
2. To perform calculation on the basis of research method in electrical engineering.
3. To explain various phenomena on high current control and application technology.

●Prerequisite Subjects

Electrical circuit theory, Electromagnetic theory, Gas discharge, Electrical Insulation, Fundamental of electric energy.

●Course Topics

1. High-temperature gas engineering
2. Distribution technology of electricity
3. Energy and current controls

Students who take the course should do research beforehand to understand contents described in a textbook on the basis of the subjects listed above and should distribute the summarized contents in the class.

●Textbook

Textbooks are selected in accordance with the progress of the seminar.

●Additional Reading

It will be introduced if necessary.

●Grade Assessment

Grade is assessed from the various viewpoints of explanations, questions and discussions during the seminar.

●Notes

No course requirement.

●Contacting Faculty

During the seminar.

Functional Materials & Devices for Electrical and Information Engineering 2A (2.0credits) (機能電気・情報材料セ

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Electrical Engineering		
Starts 1	1 Spring Semester		
Lecturer	Naoki HAYAKAWA Professor	Hiroki KOJIMA Associate Professor	Akimori TABATA Associate Professor

●Course Purpose

Fundamental theory and application technology on functional materials and devices for electrical and information engineering will be studied and discussed.

Goal:
1. To understand fundamental theory on functional materials and devices for electrical and information engineering
2. To understand application technology on functional materials and devices for electrical and information engineering
3. To investigate, present and discuss fundamental theory and application technology on functional materials and devices for electrical and information engineering

●Prerequisite Subjects

Electromagnetic theory

●Course Topics

Study and discuss fundamental theory and application technology on functional materials and devices for electrical and information engineering

●Textbook

distribution of handout

●Additional Reading

Some books will be introduced in the seminar.

●Grade Assessment

Presentation and R&D at seminar: Against a full mark of 100, a mark of more than 60 is passing.

●Notes

It is preferable to understand the basis of electromagnetic theory.

●Contacting Faculty

nhayakaw@nuee.nagoya-u.ac.jp
kojima@nuee.nagoya-u.ac.jp
tabata@nuee.nagoya-u.ac.jp

Functional Materials & Devices for Electrical and Information Engineering 2B (2.0credits) (機能電気・情報材料セ

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Electrical Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Naoki HAYAKAWA Professor	Hiroki KOJIMA Associate Professor	Akimori TABATA Associate Professor

●Course Purpose

Fundamental theory and application technology on functional materials and devices for electrical and information engineering will be studied and discussed.

Goal:
1. To understand fundamental theory on functional materials and devices for electrical and information engineering
2. To understand application technology on functional materials and devices for electrical and information engineering
3. To investigate, present and discuss fundamental theory and application technology on functional materials and devices for electrical and information engineering

●Prerequisite Subjects

Electromagnetic theory

●Course Topics

Study and discuss fundamental theory and application technology on functional materials and devices for electrical and information engineering

●Textbook

distribution of handout

●Additional Reading

Some books will be introduced in the seminar

●Grade Assessment

Presentation and R&D at seminar: Against a full mark of 100, a mark of more than 60 is passing.

●Notes

It is preferable to understand the basis of electromagnetic theory.

●Contacting Faculty

nhayakaw@nuee.nagoya-u.ac.jp
kojima@nuee.nagoya-u.ac.jp
tabata@nuee.nagoya-u.ac.jp

Functional Materials & Devices for Electrical and Information Engineering 2C (2.0credits) (機能電気・情報材料セ

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Electrical Engineering		
Starts 1	2 Spring Semester		
Lecturer	Naoki HAYAKAWA Professor	Hiroki KOJIMA Associate Professor	Akimori TABATA Associate Professor

●Course Purpose

Fundamental theory and application technology on functional materials and devices for electrical and information engineering will be studied and discussed.

Goal:
1. To understand fundamental theory on functional materials and devices for electrical and information engineering
2. To understand application technology on functional materials and devices for electrical and information engineering
3. To investigate, present and discuss fundamental theory and application technology on functional materials and devices for electrical and information engineering

●Prerequisite Subjects

Electromagnetic theory

●Course Topics

Study and discuss fundamental theory and application technology on functional materials and devices for electrical and information engineering

●Textbook

distribution of handout

●Additional Reading

Some books will be introduced in the seminar.

●Grade Assessment

Presentation and R&D at seminar: Against a full mark of 100, a mark of more than 60 is passing.

●Notes

It is preferable to understand the basis of electromagnetic theory.

●Contacting Faculty

nhayakaw@nuee.nagoya-u.ac.jp
kojima@nuee.nagoya-u.ac.jp
tabata@nuee.nagoya-u.ac.jp

Functional Materials & Devices for Electrical and Information Engineering 2D (2.0credits) (機能電気・情報材料セ

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Electrical Engineering		
Starts 1	2 Autumn Semester		
Lecturer	Naoki HAYAKAWA Professor	Hiroki KOJIMA Associate Professor	Akimori TABATA Associate Professor

●Course Purpose

Fundamental theory and application technology on functional materials and devices for electrical and information engineering will be studied and discussed.

Goal:
1. To understand fundamental theory on functional materials and devices for electrical and information engineering
2. To understand application technology on functional materials and devices for electrical and information engineering
3. To investigate, present and discuss fundamental theory and application technology on functional materials and devices for electrical and information engineering

●Prerequisite Subjects

Electromagnetic theory

●Course Topics

Study and discuss fundamental theory and application technology on functional materials and devices for electrical and information engineering

●Textbook

distribution of handout

●Additional Reading

Some books will be introduced in the seminar.

●Grade Assessment

Presentation and R&D at seminar: Against a full mark of 100, a mark of more than 60 is passing.

●Notes

It is preferable to understand the basis of electromagnetic theory.

●Contacting Faculty

nhayakaw@nuee.nagoya-u.ac.jp
kojima@nuee.nagoya-u.ac.jp
tabata@nuee.nagoya-u.ac.jp

Functional Materials & Devices for Electrical and Information Engineering 2E (2.0credits) (機能電気・情報材料セ

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Electrical Engineering		
Starts 1	3 Spring Semester		
Lecturer	Naoki HAYAKAWA Professor	Hiroki KOJIMA Associate Professor	Akimori TABATA Associate Professor

●Course Purpose

Fundamental theory and application technology on functional materials and devices for electrical and information engineering will be studied and discussed.

Goal:
1. To understand fundamental theory on functional materials and devices for electrical and information engineering
2. To understand application technology on functional materials and devices for electrical and information engineering
3. To investigate, present and discuss fundamental theory and application technology on functional materials and devices for electrical and information engineering

●Prerequisite Subjects

Electromagnetic theory

●Course Topics

Study and discuss fundamental theory and application technology on functional materials and devices for electrical and information engineering

●Textbook

distribution of handout

●Additional Reading

Some books will be introduced in the seminar.

●Grade Assessment

Presentation and R&D at seminar: Against a full mark of 100, a mark of more than 60 is passing.

●Notes

It is preferable to understand the basis of electromagnetic theory.

●Contacting Faculty

nhayakaw@nuee.nagoya-u.ac.jp
kojima@nuee.nagoya-u.ac.jp
tabata@nuee.nagoya-u.ac.jp

ar on Highly Efficient Energy Apparatus and Systems 2A (2.0credits) (環境調和型電気エネルギーシステムセミナ

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Electrical Engineering		
Starts 1	1 Spring Semester		
Lecturer	Takeyoshi KATOH Professor	Shigeyuki SUGIMOTO Professor	Muneaki KURIMOTO Lecturer
	Masaki IMANAKA Assistant Professor		

●Course Purpose

This seminar examines fundamentals of highly efficient and environmental friendly energy system and related technologies by reading latest books and papers. The seminar also aims to improve students ability such as basic skills, applied skills, creativity, comprehensive knowledge, and wide point of view, so that students can think about future energy systems.

●Prerequisite Subjects

Electric Power Apparatus, Electric Power Transmission Systems, Electric Energy Conversion Engineering, High Voltage Engineering, Materials for Electrical and Electronic Engineering

●Course Topics

1. Fundamentals of systems and apparatuses for electrical energy conversion, transport and storage. 2. Assessment of energy systems. 3. Materials for electric power systems and apparatuses. 4. Diagnostic techniques for electric power systems. Etc.Students are requested to read the textbook and understand the summary for the next class.

●Textbook

Textbooks are selected in the year beginning. Papers are selected properly according to the progress of the seminar.

●Additional Reading

Many books on energy system and equipment are available.

●Grade Assessment

Evaluated based on presentations, questions and answers during the seminar. Entrance Year: 2020 or later 100 - 95:A+, 94 - 80:A, 79 - 70:B, 69 - 65:C, 64 - 60:C-, < 59:F Entrance Year: 2019 or before 100 - 90:S, 89 - 80:A, 79 - 70:B, 69 - 60:C, < 59:F

●Notes

No course requirements

●Contacting Faculty

After the lecture.

ar on Highly Efficient Energy Apparatus and Systems 2B (2.0credits) (環境調和型電気エネルギーシステムセミナ

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Electrical Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Takeyoshi KATOH Professor	Shigeyuki SUGIMOTO Professor	Muneaki KURIMOTO Lecturer
	Masaki IMANAKA Assistant Professor		

●Course Purpose

This seminar examines fundamentals of highly efficient and environmental friendly energy system and related technologies by reading latest books and papers. The seminar also aims to improve students ability such as basic skills, applied skills, creativity, comprehensive knowledge, and wide point of view, so that students can think about future energy systems.

