Course number	U-ENG29 22050 LJ10 U-ENG29 22050 LJ55		
Course title (and course title in English)	Applied Mathematics A1	**Instructor's name, job title, and department of affiliation**	Graduate School of Informatics Associate Professor,SHIBAYAMA MITSURU
Target year	2nd year students or above	**Number of credits**	2	**Year/semesters**	2025/Second semester
Days and periods	Thu.2	**Class style**	Lecture (Face-to-face course)	**Language of instruction**	Japanese

[Overview and purpose of the course]

Complex analysis, traditionally known as the theory of functions of a complex variable, is the branch of mathematical analysis that investigates functions of complex numbers. Students will study the foundation and apply it to compute some integral.

[Course objectives]

To understand properties of complex functions with a skill for evaluation of integrals appearing in applied mathematics and physics.

[Course schedule and contents]

1. Complex function
2. Holomorphic functions
3. Elementary functions
4. Integrals in the complex plane
5. Cauchy's integral theorem
6. Power series
7. Taylor series
8. Isolated singularities
9. Laurent series
10. Multivalued functions
11. Analytic continuation
12. Residue
13. Integrals including trigonometric functions
14. Application to improper integral
15. Point at infinity and Riemann sphere

[Course requirements]

Calculus, Linear algebra

(2)

[Evaluation methods and policy]

Evaluation depends mainly on marks of examination, but marks of exercises are taken into account when needed.

[Textbooks]

Not used

[References, etc.]

Reference books

Lars V. Ahlfors　Complex Analysis　　McGraw-Hill Education　ISBN:978-0070006577

Related URLs

(KULASIS)

[Study outside of class (preparation and review)]

Students need to solve exercises.

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 22055 LJ75 U-ENG25 22055 LJ55				

Course title (and course title in English)	Applied Mathematics for Engineering F1		Instructor's name, job title, and department of affiliation	Graduate School of Engineering Associate Professor,NISHIKAWA MASAAKI	
Target year	2nd year students or above	**Number of credits**	2	**Year/semesters**	2025/Second semester
Days and periods	Tue.3	**Class style**	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

 [Introduction to complex analysis and some applications]

The objective is to explain the fundamentals of complex analysis, considering the application to engineering and science. The differential and integral calculus of complex functions, the relevant basic ideas, and the applications are introduced.

[Course objectives]

Understanding the basics of complex analysis and obtaining ability to practice it

[Course schedule and contents]

1. Definition of complex and complex plane
2-3. Differential of complex functions and Cauchy-Riemann relation
4-5. Concept and examples of regular functions
6. Line integral of complex functions
7-8. Cauchy's theorem and integral formula
9-10. Taylor and Laurent series
11-12. Singular points and residue theorem
13. Application to definite integral
14. Concept of conformal mapping, other topics
15. Feedback
Confirmation of learning achievement: Regular examination

[Course requirements]

Fundamentals of differential and integral calculus

[Evaluation methods and policy]

  Evaluation method
Evaluation will be mainly based on regular examination.
In some cases, evaluation for homework (short reports: about four times) will be also considered.
(In these cases, the ratio of the evaluations for regular examination and homework is about 9:1.)
  Evaluation standard
Evaluation will be based on class registration guideline.

(2)

[Textbooks]

A. Fujimoto　Outline of complex analysis (Fukuso-kaisekigaku Gaisetsu)　　Baifukan　ISBN:978-4563005719　in Japanese, published in 1990.

[References, etc.]

Reference books
To be referred to during the course

[Study outside of class (preparation and review)]

Homework (short reports) for the problems stated in the textbooks will be assigned.

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 22055 LJ75　　U-ENG25 22055 LJ55

Course title (and course title in English)	Applied Mathematics for Engineering F1	Instructor's name, job title, and department of affiliation	Part-time Lecturer,

Target year	2nd year students or above	Number of credits	2	Year/semesters	2025/Second semester

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

[Overview and purpose of the course]

Introduction to complex analysis and some applications

[Course objectives]

Understanding the basics of complex analysis and obtaining ability to practice it

[Course schedule and contents]

Guidance,2times,Guidance on how this class is operated, and how to use computing facility for this class. Basic knowledge on the role of IDS in network security and how machine learning can help the intrusion detection.
Intrusion Detection by Signature-Based IDS,5times,Learn the mechanism of intrusion detection by signature-based IDS by studying open source signature-based IDS and attacks, such as correspondence between alarms issued from IDS and communications, and adding signatures to detect attacks.
Intrusion Detection by Machine Learning,7times,Learn the method of classifying normal and malicious traffic by machine learning algorithms and public dataset for benchmarking intrusion detection performance.
Presentation,1time,Based on the exercise, students presents their methods of intrusion detection using machine learning, and discuss it with other students and instructors.

[Course requirements]

Fundamentals of differential and integral calculus

[Evaluation methods and policy]

Regular examination and Reports

[Textbooks]

To be referred to during the course (Nishikawa), Not used (Murakami)

[References, etc.]

Reference books
To be referred to during the course

[Study outside of class (preparation and review)]

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG29 32060 LJ10 U-ENG29 32060 LJ54 U-ENG29 32060 LJ55		
Course title (and course title in English)	Applied Mathematics A2	Instructor's name, job title, and department of affiliation	Graduate School of Informatics Professor,FUJIWARA HIROSHI

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/First semester

Days and periods	Wed.1	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

(3   ) Newton

(3   )   Gauss

Banach   Hilbert   (4   )

(4   )

(1   )

[Course requirements]

[Evaluation methods and policy]

20%)   (80%)

(2)

[Textbooks]

Not used

[References, etc.]

Reference books

```
                              1982
Rainer Kress  Numerical Analysis    Springer, 1998
                              . 1980
```

Related URLs

(   )

[Study outside of class (preparation and review)]

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 32065 LJ55 U-ENG25 32065 LJ75		

Course title (and course title in English)	Applied Mathematics for Engineering F2	Instructor's name, job title, and department of affiliation	Graduate School of Informatics Professor,KANOU MANABU Graduate School of Informatics Professor,OHTSUKA TOSHIYUKI

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/First semester

Days and periods	Tue.2	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

Fourier analysis and its application will be described. The major part consists of Fourier series, Fourier transform, and Laplace transform.

[Course objectives]

The goal is to understand the basics and applications of Fourier analysis.

[Course schedule and contents]

Preliminaries,1time,The goal and outline of this class are presented. Then, basic knowledge necessary to learn Fourier analysis is briefly reviewed.
Fourier series,1time,Fourier series expansion of periodic functions is described.
Complex Fourier series,1time,Complex Fourier series, its differential and integral, and spectrum are described.
Characteristics of Fourier series,1time,Characteristics of Fourier series are described.
Fourier transform,1time,In order to cope with aperiodic functions, Fourier transform is described.
Characteristics and applications of Fourier transform is explained together with the Parseval#039s equation and its applications.
Linear systems,1time,Linear systems is described. Solutions of linear differential equations are given by using Fourier series expansion. In addition, impulse responses and transfer functions of linear systems are explained.
Summary of the first half,1time,A summary of Fourier series and Fourier transform is provided, and an examination will be given.
Parseval#039s equality and its applications,1time,Parseval#039s equality, the WienerndashKhinchin theorem, and the relationship between impulse responses and cross-correlation functions in linear systems are described.
Introduction to partial differential equations,1time,Basic notions of partial differential equations are described.

Solutions of the wave equation and their physical interpretations,1time,The wave equation, one of important partial differential equations, is solved and physical interpretations of its solutions are discussed.
Fourier series for solving the wave equation,1time,Another expressions of solutions to the wave equation are derived in the form of Fourier series expansions.
Introduction to Laplace transform ,1time,Laplace transform and its characteristics are described aiming at solving ordinary differential equations.
Laplace transform for solving ordinary differential equations,1time,Ordinary differential equations are solved by applying Laplace transform and its inverse transform.

(2)

Discrete Fourier transform and fast Fourier transform ,1time,Discrete Fourier transform for analyzing sampled data is described.
Evaluation of achievement,1time,The achievements are evaluated.

[Course requirements]

None

[Evaluation methods and policy]

The regular examination, assignments, and attitude in the class will be taken into account.

[Textbooks]

Shinichi Ohishi: Fourier Analysis, Iwanami-Shoten isbn{}{9784000077767}

[References, etc.]

  Reference books

[Study outside of class (preparation and review)]

  Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 32065 LJ55 U-ENG25 32065 LJ75				
Course title (and course title in English)	Applied Mathematics for Engineering F2		**Instructor's name, job title, and department of affiliation**		Graduate School of Engineering Senior Lecturer,SENAMI MASATO
Target year	3rd year students or above	**Number of credits**		2	**Year/semesters**	2025/First semester
Days and periods	Tue.2	**Class style**	Lecture (Face-to-face course)	**Language of instruction**	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

,2times,
,2times,
,2times,
,2times,
,3times,
,3times,
,1time,

[Course requirements]

None

[Evaluation methods and policy]

[Textbooks]

[References, etc.]

  Reference books

[Study outside of class (preparation and review)]

  Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 32065 LJ55　　U-ENG25 32065 LJ75

Course title (and course title in English)	Applied Mathematics for Engineering F2	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Associate Professor,ICHII TAKASHI Graduate School of Engineering Associate Professor,YUGE KORETAKA

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/First semester

Days and periods	Tue.2	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

Fourier analysis, Laplace transform, Linear Algebra and their applications.

[Course objectives]

The final goal of this course is to understand basics of Fourier series expansion, Fourier transform, Laplace transform and Linear Algebra, and to learn to make full use of these mathematical tools in analyzing various physical phenomena and solving relevant differential equations. Particular emphasis is placed not on pursuing mathematical rigor but on developing skills to perceive different physical aspects of these tools and select the most appropriate one in practical problem solving.

[Course schedule and contents]

Fourier analysis, Laplace transform, Linear Algebra and their applications,15times,Complex numbers and complex analysis (1-2 weeks) -complex numbers and complex functions -complex integrals, residue theorem, and their applicationsDelta function (1 week)Fourier series expansion (2-3 weeks) -periodic functions and their Fourier series expansion -complex Fourier series expansion -applications of Fourier seriesFourier transform (2-3 weeks) -basics of Fourier transform -convolution and correlation function -applications of Fourier transform -linear response systemLaplace transform and its applications (2 weeks) -basics of Laplace transform -applications of Laplace transform to linear systemsLinear Algebra (3-4 weeks) - Vector space - Map and matrixApplications of Fourier transform and Laplace transform (1-2 weeks)

[Course requirements]

Prerequisite subjects: complex numbers and basic calculus.

[Evaluation methods and policy]

The grading is made based on the regular examination.

[Textbooks]

Lecture notes are distributed at the class.

[References, etc.]

　Reference books

(2)

[Study outside of class (preparation and review)]

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

[Study outside of class (preparation and review)]

Course number	U-ENG25 32065 LJ55 U-ENG25 32065 LJ75		
Course title (and course title in English)	Applied Mathematics for Engineering F2	**Instructor's name, job title, and department of affiliation**	Graduate School of Energy Science Professor,ISHIZAWA AKIHIRO Graduate School of Energy Science Associate Professor,IMADERA KENJI
Target year	3rd year students or above	**Number of credits** 2	**Year/semesters** 2025/First semester
Days and periods Fri.4	**Class style**	Lecture (Face-to-face course)	**Language of instruction** Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

,   times,
,   times,
,   times,

[Course requirements]

None

[Evaluation methods and policy]

[Textbooks]

[References, etc.]

  Reference books

[Study outside of class (preparation and review)]

 Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG29 32070 LJ10 U-ENG29 32070 LJ55

Course title (and course title in English)	Appleid Mathematics A3	Instructor's name, job title, and department of affiliation	Graduate School of Informatics Professor,TSUJIMOTO SATOSHI

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/First semester

Days and periods	Mon.2	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

Fourier analysis originated in Fourier's work on thermal conduction and now becomes very important not only in mathematics but also in engineering, including applications in measurement technology. This course provides its theories and applications along with the Laplace transforms closely related to it.

[Course objectives]

To understand the fundamental theories of Fourier analysis and Laplace transforms and develop an ability to apply them to concrete problems.

[Course schedule and contents]

Fourier series expansions, 3-4 times:
The definition of Fourier series expansions for periodic functions are given and their fundamental results such as computation of Fourier coefficients and convergence of Fourier series are discussed.
Properties and applications of Fourier series, 3-4 times:
Several properties of Fourier series and their applications to differential and difference equations and signal processing are discussed.
One-dimensional Fourier transform, 4-5 times:
The definition of one-dimensional Fourier transforms is given, and their fundamental properties such as the inversion formula and applications to partial differential equations are discussed.
Laplace transforms, 2-3times:
Fundamental properties of Laplace transforms and their applications are discussed.
Summary and learning achievement evaluation, 1 time:
A summary and supplements of this course are given and the learning achievement of students is evaluated.

[Course requirements]

Calculus, Linear Algebra and Differential Equations

[Evaluation methods and policy]

Evaluation depends mainly on marks of mid-term examinations (20%) and final one (80%).

(2)

[Textbooks]

S. Nakamura   Fourier Analysis   Asakura shoten, 2003   ISBN:9784254115741

[References, etc.]

Reference books

H.Fukawa   Mathematics of control and vibration   Korona-sha

[Study outside of class (preparation and review)]

Prepare and review the lectures and solving the problems given on KULASIS or PANDA to understand the contents of the textbook and lectures.

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 32075 LJ55		

Course title (and course title in English)	Applied Mathematics for Engineering F3	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,INOUE YASUHIRO

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/Second semester

Days and periods	Fri.2	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

Introduction to special functions and mathematical methods for the physical sciences.

[Course objectives]

Understanding special functions and mathematical methods for the physical sciences, and developing problem solving skills.

[Course schedule and contents]

Orthogonal function,2times,
Orthogonal polynominals,2times,
Confluent hypergeometric function,1time,
Gamma and Beta functions,2times,
Bessel function,2times,
Generalized function,2times,
Green#039s function,1time,
Partial differential equations for physical sciences,2times,
Short Exam and Discussion,1time,

[Course requirements]

Theories of complex function and differential equation

[Evaluation methods and policy]

The course grade will be based on homework(30%) and quizzes(70%).

[Textbooks]

[References, etc.]

Reference books

Mathematical Methods for Physicists, George B. Arfken and Hans J. Weber (Academic Press) isbn{{9780123846549}

[Study outside of class (preparation and review)]

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 32080 LJ52　　U-ENG25 32080 LJ71　　U-ENG25 32080 LJ57		

Course title (and course title in English)	Engineering Mechanics A	Instructor's name, job title, and department of affiliation	Graduate School of Informatics Associate Professor,NISHIHARA OSAMU Graduate School of Engineering Professor,HANAZAKI HIDESHI

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/First semester
Days and periods	Wed.2	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

[Course requirements]

None

[Evaluation methods and policy]

[Textbooks]

[References, etc.]

　Reference books

[Study outside of class (preparation and review)]

　Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 32080 LJ52 U-ENG25 32080 LJ71 U-ENG25 32080 LJ57

Course title (and course title in English)	Engineering Mechanics A	Instructor's name, job title, and department of affiliation	Graduate School of Energy Science Associate Professor,KINOSHITA KATSUYUKI

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/First semester

Days and periods	Mon.1	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

, times,
, times,
, times,
, times,
, times,
, times,

[Course requirements]

None

[Evaluation methods and policy]

[Textbooks]

[References, etc.]

  Reference books

[Study outside of class (preparation and review)]

  Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG20 42105 LJ77

Course title (and course title in English)	Engineering Ethics	Instructor's name, job title, and department of affiliation	Graduate School of Informatics Professor,NIITSU KIICHI Graduate School of Engineering Professor,ISHIDA TAIICHIROU Graduate School of Engineering Professor,IMAHORI HIROSHI Graduate School of Engineering Professor,SUZUKI MOTOFUMI Part-time Lecturer,TATEBA TAKAFUMI Graduate School of Informatics Professor,UMENO KEN Graduate School of Engineering Professor,SUGIYASU KAZUNORI Graduate School of Engineering Professor,HANAZAKI HIDESHI Graduate School of Engineering Professor,KAWASE MOTOAKI Office of Institutional Advancement and Communications NAKAGAWA　MASAYUKI Graduate School of Engineering Professor,KISHIDA KIYOUSUKE Graduate School of Engineering Professor,OONISHI MASAMITSU Graduate School of Engineering Professor,KANETA TAKASHI Graduate School of Engineering Professor,ITOH SADAHIKO Graduate School of Engineering Senior Lecturer,HAYASHI KAZUKI

Target year	4th year students or above	Number of credits	2	Year/semesters	2025/First semester

Days and periods	Thu.3	Class style	Lecture (Media-based course)	Language of instruction	Japanese

[Overview and purpose of the course]

Modern ethics based on engineering aspect are becoming essential to present engineers and scientists.
Instructors from various faculties give lectures about ethics in their research fields.