●Prerequisite Subjects

Electric Power Apparatus, Electric Power Transmission Systems, Electric Energy Conversion Engineering, High Voltage Engineering, Materials for Electrical and Electronic Engineering

●Course Topics

1. Fundamentals of systems and apparatuses for electrical energy conversion, transport and storage. 2. Assessment of energy systems. 3. Materials for electric power systems and apparatuses. 4. Diagnostic techniques for electric power systems. Etc.Students are requested to read the textbook and understand the summary for the next class.

●Textbook

Textbooks are selected in the year beginning. Papers are selected properly according to the progress of the seminar.

●Additional Reading

Many books on energy system and equipment are available.

●Grade Assessment

Evaluated based on presentations, questions and answers during the seminar. Entrance Year: 2020 or later 100 - 95:A+, 94 - 80:A, 79 - 70:B, 69 - 65:C, 64 - 60:C-, < 59:F Entrance Year: 2019 or before 100 - 90:S, 89 - 80:A, 79 - 70:B, 69 - 60:C, < 59:F

●Notes

No course requirements

●Contacting Faculty

After the lecture.

ar on Highly Efficient Energy Apparatus and Systems 2C (2.0credits) (環境調和型電気エネルギーシステムセミナ

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Electrical Engineering		
Starts 1	2 Spring Semester		
Lecturer	Takeyoshi KATOH Professor	Shigeyuki SUGIMOTO Professor	Muneaki KURIMOTO Lecturer
	Masaki IMANAKA Assistant Professor		

●Course Purpose

This seminar examines fundamentals of highly efficient and environmental friendly energy system and related technologies by reading latest books and papers. The seminar also aims to improve students ability such as basic skills, applied skills, creativity, comprehensive knowledge, and wide point of view, so that students can think about future energy systems.

●Prerequisite Subjects

Electric Power Apparatus, Electric Power Transmission Systems, Electric Energy Conversion Engineering, High Voltage Engineering, Materials for Electrical and Electronic Engineering

●Course Topics

1. Fundamentals of systems and apparatuses for electrical energy conversion, transport and storage. 2. Assessment of energy systems. 3. Materials for electric power systems and apparatuses. 4. Diagnostic techniques for electric power systems. Etc.Students are requested to read the textbook and understand the summary for the next class.

●Textbook

Textbooks are selected in the year beginning. Papers are selected properly according to the progress of the seminar.

●Additional Reading

Many books on energy system and equipment are available.

●Grade Assessment

Evaluated based on presentations, questions and answers during the seminar. Entrance Year: 2020 or later 100 - 95:A+, 94 - 80:A, 79 - 70:B, 69 - 65:C, 64 - 60:C-, < 59:F Entrance Year: 2019 or before 100 - 90:S, 89 - 80:A, 79 - 70:B, 69 - 60:C, < 59:F

●Notes

No course requirements

●Contacting Faculty

After the lecture.

ar on Highly Efficient Energy Apparatus and Systems 2D (2.0credits) (環境調和型電気エネルギーシステムセミナ

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Electrical Engineering		
Starts 1	2 Autumn Semester		
Lecturer	Takeyoshi KATOH Professor	Shigeyuki SUGIMOTO Professor	Muneaki KURIMOTO Lecturer
	Masaki IMANAKA Assistant Professor		

●Course Purpose

●Prerequisite Subjects

Electric Power Apparatus, Electric Power Transmission Systems, Electric Energy Conversion Engineering, High Voltage Engineering, Materials for Electrical and Electronic Engineering

●Course Topics

1. Fundamentals of systems and apparatuses for electrical energy conversion, transport and storage. 2. Assessment of energy systems. 3. Materials for electric power systems and apparatuses. 4. Diagnostic techniques for electric power systems. Etc.Students are requested to read the textbook and understand the summary for the next class.

●Textbook

Textbooks are selected in the year beginning. Papers are selected properly according to the progress of the seminar.

●Additional Reading

Many books on energy system and equipment are available.

●Grade Assessment

Evaluated based on presentations, questions and answers during the seminar. Entrance Year: 2020 or later 100 - 95:A+, 94 - 80:A, 79 - 70:B, 69 - 65:C, 64 - 60:C-, < 59:F Entrance Year: 2019 or before 100 - 90:S, 89 - 80:A, 79 - 70:B, 69 - 60:C, < 59:F

●Notes

No course requirements

●Contacting Faculty

After the lecture.

ar on Highly Efficient Energy Apparatus and Systems 2E (2.0credits) (環境調和型電気エネルギーシステムセミナ

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Electrical Engineering		
Starts 1	3 Spring Semester		
Lecturer	Takeyoshi KATOH Professor	Shigeyuki SUGIMOTO Professor	Muneaki KURIMOTO Lecturer
	Masaki IMANAKA Assistant Professor		

●Course Purpose

This seminar examines fundamentals of highly efficient and environmental friendly energy system and related technologies by reading latest books and papers. The seminar also aims to improve students ability such as basic skills, applied skills, creativity, comprehensive knowledge, and wide point of view, so that students can think about future energy systems.

●Prerequisite Subjects

Electric Power Apparatus, Electric Power Transmission Systems, Electric Energy Conversion Engineering, High Voltage Engineering, Materials for Electrical and Electronic Engineering

●Course Topics

1. Fundamentals of systems and apparatuses for electrical energy conversion, transport and storage. 2. Assessment of energy systems. 3. Materials for electric power systems and apparatuses. 4. Diagnostic techniques for electric power systems. Etc.Students are requested to read the textbook and understand the summary for the next class.

●Textbook

Textbooks are selected in the year beginning. Papers are selected properly according to the progress of the seminar.

●Additional Reading

Many books on energy system and equipment are available.

●Grade Assessment

Evaluated based on presentations, questions and answers during the seminar. Entrance Year: 2020 or later 100 - 95:A+, 94 - 80:A, 79 - 70:B, 69 - 65:C, 64 - 60:C-, < 59:F Entrance Year: 2019 or before 100 - 90:S, 89 - 80:A, 79 - 70:B, 69 - 60:C, < 59:F

●Notes

No course requirements

●Contacting Faculty

After the lecture.

Seminar on Plasma Energy 2A (2.0credits) (プラズマエネルギーセミナー2A)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Electrical Engineering		
Starts 1	1 Spring Semester		
Lecturer	Noriyasu ONO Professor	Hiroaki NAKAMURA Professor	Shin KAJITA Associate Professor
	HirohikoTANAKA Assistant Professor		

●Course Purpose

Deep understanding of plasma science and engineering by referring the texts and papers on plasma-surface interactions, MHD equilibrium and stability, and plasma heatingParticipants will be able to understand following contents after this seminar1. They will be able to explain the plasma material interaction in fusion devices2. They will be able to understand and explain MHD equilibrium and stability3. They will be able to understand and explain plasma heating process and mechanism

●Prerequisite Subjects

Fundamentals of plasma and fusion science

●Course Topics

1) Plasma sheath formation2) MHD equilibrium and stability of fusion plasma3) Nonlinear evolution MHD instabilities4) Electron cyclotron resonance heating

●Textbook

●Additional Reading

Tokamaks (International Series of Monographs on Physics) 4th Editionby John Wesson

●Grade Assessment

Report an/or oral examinations.

●Notes

●Contacting Faculty

Questions will be asked after the seminar or during the office hour. If necessary, students can book an appointment for your questions in advance via e-mail.

Seminar on Plasma Energy 2B (2.0credits) (プラズマエネルギーセミナー2B)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Electrical Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Noriyasu ONO Professor	Hiroaki NAKAMURA Professor	Shin KAJITA Associate Professor
	HirohikoTANAKA Assistant Professor		

●Course Purpose

Deep understanding of plasma science and engineering by referring the texts and papers on plasma-surface interactions, MHD equilibrium and stability, and plasma heatingParticipants will be able to understand following contents after this seminar1. They will be able to explain the plasma material interaction in fusion devices2. They will be able to understand and explain MHD equilibrium and stability3. They will be able to understand and explain plasma heating process and mechanism

●Prerequisite Subjects

Fundamentals of plasma and fusion science

●Course Topics

1) Plasma heat flow onto the plasma-facing material surfaces2) Microscopic plasma instabilities due to gradients of plasma pressure or temperature3) Turbulent plasma transport due to microscopic plasma instabilities4) Lower hybrid wave plasma heating

●Textbook

●Additional Reading

Tokamaks (International Series of Monographs on Physics) 4th Editionby John Wesson

●Grade Assessment

Report and/or oral examinations:

●Notes

●Contacting Faculty

Questions will be asked after the seminar or during the office hour. If necessary, students can book an appointment for your questions in advance via e-mail.

Seminar on Plasma Energy 2C (2.0credits) (プラズマエネルギーセミナー2C)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Electrical Engineering		
Starts 1	2 Spring Semester		
Lecturer	Noriyasu ONO Professor	Hiroaki NAKAMURA Professor	Shin KAJITA Associate Professor
	HirohikoTANAKA Assistant Professor		

●Course Purpose

Deep understanding of plasma science and engineering by referring the texts and papers on plasma-surface interactions, MHD equilibrium and stability, and plasma heatingParticipants will be able to understand following contents after this seminar1. They will be able to explain the plasma material interaction in fusion devices2. They will be able to understand and explain MHD equilibrium and stability3. They will be able to understand and explain plasma heating process and mechanism

●Prerequisite Subjects

Fundamentals of plasma and fusion science

●Course Topics

1) Particle reflection on material surfaces2) Erosion of plasma facing materials and impurity generation3) Material limiter and magnetic divertor4) Ion-cyclotron wave plasma heating

●Textbook

●Additional Reading

Tokamaks (International Series of Monographs on Physics) 4th Editionby John Wesson

●Grade Assessment

Reports and/or oral examinations.

●Notes

●Contacting Faculty

Questions will be asked after the seminar or during the office hour. If necessary, students can book an appointment for your questions in advance via e-mail.

Seminar on Plasma Energy 2D (2.0credits) (プラズマエネルギーセミナー2D)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Electrical Engineering		
Starts 1	2 Autumn Semester		
Lecturer	Noriyasu ONO Professor	Hiroaki NAKAMURA Professor	Shin KAJITA Associate Professor
	HirohikoTANAKA Assistant Professor		

●Course Purpose

Deep understanding of plasma science and engineering by referring the texts and papers on plasma-surface interactions, MHD equilibrium and stability, and plasma heatingParticipants will be able to understand following contents after this seminar1. They will be able to explain the plasma material interaction in fusion devices2. They will be able to understand and explain MHD equilibrium and stability3. They will be able to understand and explain plasma heating process and mechanism

●Prerequisite Subjects

Fundamentals of plasma and fusion science

●Course Topics

1) Properties of thermal plasmas2) Edge plasma control by electromagnetic fields3) Confinement improvement and reduction of turbulent plasma transport4) Plasma physics related non-thermal energetic particles5) Propagation of Alfven wave and its application

●Textbook

●Additional Reading

Tokamaks (International Series of Monographs on Physics) 4th Editionby John Wesson

●Grade Assessment

Reports and/or oral examinations.

●Notes

●Contacting Faculty

Questions will be asked after the seminar or during the office hour. If necessary, students can book an appointment for your questions in advance via e-mail.

Seminar on Plasma Energy 2E (2.0credits) (プラズマエネルギーセミナー2E)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Electrical Engineering		
Starts 1	3 Spring Semester		
Lecturer	Noriyasu ONO Professor	Hiroaki NAKAMURA Professor	Shin KAJITA Associate Professor
	HirohikoTANAKA Assistant Professor		

●Course Purpose

Deep understanding of plasma science and engineering by referring the texts and papers on plasma-surface interactions, MHD equilibrium and stability, and plasma heatingParticipants will be able to understand following contents after this seminar1. They will be able to explain the plasma material interaction in fusion devices2. They will be able to understand and explain MHD equilibrium and stability3. They will be able to understand and explain plasma heating process and mechanism

●Prerequisite Subjects

Fundamentals of plasma and fusion science

●Course Topics

1) Dusty plasma science2) Atomic and molecular processes3) Plasma diagnostic techniques4) Lawson criterion5) International Thermonuclear Experimental Reactor

●Textbook

●Additional Reading

Tokamaks (International Series of Monographs on Physics) 4th Editionby John Wesson

●Grade Assessment

Reports and oral examinations.

●Notes

●Contacting Faculty

Questions will be asked after the seminar or during the office hour. If necessary, students can book an appointment for your questions in advance via e-mail.

Seminar on Low Temperature Energy Materials 2A (2.0credits) (低温エネルギー材料セミナー2A)

Course Type	Specialized Courses	
Division at course	Doctor's Course	
Class Format	Seminar	
Course Name	Electrical Engineering	
Starts 1	1 Spring Semester	
Lecturer	"YOSHIDA Yutaka" Professor	Yuji TSUCHIYA Assistant Professor

●Course Purpose

This class aims to study about the properties in the superconducting for application of the energy efficient system. Recent studies and experimental methods will be introduced by the participants according to the selected textbook. Furthermore, the fundamental knowledge and the applied skills will be acquired for the research about the energy efficient materialsGoals:1. To understand the physical properties and fabrication methods of energy materials such as superconducting materials2. To understand recent researches and various experimental methods.3. To understand crystal growth mechanism and physical properties4. To understand applications of superconducting materials

●Prerequisite Subjects

Electromagnetic Theory with Exercises, Solid-state Electronics and Tutorial, Fundamentals of Electric Energy with Exercises, Electronic Device EngineeringIt is desirable to take the above courses, but you can take them even if you have not taken them.

●Course Topics

1. Electrons in solid materials 2. Transport properties 3. Superconductivity 4. Energy conversion, storing technologyRead the designated part of the textbook before each class

●Textbook

Textbooks will be selected each year.

●Additional Reading

to be introduced in the lecture.

●Grade Assessment

Depends on the oral presentation (60%) and the question and answers (40%) in the seminar.A+:100-95, A:94-85, B:84-75, C:74-65, C-:65-60, F: 59

●Notes

Electromagnetic Theory with Exercises, Solid-state Electronics and Tutorial, Fundamentals of Electric Energy with Exercises, Electronic Device EngineeringIt is desirable to take the above courses, but you can take them even if you have not taken them.

●Contacting Faculty

We handle student questions during and after class.

Seminar on Low Temperature Energy Materials 2B (2.0credits) (低温エネルギー材料セミナー2B)

Course Type	Specialized Courses	
Division at course	Doctor's Course	
Class Format	Seminar	
Course Name	Electrical Engineering	
Starts 1	1 Autumn Semester	
Lecturer	"YOSHIDA Yutaka" Professor	Yuji TSUCHIYA Assistant Professor

●Course Purpose

This class aims to study about the properties in the superconducting for application of the energy efficient system. Recent studies and experimental methods will be introduced by the participants according to the selected textbook. Furthermore, the fundamental knowledge and the applied skills will be acquired for the research about the energy efficient materialsGoals:1. To understand the physical properties and fabrication methods of energy materials such as superconducting materials2. To understand recent researches and various experimental methods.3. To understand crystal growth mechanism and physical properties4. To understand applications of superconducting materials

●Prerequisite Subjects

Electromagnetic Theory with Exercises, Solid-state Electronics and Tutorial, Fundamentals of Electric Energy with Exercises, Electronic Device EngineeringIt is desirable to take the above courses, but you can take them even if you have not taken them.

●Course Topics

1. Electrons in solid materials 2. Transport properties 3. Superconductivity 4. Energy conversion, storing technologyRead the designated part of the textbook before each class

●Textbook

Textbooks will be selected each year.

●Additional Reading

to be introduced in the lecture.

●Grade Assessment

Depends on the oral presentation (60%) and the question and answers (40%) in the seminar.A+:100-95, A:94-85, B:84-75, C:74-65, C-:65-60, F: 59

●Notes

Electromagnetic Theory with Exercises, Solid-state Electronics and Tutorial, Fundamentals of Electric Energy with Exercises, Electronic Device EngineeringIt is desirable to take the above courses, but you can take them even if you have not taken them.

●Contacting Faculty

We handle student questions during and after class.

Seminar on Low Temperature Energy Materials 2C (2.0credits) (低温エネルギー材料セミナー2C)

Course Type	Specialized Courses	
Division at course	Doctor's Course	
Class Format	Seminar	
Course Name	Electrical Engineering	
Starts 1	2 Spring Semester	
Lecturer	"YOSHIDA Yutaka" Professor	Yuji TSUCHIYA Assistant Professor

●Course Purpose

This class aims to study about the properties in the superconducting for application of the energy efficient system. Recent studies and experimental methods will be introduced by the participants according to the selected textbook. Furthermore, the fundamental knowledge and the applied skills will be acquired for the research about the energy efficient materialsGoals:1. To understand the physical properties and fabrication methods of energy materials such as superconducting materials2. To understand recent researches and various experimental methods.3. To understand crystal growth mechanism and physical properties4. To understand applications of superconducting materials

●Prerequisite Subjects

Electromagnetic Theory with Exercises, Solid-state Electronics and Tutorial, Fundamentals of Electric Energy with Exercises, Electronic Device EngineeringIt is desirable to take the above courses, but you can take them even if you have not taken them.

●Course Topics

1. Electrons in solid materials 2. Transport properties 3. Superconductivity 4. Energy conversion, storing technologyRead the designated part of the textbook before each class

●Textbook

Textbooks will be selected each year.

●Additional Reading

to be introduced in the lecture.

●Grade Assessment

Depends on the oral presentation (60%) and the question and answers (40%) in the seminar.A+:100-95, A:94-85, B:84-75, C:74-65, C-:65-60, F: 59

●Notes

Electromagnetic Theory with Exercises, Solid-state Electronics and Tutorial, Fundamentals of Electric Energy with Exercises, Electronic Device EngineeringIt is desirable to take the above courses, but you can take them even if you have not taken them.

●Contacting Faculty

We handle student questions during and after class.