[Course objectives]

The goal of this class is to understand engineering ethics, and to develop the ability to judge by yourself when you encounter ethical issues.

[Course schedule and contents]

Lectures on ethics in various fields of engineering will be given by faculty members of the Graduate School of Engineering or other graduate schools. (Details will be provided after they are determined.)
This course is a media course in which all lectures will be given online via Zoom.

(2)

Lectures on ethics in various fields of engineering will be given by faculty members of the Graduate School of Engineering or other graduate schools. (Details will be provided after they are determined.)

[Course requirements]

None

[Evaluation methods and policy]

Class participation and reports.

[Textbooks]

Lecture materials will be distributed.

[References, etc.]

Reference books
Omnibus Engineering Ethics　　　Kyoritsu Shuppan Co., Ltd.　ISBN:978-4320071964
Practical Engineering Ethics - A Short Course, New Edition　　　Kagaku-Dojin Publishing Company,INC
ISBN:9784759811551
Engineering Ethics (Revised Edition)　　　CORONA PUBLISHING CO.,LTD.　ISBN:978-4-339-07798-8
World of Engineering Ethics (3rd Edition)　　　Morikita Publishing Co., Ltd.　ISBN:978-4-627-97303-9

[Study outside of class (preparation and review)]

The assignment of the report will be given for each lesson.

Other information (office hours, etc.)

The class order is subject to change.

*Please visit KULASIS to find out about office hours.

[Courses delivered by instructors with practical work experience]

(1) Category
A course with practical content delivered by instructors with practical work experience

(2) Details of instructors' practical work experience related to the course

(3) Details of practical classes delivered based on instructors' practical work experience

Course number	U-ENG20 12108 LJ77

Course title (and course title in English)	Introduction to Engineering		Instructor's name, job title, and department of affiliation	Graduate School of Management Professor,YAMAMOTO TAKASHI Graduate School of Engineering Professor,ARAKI YOSHIKAZU Graduate School of Engineering Professor,HANAZAKI HIDESHI Graduate School of Informatics Professor,NOMURA TAISHIN Graduate School of Engineering Professor,OGOSHI TOMOKI Graduate School of Informatics Professor,Takayuki ITO Office of Institutional Advancement and Communications Program-Specific Professor,KITANI TETSUO Graduate School of Engineering Senior Lecturer,ISHITSUKA KAZUYA

Target year	1st year students or above	Number of credits	1	Year/semesters	2025/Intensive, First semester

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

[Overview and purpose of the course]

Engineering is to inquire after truth, to develop useful technologies, and to establish ways how to give back development results of technology to the society.
First, we offer special lectures regarding the basic knowledge that students in faculty of engineering are expected to have.
Then, we offer a series of intensive lectures about how engineering can suggest solutions of current and future problems of our society, the value of technology, and the responsibilities that researchers and engineers are expected to fulfill.

[Course objectives]

Students learn basic matters such as attitudes and responsibilities they are expected to take as a member of social community. They find value in studying engineering and become to consider what they do in future by understanding technology can suggest solutions of problems our society is facing, especially problems about safety and security.

[Course schedule and contents]

Special lectures,1time, About basic knowledge and attitude as students who start to learn engineering, and the role of engineering in society.
Intensive lectures,6times, A series of lectures offered by special lecturers playing on global stages of science and technology. Lectures are for understanding the role that technology is playing in modern society, for reconfirming importance to study engineering and to work as a researcher and engineer in society, and are to be opportunities to consider own future path. Essays are assigned in every lecture to summarize the lecture content and opinions of other students.
Schedule of the lectures are announced later.

(2)

[Course requirements]

None

[Evaluation methods and policy]

Evaluation will be based on participation and essays assigned in every intensive lecture.

[Textbooks]

Specify if necessary.

[References, etc.]

Reference books

Specify if necessary.

[Study outside of class (preparation and review)]

Specify if necessary.

Other information (office hours, etc.)

Information about lecturers and contents of lectures are announced on electric bulletin boards.
Please confirm to your department office that the credit of this course is admitted to graduation requirements.

*Please visit KULASIS to find out about office hours.

Course number	U-ENG20 32402 SE77

Course title (and course title in English)	Faculty of Engineering International Internship 1	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,HONDA MITSURU Graduate School of Engineering Senior Lecturer,KOWHAKUL, Wasana

Target year	3rd year students or above	Number of credits	1	Year/semesters	2025/Intensive, year-round

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

[Overview and purpose of the course]

The internships and related training programs (lasting less than three months) offered through the Faculty of Engineering at Kyoto University, whether conducted overseas or domestically but expected to have a similar educational effect as internships abroad, are targeted. The aim is to cultivate independence, proactivity, internationality, and language skills by placing students in diverse environments, thereby contributing to their career development after graduation.

[Course objectives]

The purpose is to enhance the expansion of international perspectives, the acquisition of international sensibilities, the improvement of foreign language proficiency (communication skills), and the enhancement of cultural receptiveness (cross-cultural adaptability) by experiencing internships in diverse environments such as overseas universities and companies.

[Course schedule and contents]

[Submission of the internship plan (1 time)]
Complete and submit the form 'International Internship Plan' at least one month before the internship takes place and undergo a preliminary review.

[Overseas internship (1 time)]
Participate in an internship abroad.

[Results debriefing (1 time)]
Internship participants report on the results of their internship and discuss their findings.

[Course requirements]

Have sufficient language skills in the language(s) spoken at the internship site.
* Must have purchased the prescribed overseas travel insurance before traveling to the internship site.
* Have submitted an overseas travel registration form in advance.

[Evaluation methods and policy]

After registering for the course, one month prior to participating in the internship, students must fill out the "International Internship Plan" on the designated form and submit it to the Undergraduate Student Section of Educational Affairs Division for prior review by the faculty members of the ER center.
After completion of the internship, students will be awarded credits (100%) based on the submission of an

(2)

internship report and the content of the presentation at the debriefing session.
It is also advisable to submit a certificate of completion from the institution hosting the internship.
The decision to grant credits for graduation will be made by each undergraduate school. If the credits are not approved as credits required for graduation, the ER center will make the decision. In this case, the credits will be treated as excess credits.
Whether the internship is approved as credit for " 1" (1 credit) or " 2" (2 credits) of the International Internship Program of the Faculty of Engineering is determined based on the duration of the internship and the content of the practical training during the internship period, but in the case of " 2," overseas travel is required.

[Textbooks]

Not used

[References, etc.]

Reference books
None

[Study outside of class (preparation and review)]

Please consult with your supervisor about your proposal before submitting it to us.
Further instructions will be given as appropriate.

Other information (office hours, etc.)

Before participating in an internship program, please inquire with the administrative office of your undergraduate school to determine whether or not the internship you wish to participate in will be approved as a credit toward completion of the program. For other information, please contact the ER center.

ER center
Tel: 075-383-2048
Mail: 090aglobal　mail2.adm.kyoto-u.ac.jp (Replace　with @)

*Please visit KULASIS to find out about office hours.

[Courses delivered by instructors with practical work experience]

(1) Category
A course that includes off-campus training classes.

(2) Details of instructors' practical work experience related to the course

(3) Details of practical classes delivered based on instructors' practical work experience

Course number	U-ENG20 22403 SJ77

Course title (and course title in English)	Global Leadership Seminar I (Study for methodology in a company)	I ( )	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Senior Lecturer,hirai yoshikazu

Target year	2nd year students or above	Number of credits	1	Year/semesters	2025/Intensive, year-round

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

[Overview and purpose of the course]

The purpose of this course is to study about how worldwide leading company, institute, etc. make proposals and find solutions for expanding their own technologies to the international market. Throughout hands-on training on their laboratory, students investigate the methodology of team organization, proposal, market prediction and conception ability by group works. After the investigation, students are expected to improve their comprehension and explanation capability. As extended exersice subject of this course, the Global Leadership Seminar II is opened in the second semester.

[Course objectives]

The goal of this course is to improve student's comprehension and explanation capability for processes of proposal and expansion on the international market invesitigating worldwide leading companies by group work.

[Course schedule and contents]

Week 1, Guidance
Week 2-13, Hands-on training
Week 14, Pre-presentation
Week 15, Final presentation

[Course requirements]

How to register will be announced later. Students who want to join this course is requested to attend the first class.

[Evaluation methods and policy]

Students are prohibited to skip hands-on training. Evaluation will be based on presentation.

[Textbooks]

Not used

[References, etc.]

Reference books

I (   ) (2)

Related URLs

http://www.glc.t.kyoto-u.ac.jp/ugrad

[Study outside of class (preparation and review)]

Investigating companies in advance. Analyzing the result from hands-on training. Preparing presentation.

Other information (office hours, etc.)

How to register will be announced later. Students who want to join this course is requested to attend the first class. Students are prohibited to skip hands-on training. Evaluation will be based on presentation.

*Please visit KULASIS to find out about office hours.

[Courses delivered by instructors with practical work experience]

(1) Category
An omnibus course delivered by invited lecturers and guest speakers from different companies, etc.

(2) Details of instructors' practical work experience related to the course

(3) Details of practical classes delivered based on instructors' practical work experience

Course number	U-ENG20 32502 SE77

Course title (and course title in English)	Faculty of Engineering International Internship 2	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,HONDA MITSURU Graduate School of Engineering Senior Lecturer,KOWHAKUL, Wasana

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/Intensive, year-round

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

[Overview and purpose of the course]

The internships and related training programs (lasting less than three months) offered through the Faculty of Engineering at Kyoto University, whether conducted overseas or domestically but expected to have a similar educational effect as internships abroad, are targeted. The aim is to cultivate independence, proactivity, internationality, and language skills by placing students in diverse environments, thereby contributing to their career development after graduation.

[Course objectives]

The purpose is to enhance the expansion of international perspectives, the acquisition of international sensibilities, the improvement of foreign language proficiency (communication skills), and the enhancement of cultural receptiveness (cross-cultural adaptability) by experiencing internships in diverse environments such as overseas universities and companies.

[Course schedule and contents]

[Submission of the internship plan (1 time)]
Complete and submit the form 'International Internship Plan' at least one month before the internship takes place and undergo a preliminary review.

[Overseas internship (1 time)]
Participate in an internship abroad.

[Results debriefing (1 time)]
Internship participants report on the results of their internship and discuss their findings.

[Course requirements]

Have sufficient language skills in the language(s) spoken at the internship site.
* Must have purchased the prescribed overseas travel insurance before traveling to the internship site.
* Have submitted an overseas travel registration form in advance.

[Evaluation methods and policy]

After registering for the course, one month prior to participating in the internship, students must fill out the "International Internship Plan" on the designated form and submit it to the Undergraduate Student Section of Educational Affairs Division for prior review by the faculty members of the ER center.
After completion of the internship, students will be awarded credits (100%) based on the submission of an

internship report and the content of the presentation at the debriefing session.
It is also advisable to submit a certificate of completion from the institution hosting the internship.
The decision to grant credits for graduation will be made by each undergraduate school. If the credits are not approved as credits required for graduation, the ER center will make the decision. In this case, the credits will be treated as excess credits.
Whether the internship is approved as credit for " 1" (1 credit) or " 2" (2 credits) of the International Internship Program of the Faculty of Engineering is determined based on the duration of the internship and the content of the practical training during the internship period, but in the case of " 2," overseas travel is required.

[Textbooks]

Not used

[References, etc.]

Reference books
None

[Study outside of class (preparation and review)]

Please consult with your supervisor about your proposal before submitting it to us.
Further instructions will be given as appropriate.

Other information (office hours, etc.)

Before participating in an internship program, please inquire with the administrative office of your undergraduate school to determine whether or not the internship you wish to participate in will be approved as a credit toward completion of the program. For other information, please contact the ER center.

ER center
Tel: 075-383-2048
Mail: 090aglobal　mail2.adm.kyoto-u.ac.jp (Replace　with @)

*Please visit KULASIS to find out about office hours.

[Courses delivered by instructors with practical work experience]

(1) Category
A course that includes off-campus training classes.

(2) Details of instructors' practical work experience related to the course

(3) Details of practical classes delivered based on instructors' practical work experience

Course number	U-ENG20 22503 SJ77		

Course title (and course title in English)	II ( ) Global Leadership Seminar II (Innovation and its commercialization)	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,HONDA MITSURU Graduate School of Engineering Senior Lecturer,hirai yoshikazu

Target year	2nd year students or above	Number of credits	1	Year/semesters	2025/Intensive, Second semester

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

[Overview and purpose of the course]

The capabilities that society expects from Kyoto University students primarily include "deep knowledge in their respective fields of specialization" and the "ability to identify issues on their own and present a path to resolution." In this course, you will develop the latter capability, which is difficult to acquire through regular lectures and university life, by creating new business plans through group work. While individual activities are allowed, group activities are encouraged.

[Features of this Course]
1. Distinguished Instructors: Under the mentoring of renowned innovators active in the business world, students will engage in setting challenges and planning solutions.
2. Activity Budget: A budget will be provided for market research, prototype production, and software development necessary for developing project proposals.
3. Presentation Opportunities: Outstanding proposals may be displayed at the Katsura Library, among other opportunities for commercialization.

[Mentors]
- Mitsuaki Oshima, Special Appointment Professor (Honorary Technical Supervisor at Panasonic HD, Director of ESL Research Institute): A leading Japanese innovator, known for inventions like image stabilization for cameras and 5G communication technologies. Recipient of the Purple Ribbon Medal and the Order of the Rising Sun, Gold Rays with Rosette.
https://hillslife.jp/learning/2018/05/06/new-perspective6/
- Seiichi Nishimoto, Honorary Professor (Chairman of the Kyoto Advanced Technology Research Institute): Supports the development of science and technology in the Kyoto area and the growth of ventures and SMEs.
https://www.astem.or.jp/about/researcher/nishimoto
- Kentaro Kaneko, Professor (Ritsumeikan University, Research Organization of Science and Technology; Director of RItsumeikan Semiconductor Application research center): Co-founder of FLOSFIA and Patentix, continuously innovating new semiconductor materials.
https://kaneko-lab.ritsumei.ac.jp/
https://www.ritsumei.ac.jp/research/center/risa/
- Teppei Tsushima, Open Innovation Dept., IP Div., Sony Corporation: Founder of Sony's smartwatch business, wena.
https://www.sony.com/ja/SonyInfo/DiscoverSony/articles/202203/wena/
- Hideki Aoyama, Special Appointment Lecturer, Panasonic HD: Developer of the visible light communication technology LinkRay(TM) and vice-chairman for the international standardization of the IEEE802.15.7 communication standard.
https://hidekia.github.io/

- Tsutomu Mukai, Senior Manager, Panasonic HD: Promotes open innovation with venture companies in Israel.

Professor Mitsuaki Oshima is one of Japan's "Top 10 Representative Inventors," known for inventing and developing fundamental patents in technologies such as camera image stabilization in iPhones and high-speed and ultra-low latency communication for 5G mobile phones. Additionally, he invented multi-disciplinary technologies like anti-piracy measures for Nintendo Wii software, digital TV broadcasting standards in Japan, the US, and Europe, and IoT home appliances. He is famous as a serial innovator. Professor Oshima will introduce how groundbreaking inventions that change society originate.

In addition to the mentors, you can learn about the support system for startups and patent strategies from the invited lecturers. For those considering starting a startup, there is information that can be immediately utilized, and for others, there are valuable lessons that will be beneficial when entering society.

More information can be found on the following page (in Japanese):
https://www.erc.t.kyoto-u.ac.jp/ugrad

[Notes]
This seminar is intended for students in their second year of the Engineering Department or higher. The seminar is worth one credit, but whether it is recognized as a required credit for graduation depends on the undergraduate school. Please confirm with your undergraduate school office. Also, a camp is planned for December 6th and 7th, so it is necessary to be enrolled in the Personal Accident Insurance for Students Pursuing Education and Research("Gakkensai"). Participation in the camp is recommended.

[Course objectives]

Through group work, you can acquire the ability to plan and propose solutions, starting from identifying and setting challenges to envisioning the creation of social value.

[Course schedule and contents]

The course will be conducted in person.
- [Orientation] (1 session): The overview and schedule of the course will be explained.
- [Lectures] (4 sessions): Special lectures by experts will be conducted.
- [Team Building (1 session): An exercise in team building, essential for group work, will be carried out.
- [Group Work] (7 sessions): Students will engage in setting challenges, problem identification, data collection, and group work. Through intensive group work discussions, they will plan and propose solutions to the identified issues, create a draft report, and conduct 2-3 presentations. Holding mini-lectures by special instructors will also be planned.
- [Camp] (1 session): An intensive session dedicated to project work in an environment exclusive to participants and mentors through overnight training camp.
- [Preliminary Review Session] (1 session): A class to practice presentations in preparation for the final presentation event.
- [Final Presentation Event] (1 session): The final presentations will take place, followed by submission of presentation materials.