Seminar on Low Temperature Energy Materials 2D (2.0credits) (低温エネルギー材料セミナー2D)

Course Type	Specialized Courses	
Division at course	Doctor's Course	
Class Format	Seminar	
Course Name	Electrical Engineering	
Starts 1	2 Autumn Semester	
Lecturer	"YOSHIDA Yutaka" Professor	Yuji TSUCHIYA Assistant Professor

●Course Purpose

This class aims to study about the properties in the superconducting for application of the energy efficient system. Recent studies and experimental methods will be introduced by the participants according to the selected textbook. Furthermore, the fundamental knowledge and the applied skills will be acquired for the research about the energy efficient materialsGoals:1. To understand the physical properties and fabrication methods of energy materials such as superconducting materials2. To understand recent researches and various experimental methods.3. To understand crystal growth mechanism and physical properties4. To understand applications of superconducting materials

●Prerequisite Subjects

Electromagnetic Theory with Exercises, Solid-state Electronics and Tutorial, Fundamentals of Electric Energy with Exercises, Electronic Device EngineeringIt is desirable to take the above courses, but you can take them even if you have not taken them.

●Course Topics

1. Electrons in solid materials 2. Transport properties 3. Superconductivity 4. Energy conversion, storing technologyRead the designated part of the textbook before each class

●Textbook

Textbooks will be selected each year.

●Additional Reading

to be introduced in the lecture.

●Grade Assessment

Depends on the oral presentation (60%) and the question and answers (40%) in the seminar.A+:100-95, A:94-85, B:84-75, C:74-65, C-:65-60, F: 59

●Notes

Electromagnetic Theory with Exercises, Solid-state Electronics and Tutorial, Fundamentals of Electric Energy with Exercises, Electronic Device EngineeringIt is desirable to take the above courses, but you can take them even if you have not taken them.

●Contacting Faculty

We handle student questions during and after class.

Seminar on Low Temperature Energy Materials 2E (2.0credits) (低温エネルギー材料セミナー2E)

Course Type	Specialized Courses	
Division at course	Doctor's Course	
Class Format	Seminar	
Course Name	Electrical Engineering	
Starts 1	3 Spring Semester	
Lecturer	"YOSHIDA Yutaka" Professor	Yuji TSUCHIYA Assistant Professor

●Course Purpose

This class aims to study about the properties in the superconducting for application of the energy efficient system. Recent studies and experimental methods will be introduced by the participants according to the selected textbook. Furthermore, the fundamental knowledge and the applied skills will be acquired for the research about the energy efficient materialsGoals:1. To understand the physical properties and fabrication methods of energy materials such as superconducting materials2. To understand recent researches and various experimental methods.3. To understand crystal growth mechanism and physical properties4. To understand applications of superconducting materials

●Prerequisite Subjects

Electromagnetic Theory with Exercises, Solid-state Electronics and Tutorial, Fundamentals of Electric Energy with Exercises, Electronic Device EngineeringIt is desirable to take the above courses, but you can take them even if you have not taken them.

●Course Topics

1. Electrons in solid materials 2. Transport properties 3. Superconductivity 4. Energy conversion, storing technologyRead the designated part of the textbook before each class

●Textbook

Textbooks will be selected each year.

●Additional Reading

to be introduced in the lecture.

●Grade Assessment

Depends on the oral presentation (60%) and the question and answers (40%) in the seminar.A+:100-95, A:94-85, B:84-75, C:74-65, C-:65-60, F: 59

●Notes

Electromagnetic Theory with Exercises, Solid-state Electronics and Tutorial, Fundamentals of Electric Energy with Exercises, Electronic Device EngineeringIt is desirable to take the above courses, but you can take them even if you have not taken them.

●Contacting Faculty

We handle student questions during and after class.

Seminar on Space Observation 2A (2.0credits) (宇宙電磁観測セミナー2A)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Electrical Engineering		
Starts 1	1 Spring Semester		
Lecturer	Kazuo SHIOKAWA Professor	Nozomu NISHITANI Associate Professor	Masahito NOSE Associate Professor
	Taku Nakajima Assistant Professor		

●Course Purpose
Reading fundamental textbooks and literature to understand the electromagnetic and plasma environment in space and to learn data analysis and modeling techniques.

●Prerequisite Subjects
Electromagnetic wave, computer technique, plasma science, geophysics

●Course Topics
For the following four topics, attendees should read fundamental textbooks and literature, make presentations of their own researches, and join discussion. (1) Electromagnetic environment of interplanetary space, the magnetosphere and the ionosphere (2) Space plasma environment (3) Earth's atmospheric environment (4) Relation between near-earth space environment and atmospheric environment

●Textbook
Suitable textbooks and scientific papers will be selected according to the progress of the research topics

●Additional Reading
(1) Introduction to Plasma Theory, D. R. Nicholson (2) Introduction to Plasma Physics, F. F. Chen (3) Introduction to Space Physics, M. G. Kivelson and C. T. Russell, Cambridge University Press (4) The Earth's Ionosphere (2nd Edition), M. C. Kelley, Academic Press (5) Basic Space Plasma Physics, W. Baumjohann and R. A. Treumann, Imperial College Press (6) Space Physics, M.-B. Kallenrode, Springer (7) Advanced Space Plasma Physics, R. A. Treumann and W. Baumjohann, Imperial College Press

●Grade Assessment
Oral examination (more than 60% for total evaluation)

●Notes
university level mathmatics and physics knowledge

●Contacting Faculty
Questions are welcome during the class.

Seminar on Space Observation 2B (2.0credits) (宇宙電磁観測セミナー2B)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Electrical Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Kazuo SHIOKAWA Professor	Nozomu NISHITANI Associate Professor	Masahito NOSE Associate Professor
	Taku Nakajima Assistant Professor		

●Course Purpose
Reading fundamental textbooks and literature to understand the electromagnetic and plasma environment in space and to learn data analysis and modeling techniques.

●Prerequisite Subjects
Electromagnetic wave, computer technique, plasma science, geophysics

●Course Topics
For the following four topics, attendees should read fundamental textbooks and literature, make presentations of their own researches, and join discussion. (1) Electromagnetic environment of interplanetary space, the magnetosphere and the ionosphere (2) Space plasma environment (3) Earth's atmospheric environment (4) Relation between near-earth space environment and atmospheric environment

●Textbook
Suitable textbooks and scientific papers will be selected according to the progress of the research topics

●Additional Reading
(1) Introduction to Plasma Theory, D. R. Nicholson (2) Introduction to Plasma Physics, F. F. Chen (3) Introduction to Space Physics, M. G. Kivelson and C. T. Russell, Cambridge University Press (4) The Earth's Ionosphere (2nd Edition), M. C. Kelley, Academic Press (5) Basic Space Plasma Physics, W. Baumjohann and R. A. Treumann, Imperial College Press (6) Space Physics, M.-B. Kallenrode, Springer (7) Advanced Space Plasma Physics, R. A. Treumann and W. Baumjohann, Imperial College Press

●Grade Assessment
Oral examination (more than 60% for total evaluation)

●Notes
university level mathmatics and physics knowledge

●Contacting Faculty
Questions are welcome during the class.

Seminar on Space Observation 2C (2.0credits) (宇宙電磁観測セミナー2C)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Electrical Engineering		
Starts 1	2 Spring Semester		
Lecturer	Kazuo SHIOKAWA Professor	Nozomu NISHITANI Associate Professor	Masahito NOSE Associate Professor
	Taku Nakajima Assistant Professor		

●Course Purpose
Reading fundamental textbooks and literature to understand the electromagnetic and plasma environment in space and to learn data analysis and modeling techniques.

●Prerequisite Subjects
Electromagnetic wave, computer technique, plasma science, geophysics

●Course Topics
For the following four topics, attendees should read fundamental textbooks and literature, make presentations of their own researches, and join discussion. (1) Electromagnetic environment of interplanetary space, the magnetosphere and the ionosphere (2) Space plasma environment (3) Earth's atmospheric environment (4) Relation between near-earth space environment and atmospheric environment

●Textbook
Suitable textbooks and scientific papers will be selected according to the progress of the research topics

●Additional Reading
(1) Introduction to Plasma Theory, D. R. Nicholson (2) Introduction to Plasma Physics, F. F. Chen (3) Introduction to Space Physics, M. G. Kivelson and C. T. Russell, Cambridge University Press (4) The Earth's Ionosphere (2nd Edition), M. C. Kelley, Academic Press (5) Basic Space Plasma Physics, W. Baumjohann and R. A. Treumann, Imperial College Press (6) Space Physics, M.-B. Kallenrode, Springer (7) Advanced Space Plasma Physics, R. A. Treumann and W. Baumjohann, Imperial College Press

●Grade Assessment
Oral examination (more than 60% for total evaluation)

●Notes
university level mathmatics and physics knowledge

●Contacting Faculty
Questions are welcome during the class.

Seminar on Space Observation 2D (2.0credits) (宇宙電磁観測セミナー2D)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Electrical Engineering		
Starts 1	2 Autumn Semester		
Lecturer	Kazuo SHIOKAWA Professor	Nozomu NISHITANI Associate Professor	Masahito NOSE Associate Professor
	Taku Nakajima Assistant Professor		

●Course Purpose

Reading fundamental textbooks and literature to understand the electromagnetic and plasma environment in space and to learn data analysis and modeling techniques.