[Course requirements]

If the number of students enrolling in the course is large, the maximum number of students may be determined.

[Evaluation methods and policy]

[Evaluation Method]
Grades will be based on regular participation (20%) and the presentation and submission of presentation materials at the final presentation event held during the last lecture session (80%). Regular participation evaluation will focus on the student's active participation in the lectures.

[Evaluation Policy]
We will comprehensively evaluate the ability to identify and set challenges through group discussions, as well as the ability to propose solutions towards achieving goals. Students are required to develop individual or group business plans through the challenges and group work, and to present them at the final presentation event.

Attendance in lectures per se is not a criterion for grade evaluation; however, as the course involves group work, regular attendance is strongly recommended.

[Textbooks]

We will let you know if necessary.

[References, etc.]

Reference books

Ⅲ. Oreilly, Charles A.   Lead and Disrupt: How to Solve the Innovator's Dilemma   Stanford Business Books, 2021   ISBN:978-1503629523
We will let you know if necessary.

[Study outside of class (preparation and review)]

Please prepare and develop your own ideas in advance that you would like to work on throughout the course.

Other information (office hours, etc.)

[Schedule for the 2024 Academic Year]
The classes will be conducted in person on Fridays during the 5th period in Lecture Room W3, Research Building 9.
*Note: The 3rd lecture will be held in Lecture Room W301, Research Building 9 (subject to change in lecture room).
- Orientation: October 3
- Fundamentals of Group Work: October 17
- Special Lectures, In-Person Group Work: October 10, 24, 31; November 7, 14, 28; December 5, 12, 19, 26; January 9
- Camp: December 6 (Sat) 13:00 - December 7 (Sun) 13:00 @ AWL Keihoku (tentative)
- Preliminary Review Session: January 16
- Final Presentation: January 17 (Sat)

Ⅱ(   )⑷

- -

*Please note that whether the credits earned are recognized as necessary for graduation depends on your undergraduate school. Refer to your undergraduate school course guide for more information.
*Registration for the course is not through KULASIS but via the following page. It is scheduled to open around September 2025:
https://www.t.kyoto-u.ac.jp/fs/erc/2025Fall_GL_seminar2

For details on office hours, please check KULASIS.

*Please visit KULASIS to find out about office hours.

[Courses delivered by instructors with practical work experience]

(1) Category

(2) Details of instructors' practical work experience related to the course

(3) Details of practical classes delivered based on instructors' practical work experience

Course number	U-ENG25 25003 LJ71 U-ENG25 25003 LJ75 U-ENG25 25003 LJ54

Course title (and course title in English)	Mathematics for Computation	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Senior Lecturer,NARITA EMI

Target year	2nd year students or above	Number of credits	2	Year/semesters	2025/First semester

Days and periods	Fri.2	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

This course deals with computer-based numerical calculation methods. The goal is to learn a programming language in order to develop the ability to use a series of processing methods (such as planning processing methods), create programs, and analyze results.

[Course objectives]

Course objective: By the end of the course, students will be able to use a series of processing methods such as planning processing methods, creating programs, and analyzing results.

[Course schedule and contents]

(1) Orientation and terminal operation, 2 classes
Login method of the terminal, how to operate the editor, etc.
(2) Learn the mechanism of numerical calculation, 2 classes
Understanding the principle of numerical calculation, representation of numbers, functions, and I/O
(3) Basic programming with Fortran, 2 classes
Acquisition of essential items for programming such as branch, repeat, variable, array, and subprogram. Task: sum-difference product quotient, sum of sequence
(4) Applicative programming with Fortran, 4 classes
Differential equation (Runge-Kutta method), simultaneous linear equation (Gauss elimination method), and so on. Acquire the basic idea of calculation methods and perform actual programming.
(5) Basic programming with Python, 4 classes
Acquire the basic programming skills in Python. Learn the basic idea of machine-learning algorithms like k-nearest neighbor algorithm, linear model, decision tree, and neural networks, and perform actual programming.
(6) Confirmation of learning attainment, 1 class
Post explanation discussion and review of examination questions to KULASIS.

[Course requirements]

Recommend taking basic information processing and basic information processing exercises.

[Evaluation methods and policy]

[Grading method]
Grade is based on reports (30%) and one written examination (70%).
[Grading criterion]

(2)

Must score 60 or above out of 100 on the reports and written examination
60 or above: pass
59 or below: fail

[Textbooks]

Not used

[References, etc.]

Reference books
Fortran90/95   ISBN:4-7819-0913-2
    Fortran 90/95   ISBN:978-4-563-01587-9
   FORTRAN77   ISBN:4781905110
    Python   C&R   ISBN:978-4-86354-269-3

[Study outside of class (preparation and review)]

Students will answer the exercises and submit the solutions as a report.

Other information (office hours, etc.)

Lecture is given in Japanese.

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 25003 LJ71 U-ENG25 25003 LJ75 U-ENG25 25003 LJ54		

Course title (and course title in English)	Mathematics for Computation	Instructor's name, job title, and department of affiliation	Graduate School of Energy Science Associate Professor,HACHIYA KAN Graduate School of Energy Science Professor,Jun HAYASHI

Target year	2nd year students or above	Number of credits	2	Year/semesters	2025/First semester

Days and periods	Tue.1	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

To acquire the ability of basic computational programing and learn the basic mathematics underlying the computational programing.

[Course objectives]

To acquire the ability of basic computational programing and learn the basic mathematics underlying the computational programing.

[Course schedule and contents]

Orientation and Practice of terminal operation, 2times, Lecture on adjust login system of satellite lecture room; Lecture on the procedure to build up the computational environment
Basics of the numerical computational language, 2times, Lecture on the basics of the numerical computation, 3times, Input/Output; Subroutine; etc.// Exercise of the arithmetic operations, Sequences, etc.
Basic programing, 4times, Lecture on the basics of approximations of roots of the real-valued function (Newton's method), numerical integration (Simpson Method); Simultaneous equation (Gaussian elimination), etc.
Advanced programing, 3times, Lecture on the procedure to built a structure of the complicated issues// Exercise of advanced programming.
Summary and confirmation,1time,

[Course requirements]

None

[Evaluation methods and policy]

Comprehensive evaluation of attendance, exercises and examination.

[Textbooks]

Not used

[References, etc.]

Reference books

Introduced during class

(2)

[Study outside of class (preparation and review)]

Learn the basics of FORTRAN and C.
Try to understand the exercises in each lecture.

Other information (office hours, etc.)

Check KULASIS/Office Hours

*Please visit KULASIS to find out about office hours.

[Courses delivered by instructors with practical work experience]

(1) Category
A course with practical content delivered by instructors with practical work experience

(2) Details of instructors' practical work experience related to the course

(3) Details of practical classes delivered based on instructors' practical work experience

Course number	U-ENG25 25003 LJ71 U-ENG25 25003 LJ75 U-ENG25 25003 LJ54		

Course title (and course title in English)	7 9 11 Mathematics for Computation	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Senior Lecturer,hirai yoshikazu

Target year	2nd year students or above	Number of credits	2	Year/semesters	2025/First semester

Days and periods	Thu.2	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

This course focuses on the mathematical and numerical methods for numerical computation. We will learn the mathematical methods to solve mathematical and physical problems by using computers. We will study the programing language and practice programming to learn and experience the process of how to use a program to solve problems, write programs, and analyze the results, and also understand the accuracy and characteristics of the numerical methods.

[Course objectives]

Understand and learn the basic knowledge, method and skill of mathematical solution for computation, planning the numerical method, programming, and analyze the results.

[Course schedule and contents]

Mathematics for numerical simulation (3)
Learn the principle of computation and the mathematical method, and understand the error appearing in the computation.

Orientation and operating the terminal (1)
Access to the computer in the satellite seminar room and how to use the editor, and compile and run a program.

Basic programming (2)
Learn the basic statements and structure of programming (input, output, loop, parameters, array, sub routine, function, etc.)

Applied and practical problems (5)
We will learn the fundamental method and programming of various numerical methods: solution of equation (Bisection method, Newton's method), numerical integration (Simpson's method), simultaneous equation (Gaussian elimination), differential equation (Runge-Kutta method), data analysis (least-square method).

Advanced programming (3)
Learn the mathematical method and programming for advanced problems including physical phenomena.

Confirmation of learning attainment. (1)

7 9 11 (2)

[Course requirements]

Students are recommended to have completed Information Processing Basics and Exercises in Information Processing Basics.

[Evaluation methods and policy]

A final examination will be held. In-class reports will be factored in for maximum 40%.

[Textbooks]

Not used

[References, etc.]

Reference books

[Study outside of class (preparation and review)]

Study and practice the basics of programming (grammar, flowchart, compile, edit, etc).

Other information (office hours, etc.)

The order of classes listed above and their timing may differ depending on the year.

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 25003 LJ71　U-ENG25 25003 LJ75　U-ENG25 25003 LJ54		
Course title (and course title in English)	8　10　12 Mathematics for Computation	**Instructor's name, job title, and department of affiliation**	Graduate School of Engineering Professor,MATSUBARA ATSUSHI Graduate School of Engineering Associate Professor,KOUNO DAISUKE Graduate School of Informatics Senior Lecturer,EGUCHI KANA
Target year	2nd year students or above	**Number of credits**	2	**Year/semesters**	2025/First semester
Days and periods	Mon.2	**Class style**	Lecture (Face-to-face course)	**Language of instruction**	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

,2times,
,2times,
,3times,
,4times,
,3times,
,1time,

[Course requirements]

None

[Evaluation methods and policy]

[Textbooks]

8 10 12 (2)

- -

[References, etc.]

Reference books

[Study outside of class (preparation and review)]

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

[Courses delivered by instructors with practical work experience]

(1) Category
A course with practical content delivered by instructors with practical work experience

(2) Details of instructors' practical work experience related to the course

(3) Details of practical classes delivered based on instructors' practical work experience

Course number	U-ENG25 25004 LJ71 U-ENG25 25004 LJ75 U-ENG25 25004 LJ77

Course title (and course title in English)	Mechanics of Materials 1	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,SHIMADA TAKAHIRO

Target year	2nd year students or above	Number of credits	2	Year/semesters	2025/First semester

Days and periods	Wed.1	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

,1time,
,1time,
,2times,
,1time,
,4times,
,1time,
,4times,
,1time,

[Course requirements]

None

[Evaluation methods and policy]

[Textbooks]

(2)

[References, etc.]

Reference books

[Study outside of class (preparation and review)]

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 25004 LJ71 U-ENG25 25004 LJ75 U-ENG25 25004 LJ77

Course title (and course title in English)	Mechanics of Materials 1	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,HIRAKATA HIROYUKI

Target year	2nd year students or above	Number of credits	2	Year/semesters	2025/First semester

Days and periods	Wed.1	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

0

[Course requirements]

None

[Evaluation methods and policy]

[Textbooks]

[References, etc.]

   Reference books

[Study outside of class (preparation and review)]

   Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 25004 LJ71　　U-ENG25 25004 LJ75　　U-ENG25 25004 LJ77		
Course title (and course title in English)	Mechanics of Materials 1	**Instructor's name, job title, and department of affiliation**	Graduate School of Energy Science Professor,IMATANI SHIYOUJI
Target year	2nd year students or above	**Number of credits**	2	**Year/semesters**	2025/First semester
Days and periods	Wed.1	**Class style**	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

Concepts of Mechanics of Materials,2times,
Subjects on Simple Stress States,3times,
Strain Energy,2times,
Bending of Beams,5times,
Complex beams,2times,
,1time,

[Course requirements]

Fundamentals of Mathematics and Physics

[Evaluation methods and policy]

[Textbooks]

ISBN:4-563-03465-7
 (Zairyo Rikigaku no Kiso, Shibata, Ohtani, Komai, Inoue, Baifukan) isbn{}{4563034657}

[References, etc.]

　　Reference books

[Study outside of class (preparation and review)]

　Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 25004 LJ71　U-ENG25 25004 LJ75　U-ENG25 25004 LJ77		

Course title (and course title in English)	Mechanics of Materials 1	Instructor's name, job title, and department of affiliation	Graduate School of Energy Science Associate Professor,ABE MASATAKA

Target year	2nd year students or above	Number of credits	2	Year/semesters	2025/First semester

Days and periods	Wed.1	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

,2times,
,3times,
,2times,
,5times,
,2times,
,1time,

[Course requirements]

None

[Evaluation methods and policy]

[Textbooks]

[References, etc.]

　Reference books

[Study outside of class (preparation and review)]

　Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 25005 LJ77 U-ENG25 25005 LJ71 U-ENG25 25005 LJ75

Course title (and course title in English)	7,8,9,10 Mechanics of Materials 2	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Associate Professor,NISHIKAWA MASAAKI Institute for Life and Medical Sciences Associate Professor,MAKI KOICHIRO

Target year	2nd year students or above	Number of credits	2	Year/semesters	2025/Second semester

Days and periods	Fri.2	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

The simplified one-dimensional treatments lectured in Mechanics of Materials 1 are extended to include more complex two- or three-dimensional problems. Analytical methods for the deformation and the stresses in various structural members are lectured including the combined stress states.

[Course objectives]

The emphasis is to understand the fundamental concepts and methods for the stress/strain analysis of various structures or struictural members, by advancing the basic principles given in Mechanics of Materials 1.

[Course schedule and contents]

1-2. Beam bending
(Beam bending, Castigliano's theorem)
3-5. Advanced problems of beams
(Statically indeterminate beams, Continuous beams, Curved beams)
6-9. Basics of elasticity
(Combined stress states, Mohr's stress and strain circles, Equilibrium equations, Displacement-strain relations, Stress-strain relations, Plane stress or strain states, Relation between elastic constants)
10-11. Torsion
(Torsion of circular bars, Coil springs, Combination of bending and torsion)
12. Buckling
(Buckling of column, Instability, Effect of support conditions, Buckling design)
13-14. Axially symmetric problems and bending of plates
(Circular cylinders, Spherical shells, Rotating circular plates, Cylindrical bending, Bending rigidity)
15. Feedback

Academic achievement assessment: Regular examination

* The order and the hours (weights) for each item are possibly subject to change.

7,8,9,10   (2)

- -

[Course requirements]

Mechanics of Materials 1, and other subjects such as calculus, linear algebra, mechanics of particles and rigid bodies.

[Evaluation methods and policy]

[Evaluation method]
 Evaluation is based on the mid-term and the final examinations as a general rule,
 possibly with considerations of short reports (about three times).
(In the cases where the evaluation for short reports are considered, the ratio of the evaluations for regular examination and short reports is about 9:1.)
[Evaluation standard]
 Evaluation is based on class registration guideline.

[Textbooks]

T. Shibata et al.   Fundamentals of Strength of Materials (Zairyo-Rikigaku no Kiso)   Baifu-kan   ISBN: 4563034657

[References, etc.]

Reference books
To be referred to during the course

[Study outside of class (preparation and review)]

It is highly recommended to make the preparation and review with the specified textbook. Homework (short reports: about three times) will be assigned.

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 25005 LJ77　　U-ENG25 25005 LJ71　　U-ENG25 25005 LJ75		

Course title (and course title in English)	11,12 Mechanics of Materials 2	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,BIWA SHIRO

Target year	2nd year students or above	Number of credits	2	Year/semesters	2025/Second semester
Days and periods	Fri.2	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

The basic treatments given in the Mechanics of Materials 1 course are extended to problems such as statically indeterminate beams and curved beams subjected to bending, bars subjected to torsion or combination of torsion and bending, columns subjected to compressive loads, cylindrical vessels subjected to internal/ external pressures, etc. More general treatments of stresses and strains and their relations are also explained. These issues are of importance for the proper selection and arrangements of materials in the design of various structures/machine elements, and serve as an introduction to more rigorous subjects of the mechanics of solids.

[Course objectives]

The aim of this subject is to acquire the methods of stress/strain analysis for relatively simple structural members such as beams, bars, columns and cylindrical vessels subjected to various types of loading, and to understand the basis of the treatments of two- or three-dimensional stresses and strains, by developing the basic ideas learnt in the Mechanics of Materials 1 course.