●Prerequisite Subjects

Electromagnetic wave, computer technique, plasma science, geophysics

●Course Topics

For the following four topics, attendees should read fundamental textbooks and literature, make presentations of their own researches, and join discussion. (1) Electromagnetic environment of interplanetary space, the magnetosphere and the ionosphere (2) Space plasma environment (3) Earth's atmospheric environment (4) Relation between near-earth space environment and atmospheric environment

●Textbook

Suitable textbooks and scientific papers will be selected according to the progress of the research topics

●Additional Reading

(1) Introduction to Plasma Theory, D. R. Nicholson (2) Introduction to Plasma Physics, F. F. Chen (3) Introduction to Space Physics, M. G. Kivelson and C. T. Russell, Cambridge University Press (4) The Earth's Ionosphere (2nd Edition), M. C. Kelley, Academic Press (5) Basic Space Plasma Physics, W. Baumjohann and R. A. Treumann, Imperial College Press (6) Space Physics, M.-B. Kallenrode, Springer (7) Advanced Space Plasma Physics, R. A. Treumann and W. Baumjohann, Imperial College Press

●Grade Assessment

Oral examination (more than 60% for total evaluation)

●Notes

university level mathmatics and physics knowledge

●Contacting Faculty

Questions are welcome during the class.

Seminar on Space Observation 2E (2.0credits) (宇宙電磁観測セミナー2E)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Electrical Engineering		
Starts 1	3 Spring Semester		
Lecturer	Kazuo SHIOKAWA Professor	Nozomu NISHITANI Associate Professor	Masahito NOSE Associate Professor
	Taku Nakajima Assistant Professor		

●Course Purpose

Reading fundamental textbooks and literature to understand the electromagnetic and plasma environment in space and to learn data analysis and modeling techniques.

●Prerequisite Subjects

Electromagnetic wave, computer technique, plasma science, geophysics

●Course Topics

For the following four topics, attendees should read fundamental textbooks and literature, make presentations of their own researches, and join discussion. (1) Electromagnetic environment of interplanetary space, the magnetosphere and the ionosphere (2) Space plasma environment (3) Earth's atmospheric environment (4) Relation between near-earth space environment and atmospheric environment

●Textbook

Suitable textbooks and scientific papers will be selected according to the progress of the research topics

●Additional Reading

(1) Introduction to Plasma Theory, D. R. Nicholson (2) Introduction to Plasma Physics, F. F. Chen (3) Introduction to Space Physics, M. G. Kivelson and C. T. Russell, Cambridge University Press (4) The Earth's Ionosphere (2nd Edition), M. C. Kelley, Academic Press (5) Basic Space Plasma Physics, W. Baumjohann and R. A. Treumann, Imperial College Press (6) Space Physics, M.-B. Kallenrode, Springer (7) Advanced Space Plasma Physics, R. A. Treumann and W. Baumjohann, Imperial College Press

●Grade Assessment

Oral examination (more than 60% for total evaluation)

●Notes

university level mathmatics and physics knowledge

●Contacting Faculty

Questions are welcome during the class.

Seminar on Space Information Engineering 2A (2.0credits) (宇宙情報処理セミナー2A)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Electrical Engineering		
Starts 1	1 Spring Semester		
Lecturer	Yoshizumi MIYOSHI Professor	Takayuki UMEDA Associate Professor	Shinsuke IMADA Lecturer

●Course Purpose

We discuss on the individual topics and subjects that form the basis of master's thesis on the space information engineering and solar-terrestrial physics. It is also intended to learn how to express and present one’s research results at research meetings or the meetings of academic society, etc.

●Prerequisite Subjects

Basic and applied mathematicsComputer programmingElectromagnetismPlasma physics

●Course Topics

Present the progress and latest achievements of the research of each student, explaining the method and background of the research in a way to be understood by everyone. Further, we discuss on the methods and how to solve the problems to deepen our understandings on the research subjects. Although it is basically designed to report on his or her research, it is also possible to give a review talk on the latest research papers to organize and consider about the contents and possibility of one’s research.

●Textbook

Information of the textbook is introduced in the guidance.

●Additional Reading

We will introduce them if necessary.

●Grade Assessment

We evaluate based on the achievement in presentation and attendance to the class, but we also consider positive attitude at the seminar. A score of more than 60 points is assumed to be “passed”. More specifically, a score from 60 to 69 points is C, a score from 70 to 79 points is B, and that over 80 points is A.

●Notes

Study about electromagnetics is suggested

●Contacting Faculty

We do not stipulate for office hours. But students who wish to talk directly with us out of the lecture hours can contact with us. We will respond them as much as possible.miyoshi@isee.nagoya-u.ac.jp umeda@isee.nagoya-u.ac.jpimada@isee.nagoya-u.ac.jp

Seminar on Space Information Engineering 2B (2.0credits) (宇宙情報処理セミナー2B)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Electrical Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Yoshizumi MIYOSHI Professor	Takayuki UMEDA Associate Professor	Shinsuke IMADA Lecturer

●Course Purpose

We discuss on the individual topics and subjects that form the basis of master's thesis on the space information engineering and solar-terrestrial physics. It is also intended to learn how to express and present one’s research results at research meetings or the meetings of academic society, etc.

●Prerequisite Subjects

Basic and applied mathematicsComputer programmingElectromagnetismPlasma physics

●Course Topics

Present the progress and latest achievements of the research of each student, explaining the method and background of the research in a way to be understood by everyone. Further, we discuss on the methods and how to solve the problems to deepen our understandings on the research subjects. Although it is basically designed to report on his or her research, it is also possible to give a review talk on the latest research papers to organize and consider about the contents and possibility of one’s research.

●Textbook

Information of the textbook is introduced in the guidance.

●Additional Reading

We will introduce them if necessary.

●Grade Assessment

We evaluate based on the achievement in presentation and attendance to the class, but we also consider positive attitude at the seminar. A score of more than 60 points is assumed to be “passed”. More specifically, a score from 60 to 69 points is C, a score from 70 to 79 points is B, and that over 80 points is A.

●Notes

Study about electromagnetics is recommended

●Contacting Faculty

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Seminar on Space Information Engineering 2C (2.0credits) (宇宙情報処理セミナー2C)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Electrical Engineering		
Starts 1	2 Spring Semester		
Lecturer	Yoshizumi MIYOSHI Professor	Takayuki UMEDA Associate Professor	Shinsuke IMADA Lecturer

●Course Purpose

We discuss on the individual topics and subjects that form the basis of master's thesis on the space information engineering and solar-terrestrial physics. It is also intended to learn how to express and present one’s research results at research meetings or the meetings of academic society, etc.

●Prerequisite Subjects

Basic and applied mathematicsComputer programmingElectromagnetismPlasma physics

●Course Topics

Present the progress and latest achievements of the research of each student, explaining the method and background of the research in a way to be understood by everyone. Further, we discuss on the methods and how to solve the problems to deepen our understandings on the research subjects. Although it is basically designed to report on his or her research, it is also possible to give a review talk on the latest research papers to organize and consider about the contents and possibility of one’s research.

●Textbook

Information of the textbook is introduced in the guidance.

●Additional Reading

We will introduce them if necessary.

●Grade Assessment

We evaluate based on the achievement in presentation and attendance to the class, but we also consider positive attitude at the seminar. A score of more than 60 points is assumed to be “passed”. More specifically, a score from 60 to 69 points is C, a score from 70 to 79 points is B, and that over 80 points is A.

●Notes

Study about electromagnetics is suggested

●Contacting Faculty

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Seminar on Space Information Engineering 2D (2.0credits) (宇宙情報処理セミナー2D)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Electrical Engineering		
Starts 1	2 Autumn Semester		
Lecturer	Yoshizumi MIYOSHI Professor	Takayuki UMEDA Associate Professor	Shinsuke IMADA Lecturer

●Course Purpose

We discuss on the individual topics and subjects that form the basis of master's thesis on the space information engineering and solar-terrestrial physics. It is also intended to learn how to express and present one’s research results at research meetings or the meetings of academic society, etc.

●Prerequisite Subjects

Basic and applied mathematicsComputer programmingElectromagnetismPlasma physics

●Course Topics

Present the progress and latest achievements of the research of each student, explaining the method and background of the research in a way to be understood by everyone. Further, we discuss on the methods and how to solve the problems to deepen our understandings on the research subjects. Although it is basically designed to report on his or her research, it is also possible to give a review talk on the latest research papers to organize and consider about the contents and possibility of one’s research.

●Textbook

Information of the textbook is introduced in the guidance.

●Additional Reading

We will introduce them if necessary.

●Grade Assessment

We evaluate based on the achievement in presentation and attendance to the class, but we also consider positive attitude at the seminar. A score of more than 60 points is assumed to be “passed”. More specifically, a score from 60 to 69 points is C, a score from 70 to 79 points is B, and that over 80 points is A.

●Notes

Study about electromagnetics is suggested

●Contacting Faculty

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Seminar on Space Information Engineering 2E (2.0credits) (宇宙情報処理セミナー2E)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Electrical Engineering		
Starts 1	3 Spring Semester		
Lecturer	Yoshizumi MIYOSHI Professor	Takayuki UMEDA Associate Professor	Shinsuke IMADA Lecturer

●Course Purpose

We discuss on the individual topics and subjects that form the basis of master's thesis on the space information engineering and solar-terrestrial physics. It is also intended to learn how to express and present one’s research results at research meetings or the meetings of academic society, etc.

●Prerequisite Subjects

Basic and applied mathematicsComputer programmingElectromagnetismPlasma physics

●Course Topics

Present the progress and latest achievements of the research of each student, explaining the method and background of the research in a way to be understood by everyone. Further, we discuss on the methods and how to solve the problems to deepen our understandings on the research subjects. Although it is basically designed to report on his or her research, it is also possible to give a review talk on the latest research papers to organize and consider about the contents and possibility of one’s research.

●Textbook

Information of the textbook is introduced in the guidance.

●Additional Reading

We will introduce them if necessary.

●Grade Assessment

We evaluate based on the achievement in presentation and attendance to the class, but we also consider positive attitude at the seminar. A score of more than 60 points is assumed to be “passed”. More specifically, a score from 60 to 69 points is C, a score from 70 to 79 points is B, and that over 80 points is A.

●Notes

Study about electromagnetics is suggested

●Contacting Faculty

We do not stipulate for office hours. But students who wish to talk directly with us out of the lecture hours can contact with us. We will respond them as much as possible.miyoshi@isee.nagoya-u.ac.jp umeda@isee.nagoya-u.ac.jpimada@isee.nagoya-u.ac.jp

Seminar on Power Electronics 2A (2.0credits) (パワーエレクトロニクスセミナー2A)

Course Type	Specialized Courses	
Division at course	Doctor's Course	
Class Format	Seminar	
Course Name	Electrical Engineering	
Starts 1	1 Spring Semester	
Lecturer	YAMAMOTO Masayoshi Professor	Jun IMAOKA Assistant Professor

●Course Purpose
We will discuss Latest Trend of Automotive Application, Latest Trend of Green Energy Application and Latest Trend of Aircraft Application.

●Prerequisite Subjects
Power Semiconductor Engineering, Electric Circuit

●Course Topics
1. Latest Trend of Automotive Application2. Latest Trend of Green Energy Application3. Latest Trend of Aircraft Application4. Future Trend of Automotive ApplicationSubmit the report for the assignment due at the end of lecture.

●Textbook
Print distribution as appropriate.

●Additional Reading
Print distribution as appropriate

●Grade Assessment
ReportEntrance Year: 2020 or later　100 - 95:A+, 94 - 80:A, 79 - 70:B, 69 - 65:C, 64 - 60:C-, < 59:F
Entrance Year: 2019 or before　100 - 90:S, 89 - 80:A, 79 - 70:B, 69 - 60:C, < 59:F

●Notes
No condition.

●Contacting Faculty
Respond after lecture is over.

Seminar on Power Electronics 2B (2.0credits) (パワーエレクトロニクスセミナー2B)

Course Type	Specialized Courses	
Division at course	Doctor's Course	
Class Format	Seminar	
Course Name	Electrical Engineering	
Starts 1	1 Autumn Semester	
Lecturer	YAMAMOTO Masayoshi Professor	Jun IMAOKA Assistant Professor

●Course Purpose
We will discuss Latest Trend of Automotive Application, Latest Trend of Green Energy Application and Latest Trend of Aircraft Application.

●Prerequisite Subjects
Power Semiconductor Engineering, Electric Circuit

●Course Topics
1. Latest Trend of Automotive Application2. Latest Trend of Green Energy Application3. Latest Trend of Aircraft Application4. Future Trend of Automotive ApplicationSubmit the report for the assignment due at the end of lecture.

●Textbook
Print distribution as appropriate.

●Additional Reading
Print distribution as appropriate.

●Grade Assessment
ReportEntrance Year: 2020 or later　100 - 95:A+, 94 - 80:A, 79 - 70:B, 69 - 65:C, 64 - 60:C-, < 59:F
Entrance Year: 2019 or before　100 - 90:S, 89 - 80:A, 79 - 70:B, 69 - 60:C, < 59:F

●Notes
No condition.

●Contacting Faculty
Respond after lecture is over.

Seminar on Power Electronics 2C (2.0credits) (パワーエレクトロニクスセミナー2C)

Course Type	Specialized Courses	
Division at course	Doctor's Course	
Class Format	Seminar	
Course Name	Electrical Engineering	
Starts 1	2 Spring Semester	
Lecturer	YAMAMOTO Masayoshi Professor	Jun IMAOKA Assistant Professor

●Course Purpose
We will discuss Latest Trend of Automotive Application, Latest Trend of Green Energy Application and Latest Trend of Aircraft Application.

●Prerequisite Subjects
Power Semiconductor Engineering, Electric Circuit

●Course Topics
1. Latest Trend of Automotive Application2. Latest Trend of Green Energy Application3. Latest Trend of Aircraft Application4. Future Trend of Automotive ApplicationSubmit the report for the assignment due at the end of lecture.

●Textbook
Print distribution as appropriate.

●Additional Reading
Print distribution as appropriate

●Grade Assessment
ReportEntrance Year: 2020 or later　100 - 95:A+, 94 - 80:A, 79 - 70:B, 69 - 65:C, 64 - 60:C-, < 59:F
Entrance Year: 2019 or before　100 - 90:S, 89 - 80:A, 79 - 70:B, 69 - 60:C, < 59:F

●Notes
No condition.

●Contacting Faculty
Respond after lecture is over.

Seminar on Power Electronics 2D (2.0credits) (パワーエレクトロニクスセミナー2D)

Course Type	Specialized Courses	
Division at course	Doctor's Course	
Class Format	Seminar	
Course Name	Electrical Engineering	
Starts 1	2 Autumn Semester	
Lecturer	YAMAMOTO Masayoshi Professor	Jun IMAOKA Assistant Professor

●Course Purpose
We will discuss Latest Trend of Automotive Application, Latest Trend of Green Energy Application and Latest Trend of Aircraft Application.

●Prerequisite Subjects
Power Semiconductor Engineering, Electric Circuit

●Course Topics
1. Latest Trend of Automotive Application2. Latest Trend of Green Energy Application3. Latest Trend of Aircraft Application4. Future Trend of Automotive ApplicationSubmit the report for the assignment due at the end of lecture.

●Textbook
Print distribution as appropriate.

●Additional Reading
Print distribution as appropriate

●Grade Assessment
ReportEntrance Year: 2020 or later　100 - 95:A+, 94 - 80:A, 79 - 70:B, 69 - 65:C, 64 - 60:C-, < 59:F
Entrance Year: 2019 or before　100 - 90:S, 89 - 80:A, 79 - 70:B, 69 - 60:C, < 59:F

●Notes
No condition.

●Contacting Faculty
Respond after lecture is over.

Seminar on Power Electronics 2E (2.0credits) (パワーエレクトロニクスセミナー2E)

Course Type	Specialized Courses	
Division at course	Doctor's Course	
Class Format	Seminar	
Course Name	Electrical Engineering	
Starts 1	3 Spring Semester	
Lecturer	YAMAMOTO Masayoshi Professor	Jun IMAOKA Assistant Professor

●Course Purpose
We will discuss Latest Trend of Automotive Application, Latest Trend of Green Energy Application and Latest Trend of Aircraft Application.

●Prerequisite Subjects
Power Semiconductor Engineering, Electric Circuit

●Course Topics
1. Latest Trend of Automotive Application2. Latest Trend of Green Energy Application3. Latest Trend of Aircraft Application4. Future Trend of Automotive ApplicationSubmit the report for the assignment due at the end of lecture.

●Textbook
Print distribution as appropriate.

●Additional Reading
Print distribution as appropriate

●Grade Assessment
ReportEntrance Year: 2020 or later　100 - 95:A+, 94 - 80:A, 79 - 70:B, 69 - 65:C, 64 - 60:C-, < 59:F
Entrance Year: 2019 or before　100 - 90:S, 89 - 80:A, 79 - 70:B, 69 - 60:C, < 59:F

●Notes
No condition.

●Contacting Faculty
Respond after lecture is over.

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	
Lecturer	Associated Faculty		

●Course Purpose

The aim of this course is to expand the student’s ability as a researcher by studying in an abroad laboratory and learn different methods and ways of thinking, as well as communicate on a daily base with foreign researchers.

By completing the course, the students are expected to acquire various research methods and ways of thinking, gain the ability to tackle research problems from multiple angles, and acquire a broad international perspective.

●Prerequisite Subjects

Basic and specialized subjects related to the research subject, English, Advanced Lectures on Scientific English

●Course Topics

Students will stay in an abroad laboratory that will be chosen based on the participant’s research field and interest. The course consists of the following contents.

1. Theme setting and literature review
2. Formulating a research plan
3. Analyzing the results and discussion
4. Presentation of the results

After the class, students should review the analyzing processes of the research results and investigate related literatures.

●Textbook
Will be introduced at the host laboratory depending on the research subject

●Additional Reading
Will be introduced at the host laboratory if necessary

●Grade Assessment
Conducting research in an abroad laboratory for one semester and submitting a report is a prerequisite. Evaluation will be based on the student's report (50%) and oral presentation (50%). To pass, the students have to demonstrate that they have the capacity to adequately analyze the results and have acquired the basic knowledge to interpret the results.

●Notes
Nothing particularly needed

●Contacting Faculty
Questions will be answered by the supervisors at the host laboratory during the course.

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	
Lecturer	Associated Faculty		

●Course Purpose

The aim of this course is to expand the student’s ability as a researcher by studying in an abroad laboratory and learn different methods and ways of thinking, as well as communicate on a daily base with foreign researchers.

By completing the course, the students are expected to acquire various research methods and ways of thinking, gain the ability to tackle research problems from multiple angles, and acquire a broad international perspective.

●Prerequisite Subjects

Basic and specialized subjects related to the research subject, English, Advanced Lectures on Scientific English

●Course Topics

Students will stay in an abroad laboratory that will be chosen based on the participant’s research field and interest. The course consists of the following contents.