[Course schedule and contents]

The following topics are discussed in the lecture, but subject to possible changes according to each year's situations.
Week 1: Bending of beams (basic equations, Castigliano's theorem, solution methods)
Week 2: Complex problems of beams (statically indeterminate beams, curved beams)
Week 3: Fundamentals of elasticity (1) (definition of stress, equilibrium equations)
Week 4: Fundamentals of elasticity (2) (stresses on an arbitrarily inclined plane, Mohr's circle of stress)
Week 5: Fundamentals of elasticity (3) (principal stresses, correspondence to eigenvalue problems)
Week 6: Fundamentals of elasticity (4) (definition of strain)
Week 7: Fundamentals of elasticity (5) (strains in an arbitrary direction, Mohr's circle of strain)
Week 8: Fundamentals of elasticity (6) (generalized Hooke's law, plane stress/plane strain, relation among elastic constants)
Week 9: Solution of exercise problems/mid-term examination
Week 10: Torsion of bars (1) (torsion of bars of circular cross-section)
Week 11: Torsion of bars (2) (coil springs, combined bending and torsion)
Week 12: Buckling of columns (buckling loads, column under eccentric loading, buckling design)
Week 13: Axially symmetric problems (basic equations, thin-walled and thick-walled cylinders)
Week 14: Solution of exercise problems
<Final examination>
Week 15: Feedback

[Course requirements]

Understanding of the Mechanics of Materials 1 course and other basic subjects such as calculus, linear algebra, and mechanics of particles and rigid bodies is prerequisite.

[Evaluation methods and policy]

Grading is made based on the report assignments (20%), the mid-term examination (40%) and the final examination (40%). If the mid-term examination is not conducted, the grading is based on the report assignments (20%) and the final examination (80%). Occasional changes will be announced in the classes. The total score is evaluated between 0 and 100 points (the pass mark is 60).

[Textbooks]

T. Shibata, R. Ohtani, K. Komai and T. Inoue　　Fundamentals of Strength of Materials (Zairyo-Rikigaku no Kiso)　　Baifu-kan, 1991　ISBN:ISBN4-563-03465-7

[References, etc.]

Reference books
Introduced during class

[Study outside of class (preparation and review)]

Contents of the Mechanics of Materials 1 course should be fully reviewed. Reports will be assigned, which need to be solved as homeworks. In addition, it is desirable that an enrolled student works on the textbook by him/herself prior to or after each lecture.

Other information (office hours, etc.)

Lectures are given in a black-board style. Students are expected to take the notes to understand the ideas as well as mathematical derivations, and make questions regarding unclear points.

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 25005 LJ77　　U-ENG25 25005 LJ71　　U-ENG25 25005 LJ75		
Course title (and course title in English)	Mechanics of Materials 2	**Instructor's name, job title, and department of affiliation**	Graduate School of Energy Science Associate Professor,KINOSHITA KATSUYUKI

Target year	2nd year students or above	**Number of credits**	2	**Year/semesters**	2025/Second semester
Days and periods	Fri.2	**Class style**	Lecture (Face-to-face course)	**Language of instruction**	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

,3times,
,2times,
,4times,
,4times,
,1time,
,1time,

[Course requirements]

None

[Evaluation methods and policy]

[Textbooks]

[References, etc.]

　Reference books

[Study outside of class (preparation and review)]

　Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 25007 LJ57　　U-ENG25 25007 LJ77　　U-ENG25 25007 LJ71

Course title (and course title in English)	Thermodynamics 2		Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,IWAI HIROSHI Graduate School of Engineering Associate Professor,KISHIMOTO MASASHI

Target year	2nd year students or above	Number of credits	2	Year/semesters	2025/Second semester

Days and periods	Tue.1	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

0

[Course requirements]

None

[Evaluation methods and policy]

[Textbooks]

[References, etc.]

　　Reference books

[Study outside of class (preparation and review)]

　Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 25007 LJ57 U-ENG25 25007 LJ77 U-ENG25 25007 LJ71

Course title (and course title in English)	Thermodynamics 2	**Instructor's name, job title, and department of affiliation**	Graduate School of Energy Science Professor,KAWANABE HIROSHI

Target year	2nd year students or above	**Number of credits**	2	**Year/semesters**	2025/Second semester

Days and periods	Mon.3	**Class style**	Lecture (Face-to-face course)	**Language of instruction**	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

,2   3times,
,2   3times,
,3times,
,2times,
,2times,
,2times,
,1time,

[Course requirements]

None

[Evaluation methods and policy]

[Textbooks]

[References, etc.]

　　Reference books

[Study outside of class (preparation and review)]

　Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 35008 LJ71 U-ENG25 35008 LJ77

Course title (and course title in English)	Fundamentals of Materials 1	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,HIRAKATA HIROYUKI Graduate School of Engineering Professor,SHIMADA TAKAHIRO

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/First semester

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

[Overview and purpose of the course]

Introductory class to teach fundamentals for Material Science.

[Course objectives]

[Course schedule and contents]

Bonding and structure of materials: Crystal structure, defects in crystals, structure and properties of polymers etc.: 4 times

Plastic deformation and fracture: Crystal defect and fracture etc.: 4 times

Phase diagram: The phase rule, binary system diagram, ternary phase diagram etc.: 2 times

Solidification and phase transformation, deposition etc.: 1 time

Processing: Hot and cold processing, recrystallization etc. 1 time

Steel: Steel processing, material, heat treatment, transformation etc.: 2 times

feedback lesson: 1 time

Confirmation of learning achievement: by reports and a test: 1 time

[Course requirements]

None

[Evaluation methods and policy]

reports and a test

[Textbooks]

isbn:978-4-901381-58-1 be sold at   https://www.jsms.jp/index.html)

(2)

[Study outside of class (preparation and review)]

Read the textbooks before each class, and ascertain the knowledge after the class.

　Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 35008 LJ71 U-ENG25 35008 LJ77				
Course title (and course title in English)	Fundamentals of Materials 1		**Instructor's name, job title, and department of affiliation**	Graduate School of Engineering Professor,TAKAGI IKUJI Graduate School of Engineering Associate Professor,TAISHI KOBAYASHI	
Target year	2nd year students or above	**Number of credits**	2	**Year/semesters**	2025/Second semester
Days and periods	Wed.1	**Class style**	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

In this course, we discuss properties that are important in selecting and using materials, as well as the basic concepts necessary for understanding these properties, focusing on metal.

[Course objectives]

Course objective: By the end of the course, students will have the basic knowledge they need to pursue further studies in materials science and they will be able to investigate appropriate materials in experimentation and design.

[Course schedule and contents]

(1) Structure of matter, 4 classes: Explain the size of the atoms, which are the basis of matter, and their electron configuration, types of bonds between atoms, the positions of electrons in solid matter, density and thermal expansion, and so on.
(2) Production of materials, 3 classes: Explain redox and the coagulation of melts, phase equilibrium of materials comprised of two or more chemical elements, and other information concerning the composition of materials.
(3) Mechanical properties, 2 classes: Explain properties related to the structural materials used to support loads such as elastic deformation and plastic deformation, yield strength, creep, and so on.
(4) Change in properties, 2 classes: Explain factors behind the change in the mechanical properties of materials such as addition of chemical elements, annealing, normalizing, quenching, and so on, as well as the reasons for these factors.
(5) Functions of materials, 2 classes: Explain the main functional properties of materials such as conduction of heat and electricity, specific heat, penetration of light, magnetism, and so on.
(6) Resources and recycling, 1 class: Discuss information concerning sustainable development such as abundance and reserves of chemical elements, recycling of materials, and so on.
(7) Confirmation of learning attainment, 1 class: Post explanation discussion and review of examination questions on KULASIS.

[Course requirements]

None

[Evaluation methods and policy]

[Grading method]
Grade is based on one written examination.

(2)

[Evaluation standard]
Must score at least 60 out of 100 on the written examination
60 or above: pass
59 or below: fail

[Textbooks]

Others. In addition, printouts will be distributed in class.

[References, etc.]

Reference books
Introuced during class

[Study outside of class (preparation and review)]

Practice problems and their solutions will be discussed in class. Therefore, please go over what you learned after each class.

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

[Courses delivered by instructors with practical work experience]

(1) Category
A course with practical content delivered by instructors with practical work experience

(2) Details of instructors' practical work experience related to the course

(3) Details of practical classes delivered based on instructors' practical work experience

Course number	U-ENG25 25009 LJ71		

Course title (and course title in English)	Scientific Measurement	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,TSUCHIYA TOSHIYUKI Graduate School of Engineering Professor,YOKOKAWA RYUUJI Graduate School of Energy Science Associate Professor,KINOSHITA KATSUYUKI Graduate School of Energy Science Professor,MIYAKE MASAO Graduate School of Engineering Associate Professor,HIROTANI JUN

Target year	2nd year students or above	Number of credits	2	Year/semesters	2025/First semester

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

[Overview and purpose of the course]

Basics of scientific insturmentaion is covered.

[Course objectives]

Understanding of the basics of scientific instrumentation in engineering physics.

[Course schedule and contents]

Units and Standards,2times,Units and Standards
Measurement uncertainity and its evaluation,3times,Measurement uncertainity and its evaluation
Data processing and statistical analysis,3times,Data processing and statistical analysis
Electrical and tempeature measurement,2times,Electrical and tempeature measurement
Radiation and material measurement,2times,Radiation and material measurement
Mechanical measurement,2times,Mechanical measurement
level of attainment,1time,level of attainment

[Course requirements]

None

[Evaluation methods and policy]

Examination. Reports are considered also.

[Textbooks]

ISBN:9784254201598

[References, etc.]

Reference books

NA

(2)

NA

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

[Courses delivered by instructors with practical work experience]

(1) Category
A course with practical content delivered by instructors with practical work experience

(2) Details of instructors' practical work experience related to the course

(3) Details of practical classes delivered based on instructors' practical work experience

Course number	U-ENG25 25009 LJ71		

Course title (and course title in English)	Scientific Measurement	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,TSUCHIYA TOSHIYUKI Graduate School of Engineering Professor,YOKOKAWA RYUUJI Graduate School of Energy Science Associate Professor,KINOSHITA KATSUYUKI Graduate School of Energy Science Professor,MIYAKE MASAO Graduate School of Engineering Associate Professor,HIROTANI JUN

Target year	2nd year students or above	Number of credits	2	Year/semesters	2025/First semester

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

[Overview and purpose of the course]

Basics of scientific insturmentaion is covered.

[Course objectives]

Understanding of the basics of scientific instrumentation in engineering physics.

[Course schedule and contents]

Guidance,2times,Guidance on how this class is operated, and how to use computing facility for this class. Basic knowledge on the role of IDS in network security and how machine learning can help the intrusion detection.
Intrusion Detection by Signature-Based IDS,5times,Learn the mechanism of intrusion detection by signature-based IDS by studying open source signature-based IDS and attacks, such as correspondence between alarms issued from IDS and communications, and adding signatures to detect attacks.
Intrusion Detection by Machine Learning,7times,Learn the method of classifying normal and malicious traffic by machine learning algorithms and public dataset for benchmarking intrusion detection performance.
Presentation,1time,Based on the exercise, students presents their methods of intrusion detection using machine learning, and discuss it with other students and instructors.

[Course requirements]

None

[Evaluation methods and policy]

Examination. Reports are considered also.

(2)

[Textbooks]

ISBN:9784254201598

[References, etc.]

Reference books
NA

[Study outside of class (preparation and review)]
NA

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

[Courses delivered by instructors with practical work experience]

(1) Category
A course with practical content delivered by instructors with practical work experience

(2) Details of instructors' practical work experience related to the course

(3) Details of practical classes delivered based on instructors' practical work experience

Course number	U-ENG25 25012 LJ75 U-ENG25 25012 LJ52 U-ENG25 25012 LJ77

Course title (and course title in English)	Solid State Physics	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,NAKAMURA HIROYUKI

Target year	2nd year students or above	Number of credits	2	Year/semesters	2025/Second semester

Days and periods	Thu.1	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

Introduction to microscopic solid state physics

[Course objectives]

Gateway to atomic and electronic theories for meterials

[Course schedule and contents]

Crystal and lattice, Diffraction by crystal, Bonding energy of crystal, 2 times, Lattice and crystal structure, Miller indices, Bragg's law, vanishing rule and structure factor, repulsion and attraction between atoms, various atomic bonding

Phonon, 3 times, Sound wave in elastic body, dispersion relation, Brillouin zone, acoustic mode and optical mode, phonon

Introduction to statistical mechanics, Specific heat of solid, 3 times, Introduction to statistical mechanics, Boltzmann distribution, entropy, state sum and free energy, Einstein model for specific heat of solid, Debye model for specific heat of solid, thermal expansion of solid

Introduction to quantum mechanics, 3 times, Introduction to quantum mechanics, Shrodinger equation, free electron/harmonic oscillator/hydrogen atom, physical quantities and operators

Free electron model. Thermal and transport properties of metal, 3 times, Density of states, Fermi-Dirac distribution, electron specific heat, resistivity of metals, Hall effect, thermal conductivity of metals

Assessment, 1time, Assessment

[Course requirements]

None

[Evaluation methods and policy]

Evaluation will be based on a final examination.

(2)

[Textbooks]

M. Shiga   Introduction to Solid State Physics for Materials Scientists   Uchidarokakuho   ISBN: 9784753655526   in Japanese

[References, etc.]

Reference books

C. Kittel   Introduction to Solid State Physics   Wiley   ISBN:9780471415268

[Study outside of class (preparation and review)]

Knowledge on quantum mechanics and statistical mechanics is highly helpful.

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 35013 LJ77　U-ENG25 35013 LJ52				

Course title (and course title in English)	Applied Electromagnetism		Instructor's name, job title, and department of affiliation	Graduate School of Engineering Associate Professor,SHIKAMA TAIICHI	
Target year	3rd year students or above	**Number of credits**	2	**Year/semesters**	2025/First semester
Days and periods	Tue.1	**Class style**	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

,2?3times,
,3?4times,
,2?4times,
,3?5times,
,1time,

[Course requirements]

None

[Evaluation methods and policy]

[Textbooks]

[References, etc.]

　Reference books

[Study outside of class (preparation and review)]

　Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 35013 LJ77 U-ENG25 35013 LJ52				

Course title (and course title in English)	Applied Electromagnetism		Instructor's name, job title, and department of affiliation	Graduate School of Engineering Associate Professor,	

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/First semester
Days and periods	Tue.1	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

The general properties of Maxwell's equations, which form the fundamental laws of electromagnetism, as well as the generation and propagation of electromagnetic waves and their applications in engineering are taught in lectures.

[Course objectives]

    To understand the general properties of Maxwell's equations, which form the fundamental laws of electromagnetism
    To understand the generation and propagation of electromagnetic waves and the optical properties of matter
    To understand how electromagnetic phenomena are applied in engineering

[Course schedule and contents]

The lecturer instructs students by deciding on the order and frequency (15 sessions in total) in which the following items will be taught, based on each student's background and level of understanding.

(1) Maxwell's equations and their general properties [3-4 sessions]
Maxwell's equations and other basic matters are reviewed.
(2) Generation and propagation of electromagnetic waves [5-6 sessions]
The propagation of electromagnetic waves in a vacuum and waveguide, polarization of electromagnetic waves, radiation of electromagnetic waves from charged particles that undergo accelerated motion and other related matters are explained.
(3) Reflection, refraction and diffraction of electromagnetic waves [4-5 sessions]
Matters such as the laws of reflection and refraction at dielectric boundaries; absorption, refraction, dispersion, and reflection of electromagnetic waves based on oscillator models; group velocity and phase velocity; diffraction of electromagnetic waves; and optical properties of metals, plasma, and other materials are explained.
(4) Application and development in physical engineering [1-2 sessions]
The development and application of electromagnetic waves in engineering are explained.

(2)

[Course requirements]

The subject is based on the continuation of electromagnetism, differential and integral calculus, and linear algebra, classes offered by the Faculty of Integrated Human Studies. Students are required to have basic knowledge in vector analysis.

[Evaluation methods and policy]

Evaluation is based on the combined grade for tests and submitted materials.

[Textbooks]

Others; printouts are distributed in lectures when needed.

[References, etc.]

 Reference books

Introduced during teaching sessions

[Study outside of class (preparation and review)]

  Students must prepare for and review lecture materials distributed in teaching sessions.
  When appropriate, students are asked to submit reports and assignments demonstrating their learning from preparation and review.

 Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

[Courses delivered by instructors with practical work experience]

(1) Category
A course with practical content delivered by instructors with practical work experience

(2) Details of instructors' practical work experience related to the course

(3) Details of practical classes delivered based on instructors' practical work experience

Course number	U-ENG25 35013 LJ77 U-ENG25 35013 LJ52

Course title (and course title in English)	Applied Electromagnetism	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,SAITOU MANABU

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/First semester

Days and periods	Tue.1	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

Guidance,2times,Guidance on how this class is operated, and how to use computing facility for this class. Basic knowledge on the role of IDS in network security and how machine learning can help the intrusion detection.

Intrusion Detection by Signature-Based IDS,5times,Learn the mechanism of intrusion detection by signature-based IDS by studying open source signature-based IDS and attacks, such as correspondence between alarms issued from IDS and communications, and adding signatures to detect attacks.

Intrusion Detection by Machine Learning,7times,Learn the method of classifying normal and malicious traffic by machine learning algorithms and public dataset for benchmarking intrusion detection performance.

Presentation,1time,Based on the exercise, students presents their methods of intrusion detection using machine learning, and discuss it with other students and instructors.

[Course requirements]

None

[Evaluation methods and policy]

[Textbooks]

[References, etc.]

　Reference books

(2)

[Study outside of class (preparation and review)]

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 25014 LJ57 U-ENG25 25014 LJ75 U-ENG25 25014 LJ52

Course title (and course title in English)	Atomic Physics		Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,MAJIMA TAKUYA

Target year	2nd year students or above	Number of credits	2	Year/semesters	2025/Second semester

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

[Overview and purpose of the course]

Students are first given an overview of physical phenomena that lead to the discovery of quantum mechanics. Following this, an introduction to quantum mechanics is given using concrete examples to provide a clear outline of various phenomena in the microscopic world, such as atoms and molecules, and the laws that are derived from them.

[Course objectives]

Targets include understanding phenomena that cannot be described in classical physics, understanding various laws in the microscopic world that relate to atoms and molecules, and acquiring basic knowledge for quantum mechanics.

[Course schedule and contents]

Atomic theories, 1 session: atomic theory of natural philosophy, atomic theory of chemistry, atoms and nuclei, structure of nuclei and elementary particles, current image of elementary particles

Kinetic theory of gases, 2 sessions: atomic theory of chemical reactions, basic assumptions of the kinetic theory of gases, pressure and temperature of gases, specific heat of matter, law of the distribution of energy, and velocity of molecules

Heat radiation and energy quantum, 2 sessions: properties of heat radiation, Stefan-Boltzmann law, Wien's displacement law, classical radiation formulas (Rayleigh-Jeans, Wien), Planck's radiation formula and energy quantum

Photons and electrons, 2 sessions: electrons and their particle properties, the discovery of electrons, beta particles, photons: light particulates, photoelectric effect, Compton effect

Atomic models and the quantum condition (old quantum theory), 1 session: theory on the structure of electrons and atoms, Thomson and Nagaoka's atomic models, discovery of the atomic nucleus/Rutherford's atomic model, Bohr's atomic model

Wave function and uncertainty principle (introduction to quantum mechanics), 1 session: fluctuation of electrons, de Broglie wave, double-slit experiment, interpretation of wave function

Schrodinger equation and its solution, 2 sessions: operator, expected value, time-independent Schrodinger equation, steady state, eigenvalue equation, square-well potential

Quantum mechanical description of a hydrogen atom, 3 sessions: spherical coordinate system, particle in a central potential, angular momentum operator, spherical harmonics, wave function, and energy level of a hydrogen atom

Confirmation of learning achieved, 1 session: the degree of learning achieved so far is confirmed

(2)

[Course requirements]

Classical mechanics, electromagnetism, thermodynamics

[Evaluation methods and policy]

Students are evaluated through a test. A raw score is given as their evaluation.

[Textbooks]

Not used

[References, etc.]

Reference books

Others; Hatakeyama, A., Ryoushirikigaku, (Nihon Hyouronsha, 2017) ISBN-10: 4535860411,
Mafune, F., Ryoushi kagaku　kiso kara no apuroochi,, (Kagaku-Dojin, 2007) ISBN-10: 4759810846,
Kikuchi, K., Genshi butsurigaku　bishiteki butsurigaku nyuumon, (Kyoritsu Shuppan, 1969) ISBN-10: 4320030478,
etc.

Related URLs

( )

[Study outside of class (preparation and review)]

Students should read materials such as introductory books on topics covered in lectures to gain an understanding of how the study of physics has emerged throughout history.

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

[Courses delivered by instructors with practical work experience]

(1) Category
A course with practical content delivered by instructors with practical work experience

(2) Details of instructors' practical work experience related to the course

(3) Details of practical classes delivered based on instructors' practical work experience

Course number	U-ENG25 35018 LJ71 U-ENG25 35018 LJ75 U-ENG25 35018 LJ77

Course title (and course title in English)	Quantum Physics 1	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,SUZUKI MOTOFUMI

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/Second semester

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

[Overview and purpose of the course]

In this subject, lectures focus on helping students understand the main concepts underlying quantum mechanics and quantum statistical mechanics, as well as deepening their quantum mechanical understanding of the structure of an atom, structure of a molecule, and the electronic structure of a solid material.

[Course objectives]

To master the main concepts underlying quantum mechanics and quantum statistical mechanics, and to deepen one's quantum mechanical understanding of the structure of an atom, the structure of a molecule, and the electronic structure of a solid material.

[Course schedule and contents]

(1) Development of quantum mechanics [1-2 weeks]
Students receive an overview of Rutherford's atomic model and its difficulties, Bohr's atomic model, experimental facts that show light particulates and the fluctuation of electrons, etc. In addition, students develop an understanding of the limits of classical mechanics and the necessity of quantum mechanics.
(2) Principles of quantum mechanics [4 weeks]
Students are introduced to wave functions and the Schrodinger equation. Further, students gain an understanding of differences between classical mechanics and quantum mechanics by studying the interpretation and properties of wave functions, expected values of physical quantities, and the properties of operators that reveal observable physical quantities. By examining the eigenvalues of operators and the properties of eigenfunctions, students also develop an understanding of the superposition principle of wave functions.
(3) Motion in one dimension [2-3 weeks]
Students are asked to think about the motion of a one-dimensional free particle when there is no external field. By examining the motion of particles when potential hills are present, and studying reflection via potential hills and the transmission phenomena of potential hills, students also gain an understanding of the tunneling effect. In addition, the bound state is explained using the square-well potential as an example.
(4) Harmonic oscillator [2-3 weeks]
Students review harmonic oscillation in classical mechanics and derive the wave function of a one-dimensional harmonic oscillator. Based on this, students are asked to think about the motion of a multidimensional harmonic oscillator and are given an explanation of the Einstein model of specific heat.
(5) Hydrogen atom [4 weeks]
Students are asked to think about motion in a spherically symmetric field using a hydrogen atom as an example. Next, polar coordinates are introduced to allow students to separate a wave function into angular

and radial parts. Then, an explanation is given on angular momentum in quantum mechanics. Following this, students are asked to obtain the wave function of a hydrogen atom and are given an explanation of the spectrum of a hydrogen atom. Based on the outcome of these activities, the wave function of a multi-electron atom is then examined generally, and an explanation is given on atomic analyses performed via atomic spectroscopy and Auger electron spectroscopy. In addition, students also gain an understanding of the origin of covalent bonds using a hydrogen molecule as an example.

[Course requirements]

None

[Evaluation methods and policy]

[Evaluation method]
Evaluation is conducted through a short-answer test.
   [Evaluation criteria]
Students must obtain at least 60 out of 100 marks in the short-answer test
60 marks or above: Pass
59 marks or below: Fail

In addition, up to 30% of the report assignments given during teaching sessions may be added to the above evaluation.

[Textbooks]

Others; none

[References, etc.]

Reference books

Others; there are many textbooks, but any basic textbook will suffice.

[Study outside of class (preparation and review)]

   Students must prepare for and review lecture materials distributed in teaching sessions.
   When appropriate, students are asked to submit reports and assignments demonstrating their learning from preparation and review.

Other information (office hours, etc.)

Students are divided into two classes, and lectures on the above contents are given in the same time slots.

*Please visit KULASIS to find out about office hours.

[Courses delivered by instructors with practical work experience]

(1) Category
A course with practical content delivered by instructors with practical work experience

(3)

(2) Details of instructors' practical work experience related to the course

(3) Details of practical classes delivered based on instructors' practical work experience

Course number	U-ENG25 35018 LJ71　　U-ENG25 35018 LJ75　　U-ENG25 35018 LJ77				

Course title (and course title in English)	Quantum Physics 1		Instructor's name, job title, and department of affiliation	Graduate School of Engineering Associate Professor,NAKAJIMA KAORU	

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/Second semester
Days and periods	Fri.3	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

0

[Course requirements]

None

[Evaluation methods and policy]

examination and homework

[Textbooks]

[References, etc.]

　Reference books

[Study outside of class (preparation and review)]

　Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 35018 LJ71 U-ENG25 35018 LJ75 U-ENG25 35018 LJ77

Course title (and course title in English)	Quantum Physics 1	Instructor's name, job title, and department of affiliation	Part-time Lecturer,Itoh Akio

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/First semester

Days and periods	Fri.2	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

Quantum theory is one of the most successful theories in the modern physics. It explains well a lot of peculiar phenomena which can not be understood within the classical theory. The main purpose of this course is to understand the fundamental mathematical structure of the quantum theory.
We may use online materials. Check PandA in advance.

[Course objectives]

An important purpose of this course is to understand the fundamental mathematical structure of the quantum theory. In addition one is hoped to become capable to calculate some basic properties of a quantum mechanical particle on one-dimensional space.

[Course schedule and contents]

1. Introduction. Wave mechanics and matrix mechanics.
2. Mathematical structure of quantum theory (1) State and observable.
3. Mathematical structure of quantum theory (2) Hilbert space and state vectors.
4. Mathematical structure of quantum theory (3) operators and observables
5. Mathematical structure of quantum theory (4) Schroedinger equation and time evolution
6. One particle on one-dimensional space (1) classical theory and its quantization
7. One particle on one-dimensional space (2) CCR and Robertson's uncertainty relation
8. Potential problem (1) General theory
9. Potential problem (2) General theory and its mathematical addendum
10. Square well potential
11. Box potental
12. Scattering theory
13. Harmonic oscillator (1)
14. Harmonic oscillator (2)
15. Summary

[Course requirements]

Classical mechanics, Linear algebra

[Evaluation methods and policy]

Evaluation method
Evaluation will be based on reports.
Evaluation policy
The result of reports should be 60 and above out of 100.
  60 and above: Passed
  59 and below: Failed

[Textbooks]

Not used

[References, etc.]

Reference books
Modern Quantum Mechanics (J.J.Sakurai) isbn{}{9780805382914} isbn{}{9781292024103}
Lectures on Quantum Theory (C.J. Isham) isbn{}{1860940013}

[Study outside of class (preparation and review)]

Clarify what you have learnt and what you do not understand. Solve a problem set which will be distributed.

Other information (office hours, etc.)

Send an email.

*Please visit KULASIS to find out about office hours.

[Courses delivered by instructors with practical work experience]

(1) Category
A course with practical content delivered by instructors with practical work experience

(2) Details of instructors' practical work experience related to the course

(3) Details of practical classes delivered based on instructors' practical work experience

Course number	U-ENG25 45019 LJ75 U-ENG25 45019 LJ77 U-ENG25 45019 LJ71

Course title (and course title in English)	Quantum Physics 2	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,HASUO MASAHIRO

Target year	4th year students or above	Number of credits	2	Year/semesters	2025/First semester

Days and periods	Wed.1	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

,3times,
,3times,
,1?2times,
,1?2times,
,2times,
,3times,
,1time,

[Course requirements]

None

[Evaluation methods and policy]

[Textbooks]

[References, etc.]

  Reference books

[Study outside of class (preparation and review)]

  Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 45019 LJ75 U-ENG25 45019 LJ77 U-ENG25 45019 LJ71

Course title (and course title in English)	Quantum Physics 2	Instructor's name, job title, and department of affiliation	Part-time Lecturer,Itoh Akio

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/Second semester

Days and periods	Tue.1	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

Quantum theory is an astonishing theory. It describes perfectly a lot of phenomena inspite of its peculiar mathematical formulation.
An important purpose of this course is to understand the formulation and to become capable to manipulate it.
We may use online materials. Check PandA in advance.

[Course objectives]

To understand the fundamental structure of quantum theory.
To be able to calculate some properties of quantum mechanical particle in three dimensional space.

[Course schedule and contents]

1. Fundamental framework
2. Angular momentum (1)
3. Angular momentum (2) generator of space rotation
4. Eigenvalue of Angular momentum operator. SU(2) and SO(3)
5. Spin
6. Central potential
7. Hydrogen atom
8. perturbation theory (1)
9. perturbation theory (2)
10. Heisenberg equation
11. Interaction picture
12. Bell's inequality
13. Mixed state
14. Many particle and Quantum field
15. Applications to quantum information

[Course requirements]

Quantum Physics 1

[Evaluation methods and policy]

Evaluation method
Evaluation will be based on reports.
Evaluation policy

The result of reports should be 60 and above out of 100.
   60 and above: Passed
   59 and below: Failed

[Textbooks]

Not used

[References, etc.]

Reference books

Modern Quantum Mechanics (J.J.Sakurai) isbn{}{9780805382914} isbn{}{9781292024103}
Lectures on Quantum Theory (C.J. Isham) isbn{}{1860940013}

[Study outside of class (preparation and review)]

Solve a distributed problem set.

Other information (office hours, etc.)

Send an email.

*Please visit KULASIS to find out about office hours.

[Courses delivered by instructors with practical work experience]

(1) Category
A course with practical content delivered by instructors with practical work experience

(2) Details of instructors' practical work experience related to the course

(3) Details of practical classes delivered based on instructors' practical work experience

Course number	U-ENG25 35020 LJ71		

Course title (and course title in English)	Continuum Mechanics	Instructor's name, job title, and department of affiliation	Graduate School of Energy Science Professor,IMATANI SHIYOUJI

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/First semester

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

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

Basic assumptions,1 times,
Vectors and tensors,2times,
Fundamental laws,2 times,
Constitutive framework,3times,
Potential theories,2times,
Wave motions,2times,
Stabilities,2times,
Examination,1 times,

[Course requirements]

None

[Evaluation methods and policy]

[Textbooks]

(2)

[References, etc.]

　Reference books

[Study outside of class (preparation and review)]

　Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 35020 LJ71

Course title (and course title in English)	Continuum Mechanics		Instructor's name, job title, and department of affiliation	Institute for Life and Medical Sciences Professor,ADACHI TAIJI

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/Second semester

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

[Overview and purpose of the course]

This lecture provides an introduction to the theory of continuum mechanics for its application to the fields of bioengineering and biomedical engineering.

[Course objectives]

Students will be able to understand tensor analysis and continuum mechanics, and to apply them in modeling of living tissues and cells.

[Course schedule and contents]

Introduction to continuum mechanics

Mathematical preliminaries
Matrix algebra, Index notation, Summation convention, Eigenvalues and eigenvectors

Vectors and tensors
Cartesian tensors, Scalar and vector products, Dyadic product, Coordinate transformation,Invariants, Nabla operator, Divergence theorem

Kinematics
Bodies and configurations, Displacement, Strain tensor, Compatibility, Material time derivative

Stress and equilibrium
Force and stress, Stress tensor, Traction, Cauchy stress, Principal stresses, Equation of equilibrium

Conservation Laws and governing equations
Mass conservation, Linear and angular momentum, The first law of thermodynamics for continua

Constitutive models
Constitutive equations, Stress-strain relationship, Linear elasticity, Newtonian viscous fluids,Material symmetry, Biological tissues

Boundary value problems
Differential equations with a set of boundary conditions, Navier-Stokes equation, Navier's equation

(2)

Feedbacks
Application of continuum mechanics to the analyses of biological tissues, Introduction to biomechanics

[Course requirements]

None

[Evaluation methods and policy]

Exam 100 (+ Reports max 10)

[Textbooks]

, 2022　ISBN:ISBN-10: 4842505907

[References, etc.]

Reference books
Introduced during class

[Study outside of class (preparation and review)]

.

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 35023 LJ77 U-ENG25 35023 LJ28 U-ENG25 35023 LJ71

Course title (and course title in English)	Energy Conversion		Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,KUROSE RYOUICHI Graduate School of Energy Science Professor,Jun HAYASHI

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/First semester

Days and periods	Fri.2	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

Various energy sources and energy conversion systems will be outlined. Also, basic matters on energy conversion processes and thermodynamics treatments for the effective use of energy will be lectured.

[Course objectives]

From this class, fundamental issues related to energy conversion engineering are learned, as well as a target is put in the current situation of energy resources, latest technologies of energy conservation and new energy system, environmental measures are comprehensible.

[Course schedule and contents]

Energy source and energy conversion system,3?4times,* Energy resources
,3?4times,
,3?4times,
,3?4times,

[Course requirements]

Knowledge of thermodynamics is required.

[Evaluation methods and policy]

Achievement will be synthetically evaluated from attendance, report and final examination.

[Textbooks]

Nothing. Print material is properly distributed.

[References, etc.]

 Reference books
It will be introduced, if necessary.

[Study outside of class (preparation and review)]

 Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 35023 LJ77　U-ENG25 35023 LJ28　U-ENG25 35023 LJ71

Course title (and course title in English)	Energy Conversion		Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,KUROSE RYOUICHI Graduate School of Energy Science Professor,Jun HAYASHI

Target year	4th year students or above	Number of credits	2	Year/semesters	2025/First semester

Days and periods	Fri.2	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

1　2

4　5

3　4

3　4

(2)

[Course requirements]

[Evaluation methods and policy]

[Textbooks]

[References, etc.]