1. Theme setting and literature review
2. Formulating a research plan
3. Analyzing the results and discussion
4. Presentation of the results

After the class, students should review the analyzing processes of the research results and investigate related literatures.

●Textbook
Will be introduced at the host laboratory depending on the research subject

●Additional Reading
Will be introduced at the host laboratory if necessary

●Grade Assessment
Conducting research in an abroad laboratory for two semesters and submitting a report is a prerequisite. Evaluation will be based on the student's report (50%) and oral presentation (50%). To pass, the students have to demonstrate that they have the capacity to adequately analyze the results and have acquired the basic knowledge to interpret the results.

●Notes
Nothing particularly needed

●Contacting Faculty
Questions will be answered by the supervisors at the host laboratory during the course.

Teaching and Instruction Exercise 1 (1.0credits) (実験指導体験実習1)

Course Type	Comprehensive engineering courses		
Division at course	Doctor's Course		
Class Format	Practice		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	
Lecturer	Hiroshi IKUTA Professor		

●Course Purpose

While attendance is raw, in "the innovation experience project," I stand with a company engineer (DP, Directing Professor) and carry an assistance, DP of the attendance straight instruction by the DP and the role of the interface of the attendance student. In this way, it is intended to let you do experience of the project management.
I aim for planning a researcher, improvement of the nature as the leader, the expansion of the field of vision by a simulated experience of instruction of the attendance life and the business management in the real world.

●Prerequisite Subjects

"Innovation Practice Course" 75 hours(Principle one day a week)

●Course Topics

In "the innovation experience project," I assist the project promotion by the DP.
Help of the understanding of a project theme and contents for the attendance life of various specialisms
I compile an opinion of the attendance life and let you make a purpose, the method of the project clear
Exchange of opinions between the attendance life, instruction, report of the discussion
Communication adjustment that DP and attendance are raw
I assume this a main component.
In addition, correspondence out of the lecture time is necessary when preparations, an investigation to affect project accomplishment are necessary.

●Textbook

documents that a lecturer (DP) introduces it and shows.

●Additional Reading
documents that a lecturer (DP) introduces it and shows.

●Grade Assessment
I evaluate it through accomplishment, the discussion of the project. If display of leadership, report ability and the leadership is accepted, it is said that I pass.

●Notes
There are no prerequisites

●Contacting Faculty
A lecturer (DP) and this project staff of the university accept questions at any time.

Teaching and Instruction Exercise 2 (1.0credits) (実験指導体験実習2)

Course Type	Comprehensive engineering courses		
Division at course	Doctor's Course		
Class Format	Practice		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	
Lecturer	Syusaku NAGANO Associate Professor		

●Course Purpose

The purpose of this course is to provide guidance to semester students for advanced science and engineering experiments at the Venture Business Laboratory. Through this research guidance, students will be able to play a comprehensive role as a researcher / educator and instructor in the field in charge of Raman spectroscopy, ionization potential measurement, X-ray diffraction measurement, and molecular simulation, and will be able to provide research guidance. Useful for practical training as a research leader.

●Prerequisite Subjects

Knowledge of the field in charge selected from the fields of Raman spectroscopy, ionization potential measurement, X-ray diffraction measurement, and molecular simulation.

●Course Topics

In the student experiment, the instructor students provide guidance to attendant students on subject research and original research from the field of Raman spectroscopy, ionization potential measurement, X-ray diffraction measurement, and molecular simulation with the professional teacher. Together with the attendant students, they perform practical use these equipment and software and get the results. They experience the leadership of the research, providing research guidance, report preparation guidance, and presentation guidance.

●Textbook

Required documents is distributed.

●Additional Reading

Required documents is distributed.

●Grade Assessment

Evaluate by compiling experiments / exercises, teaching (70%), and interviewing (30%). Students who understand each device and software and give appropriate guidance are accepted, and their research results and new approaches are highly evaluated. A score of 60 or more out of 100 is a passing score.

●Notes

To have a deep understanding in one field from Raman spectroscopy, ionization potential measurement, X-ray diffraction measurement, and molecular simulation.

●Contacting Faculty

Arranging the schedules by e-mail and etc.

Research Internship2 U2 (2.0credits) (研究インターンシップ２ U2)

Course Type	Comprehensive engineering courses		
Division at course	Doctor's Course		
Class Format	Practice		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	
Lecturer	Hiroshi IKUTA Professor		

●Course Purpose

Research internship is different from conventional internship for a working experience. Staffs in the faculty and instructors in a company cooperate with each other to set up research themes adequate to the doctoral course, and supervise a long-term internship for 1-6 months. This course aims at training of a person who has ability for an advanced research and development in not only a specialized field but also a multidisciplinary field, and a leader capable of making a proper judgment in a research project.

●Prerequisite Subjects

Students attending Research Internship are strongly recommended to take short-term Patent Laws and Focus on Venture Business I or II before the attendance.

●Course Topics

A student applies for a theme for research set up under the cooperation of a company and Nagoya University. Students should attend at the lecture at the university on the duty of confidentiality and the protection of intellectual property rights before starting the internship.

●Textbook

not specified.

●Additional Reading

not specified.

●Grade Assessment

The credits will be given to the students who have had the working days less than or equal to 20 days in the internship company.

●Notes

●Contacting Faculty

The questions will be answered by the direct supervisors as needed at the internship.

Research Internship2 U3 (3.0credits) (研究インターンシップ２ U3)

Course Type	Comprehensive engineering courses		
Division at course	Doctor's Course		
Class Format	Practice		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	
Lecturer	Hiroshi IKUTA Professor		

●Course Purpose

Research internship is different from conventional internship for a working experience. Staffs in the faculty and instructors in a company cooperate with each other to set up research themes adequate to the doctoral course, and supervise a long-term internship for 1-6 months. This course aims at training of a person who has ability for an advanced research and development in not only a specialized field but also a multidisciplinary field, and a leader capable of making a proper judgment in a research project.

●Prerequisite Subjects

Students attending Research Internship are strongly recommended to take short-term Patent Laws and Focus on Venture Business I or II before the attendance.

●Course Topics

A student applies for a theme for research set up under the cooperation of a company and Nagoya University. Students should attend at the lecture at the university on the duty of confidentiality and the protection of intellectual property rights before starting the internship.

●Textbook

not specified.

●Additional Reading

not specified.

●Grade Assessment

The credits will be given to the students who have had the working days between 21 and 40 days in the internship company.

●Notes

●Contacting Faculty

The questions will be answered by the direct supervisors as needed at the internship.

Research Internship2 U4 (4.0credits) (研究インターンシップ２ U4)

Course Type	Comprehensive engineering courses		
Division at course	Doctor's Course		
Class Format	Practice		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	
Lecturer	Hiroshi IKUTA Professor		

●Course Purpose

Research internship is different from conventional internship for a working experience. Staffs in the faculty and instructors in a company cooperate with each other to set up research themes adequate to the doctoral course, and supervise a long-term internship for 1-6 months. This course aims at training of a person who has ability for an advanced research and development in not only a specialized field but also a multidisciplinary field, and a leader capable of making a proper judgment in a research project.

●Prerequisite Subjects

Students attending Research Internship are strongly recommended to take short-term Patent Laws and Focus on Venture Business I or II before the attendance.

●Course Topics

A student applies for a theme for research set up under the cooperation of a company and Nagoya University. Students should attend at the lecture at the university on the duty of confidentiality and the protection of intellectual property rights before starting the internship.

●Textbook

not specified.

●Additional Reading

not specified.

●Grade Assessment

The credits will be given to the students who have had the working days between 41 and 60 days in the internship company.

●Notes

●Contacting Faculty

The questions will be answered by the direct supervisors as needed at the internship.

Research Internship2 U6 (6.0credits) (研究インターンシップ２ U6)

Course Type	Comprehensive engineering courses		
Division at course	Doctor's Course		
Class Format	Practice		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	
Lecturer	Hiroshi IKUTA Professor		

●Course Purpose

Research internship is different from conventional internship for a working experience. Staffs in the faculty and instructors in a company cooperate with each other to set up research themes adequate to the doctoral course, and supervise a long-term internship for 1-6 months. This course aims at training of a person who has ability for an advanced research and development in not only a specialized field but also a multidisciplinary field, and a leader capable of making a proper judgment in a research project.

●Prerequisite Subjects

Students attending Research Internship are strongly recommended to take short-term Patent Laws and Focus on Venture Business I or II before the attendance.

●Course Topics

A student applies for a theme for research set up under the cooperation of a company and Nagoya University. Students should attend at the lecture at the university on the duty of confidentiality and the protection of intellectual property rights before starting the internship.

●Textbook

not specified.

●Additional Reading

not specified.

●Grade Assessment

The credits will be given to the students who have had the working days between 61 and 80 days in the internship company.

●Notes

●Contacting Faculty

The questions will be answered by the direct supervisors as needed at the internship.

Research Internship2 U8 (8.0credits) (研究インターンシップ２ U8)

Course Type	Comprehensive engineering courses		
Division at course	Doctor's Course		
Class Format	Practice		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	
Lecturer	Hiroshi IKUTA Professor		

●Course Purpose

Research internship is different from conventional internship for a working experience. Staffs in the faculty and instructors in a company cooperate with each other to set up research themes adequate to the doctoral course, and supervise a long-term internship for 1-6 months. This course aims at training of a person who has ability for an advanced research and development in not only a specialized field but also a multidisciplinary field, and a leader capable of making a proper judgment in a research project.