　　Reference books

[Study outside of class (preparation and review)]

　Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 35024 LJ77 U-ENG25 35024 LJ71		
Course title (and course title in English)	Vibration Engineering	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Senior Lecturer,NAKANISHI HIROAKI Graduate School of Engineering Professor,KOMORI MASAHARU Graduate School of Engineering Professor,MATSUBARA ATSUSHI
Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/Second semester

Days and periods	Wed.1	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

,3times,
,3times,
,1time,
,4times,
,3times,
,1time,

[Course requirements]

None

[Evaluation methods and policy]

[Textbooks]

(2)

[Study outside of class (preparation and review)]

 Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

[Courses delivered by instructors with practical work experience]

(1) Category
A course with practical content delivered by instructors with practical work experience

(2) Details of instructors' practical work experience related to the course

(3) Details of practical classes delivered based on instructors' practical work experience

Course number	U-ENG25 35024 LJ77　　U-ENG25 35024 LJ71

Course title (and course title in English)	Vibration Engineering	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,SENDA KEI

Target year	2nd year students or above	Number of credits	2	Year/semesters	2025/Second semester

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

[Overview and purpose of the course]

To introduce the fundamentals of analytical methods for linear dynamic systems, especially the modeling of vibration phenomena and their analysis.

[Course objectives]

To acquire basic knowledge of analytical methods for linear dynamic systems, especially modeling, and analysis of vibration phenomena, and to acquire the ability to analyze various dynamic systems.

[Course schedule and contents]

(1) Introduction [1 week]
Outline and fundamentals of analytical methods for linear dynamic systems will be presented.
(2) Fourier analysis [1 week]
The fundamentals of Fourier series and Fourier transform and their applications to vibration analysis will be explained.
(3) Analysis of one-degree-of-freedom vibration systems [4 weeks]
Free vibration and forced vibration of one-degree-of-freedom vibration systems consisting of masses, springs, and damping will be explained.
(4) Analysis of 2-DOF vibration system [3 weeks]
Equations of motion, eigenfrequency, undamped free vibration, and properties of eigenfrequency of 2-DOF vibration systems consisting of masses, springs, and damping will be explained.
(5) Analysis of multi-degree-of-freedom vibration systems [3 weeks]
An explanation will be given on eigen vibration of general multi-degree-of-freedom vibration systems, mode coordinate system, and analysis of free/forced vibration using mode coordinates.
(6) Analysis of distributed constant vibration systems [3 weeks]
Using the longitudinal vibration of a bar, vibration of a string, and bending vibration of a beam as examples, the boundary conditions, natural frequencies, modes, and comparison with analysis of multi-degree-of-freedom vibration systems will be explained.

[Course requirements]

Basic Mechanics and Mathematics, Basic Differential and Integral Calculus including Ordinary Differential Equations, Fourie Analysis

[Evaluation methods and policy]

Grades are assessed on a scale of 100 points, based on the scores of regular tests and class participation.
Class participation is assessed based on submitted assignments, class participation, and in-class comments.
Class participation is taken into account up to a maximum of 20% of the overall grade.
The assessment criteria follow the policy for grading in the Faculty of Engineering, as stated in the course handbook.

[Textbooks]

Takuzo Iwatsubo and Hiroshi Matsuhisa   Fundamentals of Vibration Engineering   Morikita Publishing Co., Ltd.   ISBN:9784627666825   2014

[References, etc.]

Reference books
Introduced during class

[Study outside of class (preparation and review)]

Students should learn the basic mechanics and mathematics in advance as necessary. They should answer the questions given as assignments, understand the lecture content, review it by reorganizing their notes, etc., and systematize the content they have learned. For this reason, it takes an average of about 4 hours of preparation and review for each lesson.

Other information (office hours, etc.)

Instructions will be given during class.

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 35025 LJ77 U-ENG25 35025 LJ71				
Course title (and course title in English)	Control Engineering 1		**Instructor's name, job title, and department of affiliation**	Graduate School of Engineering Professor,KOH HOSODA Graduate School of Engineering Senior Lecturer,Kawasetsu Takumi	
Target year	3rd year students or above	**Number of credits**	2	**Year/semesters**	2025/First semester
Days and periods	Thu.1	**Class style**	Lecture (Face-to-face course)	**Language of instruction**	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

,1time,
,3times,
,2times,
,2-3times,
,3times,
,2-3times,
,1time,

[Course requirements]

None

[Evaluation methods and policy]

[Textbooks]

[References, etc.]

  Reference books

[Study outside of class (preparation and review)]

  Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 35025 LJ77　　U-ENG25 35025 LJ71

Course title (and course title in English)	Control Engineering 1	Instructor's name, job title, and department of affiliation	Graduate School of Informatics Professor,OHTSUKA TOSHIYUKI Graduate School of Informatics Professor,AZUMA SHUNICHI

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/First semester

Days and periods	Thu.1	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

Control Engineering provides a methodology of controlling various systems including mechanical ones in a systematic way. Its major part consists of both Classical Control Theory and Modern Control Theory. This class describes the fundamentals of Classical Control Theory.

[Course objectives]

The course goal is to understand the basic concepts of Classical Control Theory such as transfer functions, frequency responses and stability.

[Course schedule and contents]

Introduction,1time,The basic idea of Control Engineering such as the purpose and methods of control is described through various real world examples.
Representation of dynamical systems,2-3times,Mathematical description of systems is developed first. Then, the concept of Transfer Functions is introduced based on Laplace Transform, and Block diagram representation is shown.
Responses of dynamical systems,3times,Time responses of linear systems are shown. Stability of systems and Stability tests are described.
Properties of feedback systems,2-3times,Basic properties such as steady state characteristics of feedback control systems and Root Locus are explained.
Frequency responses,3-4times,The concept of Frequency responses, Bode diagrams, Vector locus are introduced. The stability test of feedback systems based on the frequency responses is explained.
Design of control systems,2times,Basic components of classical controller design methods such as Phase lead, Phase Lag, and PID compensation are described.

[Course requirements]

Elementary knowledge of Laplace Transform is required.

[Evaluation methods and policy]

Scores of quizzes, reports and the regular examination are taken into account.

(2)

[Textbooks]

T. Sugie, M. Fujita: Introduction of Feedback Control. Corona Publishing Co. Ltd. isbn{}{9784339033038}

[References, etc.]

Reference books

T. Sugie, H. Kajiwara: Exercises in System Control Engineering. Corona Publishing Co. Ltd. isbn{}{9784339033069}

Related URLs

(none)

[Study outside of class (preparation and review)]

Other information (office hours, etc.)

Some parts of the above contents may be skipped/added depending on the course schedule of the year.

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 35025 LJ77 U-ENG25 35025 LJ71

Course title (and course title in English)	Control Engineering 1	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Associate Professor,MARUTA ICHIROU

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/First semester

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

[Overview and purpose of the course]

Control engineering consists of theory and methodology to design control systems. It includes the classical control theory to design feedback control systems based on transfer functions and frequency response.

[Course objectives]

The goal of this course is to understand the classical control theory and the related methodologies to design feedback control systems based on transfer functions and frequency response.

[Course schedule and contents]

1. Introduction
   History and background of control engineering
2-5. Dynamical systems and transfer functions
   Basic knowledge on dynamical systems, ordinary differential equations, transfer functions and block diagrams
6-8. Transit response and stability
   Stability of dynamical systems, transit response, steady response and Routh-Hurwitz stability criteria
9-10. Frequency response
   Basic knowledge on frequency response using Bode plots and vector locus
11-13. Characteristic of feedback control systems
   Performance criteria of feedback control systems using Nyquist's stability criteria and the root locus method.
14-15. Design of feedback control system,
   How to design feedback control system using phase-lead compensation, phase-lead-lag compensation and PID control

[Course requirements]

Complex function theory, Ordinary differential equation theory

[Evaluation methods and policy]

Evaluation will be based on the final examination which determines the degree of comprehension of the basic concepts and the design theory of feedback systems.
Also, the reports and assignments will be added up to one third of the points lost in the final examination.

(2)

[Textbooks]

T. Sugie and M. Fujita   Introduction to feedback control   Corona Publisher   ISBN:4339033030   in Japanese

[References, etc.]

Reference books
Introduced during class

[Study outside of class (preparation and review)]

To read through textbooks as the lecture progresses.
Also, review the parts of the textbook instructed according to the achievement level of the assignments.

Other information (office hours, etc.)

Feedback on lecture understanding is made from time to time according to the degree of achievement of the assignments.

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 35027 LJ71				
Course title (and course title in English)	Control Engineering 2		**Instructor's name, job title, and department of affiliation**		Graduate School of Informatics Professor,AZUMA SHUNICHI Graduate School of Engineering Senior Lecturer,Kawasetsu Takumi
Target year	3rd year students or above	**Number of credits**	2	**Year/semesters**	2025/Second semester
Days and periods	Wed.3	**Class style**	Lecture (Face-to-face course)	**Language of instruction**	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

,1time,
,2times,
,2times,
,2times,
,1time,
,2times,
,2times,
,2times,
,1time,

[Course requirements]

None

[Evaluation methods and policy]

[Textbooks]

[References, etc.]

  Reference books

(2)

[Study outside of class (preparation and review)]

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 35027 LJ71

Course title (and course title in English)	Control Engineering 2	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,FUJIMOTO KENJI

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/Second semester

Days and periods	Thu.2	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

This course treats modern control theory based on state-space models of dynamical systems. It includes modeling, analysis and synthesis methods of feedback control systems.

[Course objectives]

Students will learn state-space equations, stability analysis, feedback controller synthesis and observer design.

[Course schedule and contents]

The basic schedule of the course is as follows.

1. Introductions
2. Ordinary differential equations and state-space equations
3. Eigenvalues, eigenvectors and systems
4. Solutions of state-space equations
5. Stability
6. Transfer functions and realization theory
7. Controllability
8. Observability
9. Coordinate transformation and canonical decomposition
10. Controllability canonical form
11. Observability canonical form
12. State feedback control
13. State observers and output feedback control
14. Optimal control and Kalman filters
15. Summary

[Course requirements]

Students are required to take basic knowledge of linear algebra and differential equation theory. I is also preferable to take Control Engineering 1.

(2)

[Evaluation methods and policy]

The points will be evaluated based on the score of the paper test. The report assignment and attendance point may adds auxiliary points. The goal of this course is to understand the outline of the modern control and to acquire the ability to design the control system.

[Textbooks]

Not used

[References, etc.]

Reference books
Introduced during class

[Study outside of class (preparation and review)]

We will give a report for each unit. Review is necessary after every lecture.

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 35030 LJ71

Course title (and course title in English)	Production Engineering		Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,IZUI KAZUHIRO

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/Second semester

Days and periods	Wed.2	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

This course deals with how to construct and operate a manufacturing system of a mechanical product.

[Course objectives]

The goal is to understand the concept of a manufacturing system, and to become able to handle related basic decision-making problems.

[Course schedule and contents]

Introduction,1time,The overall concept of a manufacturing system is given.
Industrial Economics,2times,After introducing the concept of the manufacturing cost and cash flow, how to make decisions using the concept (for example, the DCF method for investment decisions) is addressed.
Production amp Operations Management,2times,Demand forecasting, production planning, inventory management, MRP, JIT, etc. are covered.
,3times,
Production Scheduling,2times,Basic approaches for single machine scheduling, flow shop scheduling, job shop scheduling, and project scheduling are introduced.
Plant Layout amp Line Blancing,2times,Basic approaches for plant layout and line balancing are introduced.
Industrial Engineering,2times,After introducing the principles of motion economy, the approaches for process analysis, human-machine analysis, Therblig analysis, standard time setting, etc. are addressed.
,1time,

[Course requirements]

None

[Evaluation methods and policy]

The regular examination, in-class examinations and reports are taken into account.

(2)

[Textbooks]

Not used

[References, etc.]

Reference books

[Study outside of class (preparation and review)]

Homework problems are assigned.

Other information (office hours, etc.)

The topics covered may be modified from the plan according to the actual schedule.

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 35035 LJ75				

Course title (and course title in English)	Physics of Crystal Properties and Imperfections		Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,INUI HARUYUKI Graduate School of Engineering Professor,KISHIDA KIYOUSUKE	
Target year	3rd year students or above	**Number of credits**	2	**Year/semesters**	2025/First semester
Days and periods	Fri.1	**Class style**	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

Dislocations are the most important lattice defects that strongly affect various propieties, especially mechanical properties of crystalline materials. In this course, fundamental properties of dislocations as well as basics of elasticity will be lectured.

[Course objectives]

This class aims to help students to acquire fundamental understandings of dislocations and also to acquire ways to understand mechanical properties of crystalline materials based on dislocation theory.

[Course schedule and contents]

(1) Introduction to dislocations [1 week]:
(2) Basics of elasticity theory [5 weeks]
(3) Elastic properties of dislocations [2 weeks]
(4) Motion of dislocations [2 weeks]
(5) Force on dislocations [4 weeks]
(6) Feedback [1 weeks]

[Course requirements]

None

[Evaluation methods and policy]

Evaluation will be based on one (or two) written examination(s). Daily reports may be considered in grading determination.

[Textbooks]

Hand out materials will be provided during the lecture.

[References, etc.]

Reference books

ISBN:4750702315
J.P. Hirth and J. Lothe   Theory of Dislocations   McGraw-Hill   ISBN:TY86299777
J.P. Hirth and J. Lothe   Theory of Dislocations, 2nd ed.   Wiley   ISBN:047109125
P.M. Anderson, J.P. Hirth and J. Lothe   Theory of Dislocations, 3rd ed.   Cambridge University Press,

(2)

[Study outside of class (preparation and review)]

To review contents covered in the previous lecture.

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 35036 LJ62　　U-ENG25 35036 LJ75　　U-ENG25 35036 LJ76

Course title (and course title in English)	Physical Chemistry of Materials	Instructor's name, job title, and department of affiliation	Graduate School of Energy Science Professor,MIYAKE MASAO

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/Second semester

Days and periods	Wed.2	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

This course discusses physical chemistry in relation to materials and raw materials processing. To do so, lectures focus on thermodynamics, solution chemistry, electrochemistry, the sciences that serve as the basis for material production, functional materials processes, recycling, corrosion and corrosion protection, etc.

[Course objectives]

From this course, students will become able to do the following:
1. Thermodynamically estimate aqueous solution reactions (acid-base reaction, oxygen reduction reaction) utilizing the free energy of ion formation.
2. Depict log a-pH diagrams and phase-pH diagrams.
3. Read log a-pH diagrams and phase-pH diagrams.
4. Express simple reaction rate equations in differential and integral form, and determine the reaction rate constant from experiment results.
5. Determine activation energy in relation to reaction rate temperature dependence from an Arrhenius plot.
6. Consider electrode kinetics using the Butler-Volmer equation.
7. Consider corrosion in light of equilibrium theory (Potential-pH diagram).
8. Consider corrosion in light of kinetic theory (Evans diagram, mixed potential model).

[Course schedule and contents]

Fundamentals of chemical thermodynamics (2 classes)
Confirmation is made of the basic items of Gibbs energy, chemical potential and activity, etc., all of which will serve as the foundation for this course.

Equilibrium theory of aqueous solution reactions (6 classes)
Lectures discuss acid-base reactions, oxidation-reduction reactions, and equilibrium electrochemistry, which serve as the foundation for materials processes using aqueous solutions and for corrosion and corrosion prevention.

Reaction rate fundamentals (3 classes)
Explanation is made of chemical reaction rate, dynamic electrochemistry, and solid surface processes, which serve as the foundation for materials processes using aqueous solutions and for corrosion and corrosion prevention.

Corrosion (3 classes)
Lectures will discuss equilibrium theory and kinetics of metal corrosion.

(2)

Feedback class (1 class)
Via questions and answer using the study support service (PandA), students will gain a deeper understanding of the contents of this course.

[Course requirements]

Students are recommended to have finished the course Energy and Material Thermochemistry I.

[Evaluation methods and policy]

Grading will be performed in principle using scores on regular tests. Consideration may also be given to exercises, quizzes, and reports assigned in classes.

[Textbooks]

Materials will be distributed during class or using the student support service (PandA).

[References, etc.]

Reference books

[Study outside of class (preparation and review)]

Notification will be made via the study support service (PandA).
For each week's class, class contents and quiz answers will be posted on the study support service (PandA).
Students are requested to review and gain a sufficient understanding of these before each next class period.

Other information (office hours, etc.)

Problem-solving type assignments will be designated as necessary using practice exercises as well as the study support service (PandA).
This lecture may be changed to the on-demand via PandA on account of the speaker.
Please note also that a portion of course contents may be omitted, or additional content may be added, depending on the progress of the course during each specific academic year.

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 35037 LJ75 U-ENG25 35037 LJ57		

Course title (and course title in English)	Heat and Mass Transfer	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,HIDEYUKI YASUDA

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/First semester
Days and periods	Wed.2	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

The fundamentals of transport phenomena for the engineers and/or researchers related to physical engineering are given.