●Prerequisite Subjects

Students attending Research Internship are strongly recommended to take short-term Patent Laws and Focus on Venture Business I or II before the attendance.

●Course Topics

A student applies for a theme for research set up under the cooperation of a company and Nagoya University. Students should attend at the lecture at the university on the duty of confidentiality and the protection of intellectual property rights before starting the internship.

●Textbook

not specified.

●Additional Reading

not specified.

●Grade Assessment

The credits will be given to the students who have had the working days more than or equal to 81 daysin the internship company.

●Notes

●Contacting Faculty

The questions will be answered by the direct supervisors as needed at the internship.

Laboratory Visit 1 U2 (2.0credits) (研究室ローテーション２ U2)

Course Type	Comprehensive engineering courses		
Division at course	Doctor's Course		
Class Format	Practice		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Chemical Systems Engineering
	Electrical Engineering	Electronics	Information and Communication Engineering
	Mechanical Systems Engineering	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
Lecturer	Associated Faculty		

●Course Purpose

The aim of this course is to expand the student’s ability as a researcher by conducting a research at a different laboratory and learn different methods and ways of thinking, as well as communicate with other researchers in related fields.By completing the course, the students are expected to acquire various research methods and ways of thinking, and gain the ability to tackle research problems from multiple angles.

●Prerequisite Subjects

Basic and specialized subjects related to the research subject

●Course Topics

Students will conduct research at a different laboratory. The host laboratory will be chosen based on the participant’s research field and interest from other laboratories within the campus, other universities, research institutes and companies. The course consists of the following contents.1. Theme setting and literature review2. Formulating the research plan3. Analyzing the results and discussion4. Presentation of the resultsAfter the class, students should review the analyzing process of the obtained results and investigate related literatures.

●Textbook

Will be introduced at the host laboratory depending on the research subject

●Additional Reading

Will be introduced at the host laboratory if necessary

●Grade Assessment

Up to 20 days research in the host laboratory and submitting a report is a prerequisite. Evaluation will be based on the student's report and the evaluation by the supervisor in the host laboratory. To pass, the students have to demonstrate that they have the capacity to adequately analyze the results and have acquired the basic knowledge to interpret the results. Grading will be decided from P (pass) or NP (not passed).

●Notes

Nothing particularly needed

●Contacting Faculty

Questions will be answered by the supervisors at the host laboratory during the course.

Laboratory Visit 1 U3 (3.0credits) (研究室ローテーション２ U3)

Course Type	Comprehensive engineering courses		
Division at course	Doctor's Course		
Class Format	Practice		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Chemical Systems Engineering
	Electrical Engineering	Electronics	Information and Communication Engineering
	Mechanical Systems Engineering	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
Lecturer	Associated Faculty		

●Course Purpose

The aim of this course is to expand the student’s ability as a researcher by conducting a research at a different laboratory and learn different methods and ways of thinking, as well as communicate with other researchers in related fields.By completing the course, the students are expected to acquire various research methods and ways of thinking, and gain the ability to tackle research problems from multiple angles.

●Prerequisite Subjects

Basic and specialized subjects related to the research subject

●Course Topics

Students will conduct research at a different laboratory. The host laboratory will be chosen based on the participant’s research field and interest from other laboratories within the campus, other universities, research institutes and companies. The course consists of the following contents.1. Theme setting and literature review2. Formulating the research plan3. Analyzing the results and discussion4. Presentation of the resultsAfter the class, students should review the analyzing process of the obtained results and investigate related literatures.

●Textbook

Will be introduced at the host laboratory depending on the research subject

●Additional Reading

Will be introduced at the host laboratory if necessary

●Grade Assessment

21 days or more and 40 days or less research in the host laboratory and submitting a report is a prerequisite. Evaluation will be based on the student's report and the evaluation by the supervisor in the host laboratory. To pass, the students have to demonstrate that they have the capacity to adequately analyze the results and have acquired the basic knowledge to interpret the results. Grading will be decided from P (pass) or NP (not passed).

●Notes

Nothing particularly needed

●Contacting Faculty

Questions will be answered by the supervisors at the host laboratory during the course.

Laboratory Visit 1 U4 (4.0credits) (研究室ローテーション２ U4)

Course Type	Comprehensive engineering courses		
Division at course	Doctor's Course		
Class Format	Practice		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Chemical Systems Engineering
	Electrical Engineering	Electronics	Information and Communication Engineering
	Mechanical Systems Engineering	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
Lecturer	Associated Faculty		

●Course Purpose

The aim of this course is to expand the student’s ability as a researcher by conducting a research at a different laboratory and learn different methods and ways of thinking, as well as communicate with other researchers in related fields.By completing the course, the students are expected to acquire various research methods and ways of thinking, and gain the ability to tackle research problems from multiple angles.

●Prerequisite Subjects

Basic and specialized subjects related to the research subject

●Course Topics

Students will conduct research at a different laboratory. The host laboratory will be chosen based on the participant’s research field and interest from other laboratories within the campus, other universities, research institutes and companies. The course consists of the following contents.1. Theme setting and literature review2. Formulating the research plan3. Analyzing the results and discussion4. Presentation of the resultsAfter the class, students should review the analyzing process of the obtained results and investigate related literatures.

●Textbook

Will be introduced at the host laboratory depending on the research subject

●Additional Reading

Will be introduced at the host laboratory if necessary

●Grade Assessment

41 days or more and 60 days or less research in the host laboratory and submitting a report is a prerequisite. Evaluation will be based on the student's report and the evaluation by the supervisor in the host laboratory. To pass, the students have to demonstrate that they have the capacity to adequately analyze the results and have acquired the basic knowledge to interpret the results. Grading will be decided from P (pass) or NP (not passed).

●Notes

Nothing particularly needed

●Contacting Faculty

Questions will be answered by the supervisors at the host laboratory during the course.

Laboratory Visit 1 U6 (6.0credits) (研究室ローテーション２ U6)

Course Type	Comprehensive engineering courses		
Division at course	Doctor's Course		
Class Format	Practice		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Chemical Systems Engineering
	Electrical Engineering	Electronics	Information and Communication Engineering
	Mechanical Systems Engineering	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
Lecturer	Associated Faculty		

●Course Purpose

The aim of this course is to expand the student’s ability as a researcher by conducting a research at a different laboratory and learn different methods and ways of thinking, as well as communicate with other researchers in related fields.By completing the course, the students are expected to acquire various research methods and ways of thinking, and gain the ability to tackle research problems from multiple angles.

●Prerequisite Subjects

Basic and specialized subjects related to the research subject

●Course Topics

Students will conduct research at a different laboratory. The host laboratory will be chosen based on the participant’s research field and interest from other laboratories within the campus, other universities, research institutes and companies. The course consists of the following contents.1. Theme setting and literature review2. Formulating the research plan3. Analyzing the results and discussion4. Presentation of the resultsAfter the class, students should review the analyzing process of the obtained results and investigate related literatures.

●Textbook

Will be introduced at the host laboratory depending on the research subject

●Additional Reading

Will be introduced at the host laboratory if necessary

●Grade Assessment

61 days or more and 80 days or less research in the host laboratory and submitting a report is a prerequisite. Evaluation will be based on the student's report and the evaluation by the supervisor in the host laboratory. To pass, the students have to demonstrate that they have the capacity to adequately analyze the results and have acquired the basic knowledge to interpret the results. Grading will be decided from P (pass) or NP (not passed).

●Notes

Nothing particularly needed

●Contacting Faculty

Questions will be answered by the supervisors at the host laboratory during the course.

Laboratory Visit 1 U8 (8.0credits) (研究室ローテーション２ U8)

Course Type	Comprehensive engineering courses		
Division at course	Doctor's Course		
Class Format	Practice		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Chemical Systems Engineering
	Electrical Engineering	Electronics	Information and Communication Engineering
	Mechanical Systems Engineering	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
Lecturer	Associated Faculty		

●Course Purpose

The aim of this course is to expand the student’s ability as a researcher by conducting a research at a different laboratory and learn different methods and ways of thinking, as well as communicate with other researchers in related fields.By completing the course, the students are expected to acquire various research methods and ways of thinking, and gain the ability to tackle research problems from multiple angles.

●Prerequisite Subjects

Basic and specialized subjects related to the research subject

●Course Topics

Students will conduct research at a different laboratory. The host laboratory will be chosen based on the participant’s research field and interest from other laboratories within the campus, other universities, research institutes and companies. The course consists of the following contents.1. Theme setting and literature review2. Formulating the research plan3. Analyzing the results and discussion4. Presentation of the resultsAfter the class, students should review the analyzing process of the obtained results and investigate related literatures.

●Textbook

Will be introduced at the host laboratory depending on the research subject

●Additional Reading

Will be introduced at the host laboratory if necessary

●Grade Assessment

81 days or more research in the host laboratory and submitting a report is a prerequisite. Evaluation will be based on the student's report and the evaluation by the supervisor in the host laboratory. To pass, the students have to demonstrate that they have the capacity to adequately analyze the results and have acquired the basic knowledge to interpret the results. Grading will be decided from P (pass) or NP (not passed).

●Notes

Nothing particularly needed

●Contacting Faculty

Questions will be answered by the supervisors at the host laboratory during the course.