[Course objectives]

To be able to apply the fundamental equations of thermal and mass transport studied in the class to real phenomena.

[Course schedule and contents]

One dimensional heat conducion,2times,Difference between heat and temperature. Similarity among heat, mass, and momentum transfers. Fourier#039s law, Steady heat conduction.
Non-steady heat transfer,2times,Diffusion equation, solved by Fourier expansion, Laplace transform, and numerical method.
Conservation rules,1time,Fourier#039s law, Steady heat conduction.
Molecular kinetics,1time,Maxwell#039s theorr.
Heat conduction of cylinder and sphere,1time,Heat transfer of cylindrical and sperical coordinates.
2 dimensional heat conduction,1time,2 dimensional Laplace equation.
Green function,2times,Green function. Relation between Schroedinger equation and diffusion equation.
Hydrodynamics,2times,Navier Stokes equation.
Boundary layer,1time,
Electromagnetic radiation,1time,
Achievement check,1time,Learning how to solve the problems through practical exercises.

[Course requirements]

None

[Evaluation methods and policy]

Assignment and written examination

(2)

[References, etc.]

Reference books

Related URLs

((50370) http://www.process.mtl.kyoto-u.ac.jp/)

[Study outside of class (preparation and review)]

The homework will be announced in the lecture.

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 35037 LJ75 U-ENG25 35037 LJ57		
Course title (and course title in English)	Heat and Mass Transfer	Instructor's name, job title, and department of affiliation	Graduate School of Energy Science Associate Professor,OKUMURA HIDEYUKI Graduate School of Energy Science Professor,SAGAWA TAKASHI Graduate School of Energy Science Associate Professor,OGAWA TAKAYA
Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/First semester
Days and periods	Mon.2	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

,2times,
,2times,
,3times,
,2times,
,2times,
,3times,
,1time,

[Course requirements]

None

[Evaluation methods and policy]

[Textbooks]

[References, etc.]

  Reference books

[Study outside of class (preparation and review)]

  Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 35040 LJ59 U-ENG25 35040 LJ52 U-ENG25 35040 LJ77

Course title (and course title in English)	Plasma Physics		Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,MURAKAMI SADAYOSHI Graduate School of Engineering Assistant Professor,Morishita, Yuya

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/Second semester

Days and periods	Tue.2	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

Fundamental properties of plasma as a universal state of high-temperature matters, basic equation describing plasma, magnetohydrodynamics, plasma waves and transport phenomena are explained.

[Course objectives]

to understand basic properties of plasmas and learn fundamental method of analysis

[Course schedule and contents]

What is a plasma?,2times,
Motion of charged particles,2times,
Coulomb collision,1time,
Basic equations,2times,
Equilibrium and stability,1time,
Plasma waves,2times,
Wave-particle interaction,1time,
Transport phenomena,1time,
Gas discharge,1time,
Nuclear fusion,1time,
Confirmation of achievement,1time,

[Course requirements]

Basic knowledges of electromagnetism, statistical physics, fluid dynamics and atomic physics are expected.

[Evaluation methods and policy]

semester-end examination and reports

[Textbooks]

Hand out will be distributed

[References, etc.]

Reference books

Introduced during class

(2)

[Study outside of class (preparation and review)]

Please read and study the handouts in advance about the contents of the day's class.

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 35041 LJ53　　U-ENG25 35041 LJ52

Course title (and course title in English)	Fundamentals of Particle Interactions	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,SAITOU MANABU

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/Second semester

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

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

,2times,
,4times,
,2times,
,2times,
,2times,
,2times,
,　　times,

[Course requirements]

None

[Evaluation methods and policy]

[Textbooks]

[References, etc.]

　Reference books

[Study outside of class (preparation and review)]

　Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 35045 LJ77 U-ENG25 35045 LJ52

Course title (and course title in English)	Gasdynamics		Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,TAKATA SHIGERU

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/First semester

Days and periods	Tue.2	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

Dynamics of high speed gas flows is treated on the basis of the fluid dynamics for compressible inviscid fluid. In this course, one-dimensional and quasi one-dimensional flows are mainly discussed, in order to show typical phenomena coming from the fluid compressibility.

[Course objectives]

To learn/understand fundamental issues specific to compressible fluid flows

[Course schedule and contents]

1. Euler set of equations (2-3 times)
2. Sound propagation (2 times)-- propagation of infinitesimal disturbance
3. Quasi one-dimension flow (2-3 times) -- isentropic flow, Laval nozzle, etc.
4. Propagation of finite amplitude disturbance (2-3 times) -- wave deformation, Riemann invariants, etc.
5. Standing Shock wave (1-2 times) -- Rankine-Hugoniot relation, etc.
6. Shock tube problem (2 time) -- Riemann problem, Reflection and deflection of waves

[Course requirements]

Fluid dynamics 1, Elemental Calculus (A,B, I,II), Linear Algebra (A,B)

[Evaluation methods and policy]

By the final exam., in principle.

[Textbooks]

H. M. Liepmann and A. Roshko   Elements of Gasdynamics   Dover Publications   ISBN:0486419630

[References, etc.]

Reference books

J. D. Anderson, Jr.   Modern Compressible Flow (2nd ed.)   McGraw-Hill   ISBN:0071006656

[Study outside of class (preparation and review)]

Students are expected to read the textbook by themselves in accordance with the progress of the class.

Other information (office hours, etc.)

Actual times and order of topics may change, depending on the class attendants or other reasons.

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 35046 LJ77 U-ENG25 35046 LJ52

Course title (and course title in English)	Thermodynamics and Statistical Mechanics	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,ERIGUCHI KOUJI

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/First semester

Days and periods	Thu.1	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

, times,
, times,
, times,
, times,
, times,

[Course requirements]

None

[Evaluation methods and policy]

[Textbooks]

[References, etc.]

  Reference books

(2)

[Study outside of class (preparation and review)]

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

[Courses delivered by instructors with practical work experience]

(1) Category
A course with practical content delivered by instructors with practical work experience

(2) Details of instructors' practical work experience related to the course

(3) Details of practical classes delivered based on instructors' practical work experience

Course number	U-ENG25 35047 LJ77 U-ENG25 35047 LJ52

Course title (and course title in English)	Aerodynamics		Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,TAKATA SHIGERU

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/Second semester

Days and periods	Fri.2	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

This is the continuation of the class "Gasdynamics (50450)." Mainly treated are two-dimensional inviscid compressible fluid flows and aerodynamic forces acting on the bodies in such flows. A modern approach to gas flows based on the kinetic theory of gases is introduced as well.

[Course objectives]

To learn/ understand the fundamental issues of two-dimensional compressible gas flows related to high speed flight.

[Course schedule and contents]

1. From one-dimensional to two-dimensional flow (3 times) -- Oblique Shock, Prandtl-Meyer fan, etc.
2. Shock--Expansion wave theory and Interaction of oblique shocks (2 times)
3. Non-isentropic flow and Mrocco's theorem (1-2 times) -- Bow shock, Shock--Expansion wave interaction, etc.
4. Small perturbation theory (3 times) -- Potential flow, Similarity rules, etc.
5. Steady two-dimensional flow and the method of characteristics (3-4 times)
6. Kinetic theory of gases (2-3 times) -- velocity distribution function, Boltzmann equation, etc.

[Course requirements]

Fluid dynamics 1,2, Gasdynamics, Elemental Calculus (A,B, I,II), Linear Algebra (A,B)

[Evaluation methods and policy]

By the final exam., in principle.

[Textbooks]

H. M. Liepmann and A. Roshko   Elements of Gasdynamics   Dover Publications   ISBN:0486419630

[References, etc.]

Reference books

J. D. Anderson, Jr.   Modern Compressible Flow (2nd ed.)   McGraw-Hill   ISBN:0071006656

[Study outside of class (preparation and review)]

Students are expected to read the textbook by themselves in accordance with the progress of the class.

Other information (office hours, etc.)

Actual times and order of topics may change, depending on the class attendants or other reasons.

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 35048 LJ77		

Course title (and course title in English)	Fundamentals of Aerospace Propulsion	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,ERIGUCHI KOUJI Graduate School of Engineering Associate Professor,URABE KEIICHIRO

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/Second semester

Days and periods	Mon.1	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

Propulsion Fundamentals,1time,
,3times,
Ionized Gases,1time,
Electromagnetics,2times,
Equation of Ionized Gases,1time,
Atomic and Molecular Collisions,2times,
Diffusion and Transport of Ionized Gases,1time,
Ionized Gases near Solid Surfaces,2times,
Electric Propulsion,1time,
,1time,

[Course requirements]

Fluid Dynamics, Gas Dynamics, Thermodynamics, Electromagnetics

[Evaluation methods and policy]

[Textbooks]

[References, etc.]

　　Reference books
R.W. Humble, G.N. Henry, and W.J. Larson, Space Propulsion Analysis and Design (McGraw-Hill, New

York, 1995)
G.P. Sutton and O. Biblarz, Rocket Propulsion Elements, 8th ed. (John Wiley amp Sons, Hoboken, 2010) isbn{}{9780470080245};
G.P. Sutton and O. Biblarz, Rocket Propulsion Elements, 7th ed. (Wiley, New York, 2001) isbn{}{0471326429};
M. Mitchner and Ch.H. Kruger, Jr., Partially Ionized Gases (Wiley, New York, 1973) isbn{}{0471611727};
F.F. Chen, Introduction to Plasma Physics and Controlled Fusion, 3rd ed. (Springer International Publishing Switzerland, Cham, 2016) isbn{}{9783319223087};
F.F. Chen, Introduction to Plasma Physics and Controlled Fusion, Vol. 1, Plasma Physics, 2nd ed. (Plenum, New York, 1984) isbn{}{9780306413322};
L.M. Biberman, V.S. Vorobev, and I.T. Yakubov, Kinetics of Nonequilibrium Low-Temperature Plasmas (Consultants Bureau, New York, 1987);
R.O. Dendy ed., Plasma Physics: An Introductory Course (Cambridge University Press, London, 1993) isbn{} {0521433096}, (, 1995) isbn{}{0521484529};
M.A. Lieberman and A.J. Lichtenberg, Principles of Plasma Discharges and Materials Processing (Wiley-Interscience, Hoboken, 2005) isbn{}{0471720011}.

[Study outside of class (preparation and review)]

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

[Courses delivered by instructors with practical work experience]

(1) Category
A course with practical content delivered by instructors with practical work experience

(2) Details of instructors' practical work experience related to the course

(3) Details of practical classes delivered based on instructors' practical work experience

Course number	U-ENG25 35049 LJ77

Course title (and course title in English)	Flight Dynamics of Aerospace Vehicle	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,SENDA KEI

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/Second semester

Days and periods	Mon.2	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

Flight dynamics of aerospace vehicles.

[Course objectives]

To understand analytical mechanics through flight dynamics of aerospace vehicles.

[Course schedule and contents]

Analytical mechanics, 7 times
- introduction
- coordinates
- principle of virtual work
- d'Alembert principle
- potential
- Lagrange equation of motion
- conservation law
- Lagrange multiplier
- Euler-Lagrange equation
Rigid body kinematics, 3 times
- Euler angles
- angular rate
- pseudo coordinates
Rigid body dynamics, 3 times
- kinetic energy of rigid body
- linear and angular momentum
- inertia tensor
- Euler equation of motion
Dynamics of space vehicle, 2 times
- topics of attitude dynamics of space vehicles
Achievement confirmation, 1 time
- achievement confirmation to check up level of understanding

- -

[Course requirements]

Foundation of mechanics and mathematics

[Evaluation methods and policy]

Grades are assessed on a scale of 100 points, based on the scores of regular tests and class participation.
Class participation is assessed based on submitted assignments, class participation, and in-class comments.
Class participation is taken into account up to a maximum of 20% of the overall grade.
The assessment criteria follow the policy for grading in the Faculty of Engineering, as stated in the course handbook.

[Textbooks]

Instructed during class

[References, etc.]

Reference books

L. D. Landau and E. M. Lifshitz   Mechanics: Volume 1   Butterworth-Heinemann   ISBN: 9780750628969   1982
Herbert Goldstein   Classical Mechanics   Pearson   ISBN:9781292026558   2013
Morikazu Toda   Introductory course of physics 1 Mechanics   Iwanami Shoten   ISBN:9784000298612   2017, in Japanese
Shoichro Koide   Introductory course of physics 2 Analytical Mechanics   Iwanami Shoten   ISBN: 9784000298629   2017, in Japanese
Miki Wadachi   Introductory course of physics 10 Mathematics for physics   Iwanami Shoten   ISBN: 9784000298704   2017, in Japanese

[Study outside of class (preparation and review)]

Students should learn the basic mechanics and mathematics in advance as necessary. They should answer the questions given as assignments, understand the lecture content, review it by reorganizing their notes, etc., and systematize the content they have learned. For this reason, it takes an average of about 4 hours of preparation and review for each lesson.

Other information (office hours, etc.)

Instructions will be given during class.

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 35051 LJ71

Course title (and course title in English)	Mechanics of Solids		Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,BIWA SHIRO

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/First semester

Days and periods	Mon.1	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

While the methods of stress-strain analysis for elementary structural members are the main topics in the "Mechanics of Materials" courses, the significance of this course lies in the treatments of more general physical laws of the mechanical behavior of solids. Namely, fundamental principles of solid mechanics such as three-dimensional expressions of stress and strain, equilibrium equations, constitutive equations (Hooke's law) are treated together with mathematical analysis of static deformations in elastic bodies. These subjects are important for the understanding of basic principles of large-scale computational analysis employed for the design of various structures and machine elements.

[Course objectives]

This course aims to establish the understanding of rigorous expressions of stress and strain and fundamentals of deformation analysis of solids and structures. It is also the aim of this course to re-examine the values of approximate theories given in the "Mechanics of Materials" courses from a rigorous viewpoint.

[Course schedule and contents]

The following topics are discussed in the lectures, but subject to possible change according to each year's situations.
Week 1 [Preliminaries] Basis vecotrs; Kronecker's delta; Alternating symbol; Summation convention
Weeks 2-3 [Deformation and strain] Description of motion; Material time derivative; Green-Lagrange strain; Infinitesimal strain; Transformation of strain components; Principal strains
Weeks 4-6 [Stress and laws of motion] Stress vector, Euler's laws of motion; Cauchy's law; Transformation of stress components; Cauchy's laws of motion; Equilibrium equations; Principal stresses and stress invariants
Weeks 7-8 [Stress-strain relations] Hooke's law; Elastic moduli; Voigt expression
Weeks 9-10 [Fundamental equations of elasticity] Navier's equations; Plane stress and plane strain; Compatibility relation for strain
Weeks 11-12 [Two-dimensional problems of elastic deformations] Airy's stress function; Biharmonic equation; Stress function in polar coordinates; Stress concentration around a circular hole
Week 13 [St. Venant's theory of torsion] Warping function; Prandtl's stress function; Torsion of bars of thin-walled cross-sections
Week 14 [Principle of virtual work] Virtual displacement; Principle of virtual work; Principle of stationary potential energy
<Final examination>
Week 15 [Feedback]

(2)

[Course requirements]

The enrolling students are expected to have knowledge in the Mechanics of Materials courses. Good understanding of calculus, linear algebra (eigenvalue problems) and vector analysis is also necessary.

[Evaluation methods and policy]

Grading is made based on the examination (80%) and the reports (20%). The total score of the examination and the reports is evaluated between 0 and 100 points (the pass mark is 60). Occasional changes will be announced in the classes.

[Textbooks]

Textbooks are not assigned. The lecture is given in the blackboard style.

[References, etc.]

Reference books

T. Inoue, "Fundamentals of elasticity" (Nikkan Kogyo)

S. Kobayashi and K. Kondo, "Elasticity" (Baihu-kan)

For references written in English, students are advised to contact the instructor directly.

[Study outside of class (preparation and review)]

Contents of "Mechanics of Materials" courses should be fully reviewed. Homeworks (reports) will be assigned to review the lectures.

Other information (office hours, etc.)

Lectures are given in a black-board style. Students are expected to take the notes to understand the ideas and mathematical derivations, and make questions regarding unclear points.

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 35054 SJ77　　U-ENG25 35054 SJ71		

Course title (and course title in English)	Exercise on Engineering Science 1	Instructor's name, job title, and department of affiliation	Graduate School of Energy Science Professor,SUMIGAWA TAKASHI

Target year	3rd year students or above	Number of credits	1	Year/semesters	2025/First semester
Days and periods	Mon.4	Class style	Seminar (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

,9times,
,6times,

[Course requirements]

None

[Evaluation methods and policy]

[Textbooks]

[References, etc.]

　Reference books

(2)

[Study outside of class (preparation and review)]

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

[Courses delivered by instructors with practical work experience]

(1) Category
A course with practical content delivered by instructors with practical work experience

(2) Details of instructors' practical work experience related to the course

(3) Details of practical classes delivered based on instructors' practical work experience

Course number	U-ENG25 35054 SJ77　　U-ENG25 35054 SJ71

Course title (and course title in English)	Exercise on Engineering Science 1	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Assistant Professor,OGURE KENZOU Graduate School of Engineering Senior Lecturer,NARITA EMI

Target year	3rd year students or above	Number of credits	1	Year/semesters	2025/First semester

Days and periods	Tue.3,4	Class style	Seminar (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

Linear algebra,5times,
Linear differential equations,5times,
Laplace transform,4times,
Confirmation of achievement in study,1time,

[Course requirements]

differential and integral, linear algebra

[Evaluation methods and policy]

exercises and reports

[Textbooks]

Prints are distributed in the class.

[References, etc.]

　　Reference books

[Study outside of class (preparation and review)]

　Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 35054 SJ77 U-ENG25 35054 SJ71

Course title (and course title in English)	Exercise on Engineering Science 1	Instructor's name, job title, and department of affiliation	Part-time Lecturer,KOBAYASHI TAKUMI Part-time Lecturer,Ishiguro Takahisa

Target year	3rd year students or above	Number of credits	1	Year/semesters	2025/First semester

Days and periods	Thu.3,4	Class style	Seminar (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

This course provides the basics of conceptual aircraft design, mainly commercial aircraft, including flight dynamics, aircraft structure, aircraft systems, equipment, etc.
Also, this course includes the exercises about aircraft configuration, airframe construction type, aircraft system design, etc.

[Course objectives]

This course aims to acquire the necessary skills and basic knowledge for aircraft design. This course helps to visualize the outline of aircraft development through a few tours of facilities outside the university.

[Course schedule and contents]

(1) Aircraft sizing <Instructor: Kobayashi Takumi>
    Basic knowledge of aircraft and flight mechanics (2 sessions)
    Determination of aircraft configuration (3 sessions)
(2) Airframe structural design <Instructor: Takagi Yohei>
    Basic knowledge of aircraft structure, loads, strength, materials and manufacturing methods (2 sessions)
    Design and strengh calculation of main structural members (3 sessions)
(3) Aircraft Systems and equipment <Instructor: Ishiguro Takahisa>
    Basic knowledge of aircraft systems and equipment (2 sessions)
    System design of sensor systems (2 sessions)

[Course requirements]

This course requires understanding the fundamental of dynamics.

[Evaluation methods and policy]

Evaluation will be based on the below.
    Attendance and participation in course.
    Submission and performance of exercises and homeworks.

(2)

[Textbooks]

To be distributed at class.

[References, etc.]

Reference books
To be introduced during class.

[Study outside of class (preparation and review)]

Possibly will be given some homeworks, which requires submission of reports.

Other information (office hours, etc.)

For exercises during the class, writing tools, rulers, compasses and a calculator.
It is recommended to use laptop PC or tablet which spread software like EXCEL is installed.

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 35055 SJ71 U-ENG25 35055 SJ77

Course title (and course title in English)	Exercise on Engineering Science 2	Instructor's name, job title, and department of affiliation	Graduate School of Energy Science Professor,KAWANABE HIROSHI Graduate School of Energy Science Professor,IMATANI SHIYOUJI Graduate School of Energy Science Professor,MATSUMOTO KAZUHIKO Graduate School of Energy Science Associate Professor,HORIBE NAOTO Graduate School of Energy Science Associate Professor,OGAWA TAKAYA Graduate School of Energy Science Associate Professor,KAWANISHI SAKIKO Part-time Lecturer,HAYASHI KAZUHIRO

Target year	3rd year students or above	Number of credits	1	Year/semesters	2025/Second semester

Days and periods	Tue.2	Class style	Seminar (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

Exercises for each topic related to energy science will be provided during lecture, and students are supposed to solve them and submit assignments. Answers and commenets including related fields will also be provided.

[Course objectives]

This class aims to help students to learn fundamental matters in the field of energy science acquire by solving exercises.

[Course schedule and contents]

Thermal engineering, 3 weeks
Hydrodynamics, 3 weeks
Mechanics of materials. 2 weeks
Thermodynamics, 2 weeks
Physical Chemistry, 2 weeks
Crystallography, 2 weeks
Summary, 1 week

[Course requirements]

It is desirable that students learned the basis of each topic.

(2)

[Evaluation methods and policy]

Evaluation will be based on active participation and assignments.

[Textbooks]

Handout will be provided in each topic.

[References, etc.]

Reference books

Introduced during class

[Study outside of class (preparation and review)]

Students are supposed to study the contents of each topic before the course.

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 35055 SJ71 U-ENG25 35055 SJ77

Course title (and course title in English)	Exercise on Engineering Science 2	Instructor's name, job title, and department of affiliation	Graduate School of Engineering ALL STAFF Graduate School of Engineering Assistant Professor,OGURE KENZOU Graduate School of Engineering Senior Lecturer,NARITA EMI

Target year	3rd year students or above	Number of credits	1	Year/semesters	2025/Second semester

Days and periods	Tue.4,5	Class style	Seminar (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

Students will learn how to solve applied physical-mathematical problems through practical exercises. These problems appear in broad fields, including fluid thermal engineering, and are significant.

[Course objectives]

This course is designed to provide students with the mathematical background necessary for studying engineering science. Students will learn how to deal with boundary value problems, partial differential equations, and special functions. This is important for study, including fluid thermal engineering, in the future. In addition, students will learn the basics of statistical data analysis. This is important for identifying the physical mechanisms behind the observed data and for constructing statistical models that can approximately and phenomenologically replace the physical mechanisms in the future.

[Course schedule and contents]

Boundary value problems (5 classes): Initial-boundary-value problems like wave phenomena and thermal diffusion.
Special functions (5 classes): Partial differential equations like Legendre differential equation and Bessel differential equation.
Statistical data analysis (4 classes): Calculation of statistics and visualization. Statistical modeling.
Feedback (1 class)

[Course requirements]

Calculus, Linear algebra

[Evaluation methods and policy]

Students will learn how to solve the problems and answer the exercises. The solutions will be submitted as a report through PandA. Grades will be based on the content of the reports, which will be graded on a 100-point scale.

(2)

[Textbooks]

Texts will be distributed.

[References, etc.]

Reference books

[Study outside of class (preparation and review)]

Students will answer the exercises and submit the solutions as a report through PandA.

Other information (office hours, etc.)

Students can ask their questions during and after the lessons or by email.

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 35055 SJ71　U-ENG25 35055 SJ77		
Course title (and course title in English)	Exercise on Engineering Science 2	**Instructor's name, job title, and department of affiliation**	Part-time Lecturer,NAKANISHI TOSHIYUKI Part-time Lecturer,FUJIWARA SATOSHI Part-time Lecturer,SASAKI ATSUSHI
Target year	3rd year students or above	**Number of credits** 1	**Year/semesters** 2025/Second semester
Days and periods	Fri.3,4	**Class style** Seminar (Face-to-face course)	**Language of instruction** Japanese

[Overview and purpose of the course]

Conduct lecture and exercise on aircraft and spacecraft design.

[Course objectives]

Understand the basis of aircraft/spacecraft systems and flight dynamics, and acquire a basic attitude toward aircraft/spacecraft design.

[Course schedule and contents]

1. History of aircraft and spacecraft [1 week]
   History of aircraft development and effort in Japan
   History of spacecraft development and effort in Japan
2. Spacecraft - Summary of satellite and rocket systems [1 week]
   Summary of satellite system
   Summary of rocket system
   Summary of propulsion system of spacecraft
3. Spacecraft - Orbit of satellite [1 week]
   Kepler motion
   Transfer of orbit
4. Spacecraft - Principle of rocket propulsion [1 or 2 weeks]
   Thrust and effective exhaust velocity
   Specific impulse
   Ideal velocity and mass component
   Multi-stage rocket
   Required velocity increment
5. Spacecraft - Design exercise [1 or 2 weeks]
   Exercise on sizing of rocket specification
6. Aircraft - Summary of airplane system [1 week]
   Airplane shape
   Airplane structure
   Airplane subsystems
   Airplane engine
7. Aircraft - Airplane performance [2 or 3 weeks]
   Standard atmosphere
   Definition of velocity
   Aerodynamic characteristics

Engine performance
Major performances of airplane
8. Aircraft - Airplane stability and controllability [1 week]
   Longitudinal stability and controllability
   Center of gravity limits
   Lateral and directional stability and controllability
   Crosswind landing
   Trim at engine failure
9. Aircraft - Airplane airworthiness [1 week]
   Regulation of airplane airworthiness
   Lessons learned from accidents
10. Aircraft - Design exercise [1 or 2 weeks]
   Exercise on flight test of airplane

* As part of the class, students may take a tour of facilities outside the university related to aircraft/spacecraft.

[Course requirements]

Assumes students understand the fundamentals of dynamics.

[Evaluation methods and policy]

[Evaluation method]
 Evaluation will be based on report (75%) and class performance (25%).
 Evaluation for class performance includes the attendance at the class and the effort toward the exercise.
[Evaluation policy]
 Evaluate the degree of understanding of aircraft/spacecraft systems and flight dynamics, and the degree of mastery of basic attitude toward aircraft/spacecraft design.

[Textbooks]

Handouts will be distributed.

[References, etc.]

Reference books
Introduced during class

[Study outside of class (preparation and review)]

Students are likely to make reports outside of class time, which will be imposed during class.

Other information (office hours, etc.)

The contents and number of classes are subject to change depending on the situation.

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 35056 EJ71

Course title (and course title in English)	Mechanical and System Engineering Laboratory 1	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Associate Professor,HIROTANI JUN Graduate School of Engineering Associate Professor, Institute for Life and Medical Sciences Associate Professor,MAKI KOICHIRO Graduate School of Engineering Assistant Professor,KURIYAMA REIKO Graduate School of Engineering Assistant Professor,PILLAI, Abhishek Lakshman Graduate School of Engineering Assistant Professor,GUO Yuting Graduate School of Engineering Professor,TSUCHIYA TOSHIYUKI Institute for Life and Medical Sciences Assistant Professor,Hironori Takeda Graduate School of Informatics Assistant Professor,BANNO IKUMI

Target year	3rd year students or above	Number of credits	1	Year/semesters	2025/First semester

Days and periods	Wed.4,5	Class style	Experiment (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

,1time,
,2times,
,2times,
,2times,
,2times,
,2times,
,1time,
,1time,
,2times,

(2)

[Course requirements]

None

[Evaluation methods and policy]

[Textbooks]

[References, etc.]

Reference books

[Study outside of class (preparation and review)]

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

[Courses delivered by instructors with practical work experience]

(1) Category
A course with practical content delivered by instructors with practical work experience

(2) Details of instructors' practical work experience related to the course

(3) Details of practical classes delivered based on instructors' practical work experience

Course number	U-ENG25 35056 EJ71

Course title (and course title in English)	Mechanical and System Engineering Laboratory 1	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Associate Professor,HIROTANI JUN Graduate School of Engineering Associate Professor, Institute for Life and Medical Sciences Associate Professor,MAKI KOICHIRO Graduate School of Engineering Assistant Professor,KURIYAMA REIKO Graduate School of Engineering Assistant Professor,PILLAI, Abhishek Lakshman Graduate School of Engineering Assistant Professor,GUO Yuting Graduate School of Engineering Professor,TSUCHIYA TOSHIYUKI Graduate School of Informatics Assistant Professor,BANNO IKUMI Institute for Life and Medical Sciences Assistant Professor,Hironori Takeda Graduate School of Engineering Assistant Professor,Yinli Wang

Target year	3rd year students or above	Number of credits	1	Year/semesters	2025/Second semester

Days and periods	Mon.4,5	Class style	Experiment (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

Guidance,2times,Guidance on how this class is operated, and how to use computing facility for this class. Basic knowledge on the role of IDS in network security and how machine learning can help the intrusion detection.

Intrusion Detection by Signature-Based IDS,5times,Learn the mechanism of intrusion detection by signature-based IDS by studying open source signature-based IDS and attacks, such as correspondence between alarms issued from IDS and communications, and adding signatures to detect attacks.

Intrusion Detection by Machine Learning,7times,Learn the method of classifying normal and malicious traffic by machine learning algorithms and public dataset for benchmarking intrusion detection performance.

Presentation,1time,Based on the exercise, students presents their methods of intrusion detection using machine learning, and discuss it with other students and instructors.

[Course requirements]

None

[Evaluation methods and policy]

[Textbooks]

[References, etc.]

   Reference books

[Study outside of class (preparation and review)]

   Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

[Courses delivered by instructors with practical work experience]

(1) Category
A course with practical content delivered by instructors with practical work experience

(2) Details of instructors' practical work experience related to the course

(3) Details of practical classes delivered based on instructors' practical work experience

Course number	U-ENG25 35057 EJ71		

| Course title (and course title in English) | Mechanical and System Engineering Laboratory 2 | Instructor's name, job title, and department of affiliation | Graduate School of Engineering Associate Professor,HIROTANI JUN
Graduate School of Engineering Associate Professor,
Graduate School of Engineering Assistant Professor,TERAKAWA TATSURO
Graduate School of Engineering Assistant Professor,Wataru MATSUNAGA
Graduate School of Engineering Associate Professor,FUJIMOTO KAZUYA
Graduate School of Engineering Assistant Professor,WAKABAYASHI HIDENOBU
Graduate School of Engineering Associate Professor,KOUNO DAISUKE
Graduate School of Engineering Senior Lecturer,NAKANISHI HIROAKI
Graduate School of Engineering Assistant Professor,SHIMOFURI MASAKI
Institute for Life and Medical Sciences Assistant Professor,Kaneko Taikopaul |

Target year	3rd year students or above	Number of credits	1	Year/semesters	2025/First semester

Days and periods	Thu.4,5	Class style	Experiment (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

,1time,
,2times,
,2times,
,2times,
,2times,
,2times,
,1time,
,1time,
,2times,

(2)

[Course requirements]

None

[Evaluation methods and policy]

[Textbooks]

[References, etc.]

　Reference books

[Study outside of class (preparation and review)]

　Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

[Courses delivered by instructors with practical work experience]

(1) Category
A course with practical content delivered by instructors with practical work experience

(2) Details of instructors' practical work experience related to the course

(3) Details of practical classes delivered based on instructors' practical work experience

Course number	U-ENG25 35057 EJ71

Course title (and course title in English)	Mechanical and System Engineering Laboratory 2	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Associate Professor,HIROTANI JUN Graduate School of Engineering Associate Professor, Graduate School of Engineering Assistant Professor,TERAKAWA　TATSURO Graduate School of Engineering Assistant Professor,Wataru MATSUNAGA Graduate School of Engineering Assistant Professor,WAKABAYASHI HIDENOBU Graduate School of Engineering Associate Professor,KOUNO DAISUKE Graduate School of Engineering Senior Lecturer,NAKANISHI HIROAKI Graduate School of Engineering Assistant Professor,SHIMOFURI MASAKI Institute for Life and Medical Sciences Assistant Professor,Kaneko Taikopaul

Target year	3rd year students or above	Number of credits	1	Year/semesters	2025/Second semester

Days and periods	Thu.1,2	Class style	Experiment (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

Guidance,2times,Guidance on how this class is operated, and how to use computing facility for this class. Basic knowledge on the role of IDS in network security and how machine learning can help the intrusion detection.

Intrusion Detection by Signature-Based IDS,5times,Learn the mechanism of intrusion detection by signature-based IDS by studying open source signature-based IDS and attacks, such as correspondence between alarms issued from IDS and communications, and adding signatures to detect attacks.

Intrusion Detection by Machine Learning,7times,Learn the method of classifying normal and malicious traffic by machine learning algorithms and public dataset for benchmarking intrusion detection performance.

Presentation,1time,Based on the exercise, students presents their methods of intrusion detection using machine learning, and discuss it with other students and instructors.

(2)

[Course requirements]

None

[Evaluation methods and policy]

[Textbooks]

[References, etc.]

   Reference books

[Study outside of class (preparation and review)]

   Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

[Courses delivered by instructors with practical work experience]

(1) Category
A course with practical content delivered by instructors with practical work experience

(2) Details of instructors' practical work experience related to the course

(3) Details of practical classes delivered based on instructors' practical work experience

Course number	U-ENG25 35058 EJ71		
Course title (and course title in English)	Mechanical and System Engineering Laboratory 3	**Instructor's name, job title, and department of affiliation**	Graduate School of Engineering Associate Professor,HIROTANI JUN Graduate School of Engineering Associate Professor, Graduate School of Engineering Program-Specific Associate Professor,FURUTA KOZO Graduate School of Engineering Assistant Professor,Susumu Minami Graduate School of Engineering Assistant Professor,ADACHI MASATO Graduate School of Informatics Assistant Professor,HOSHINO　KENTA Graduate School of Engineering Program-Specific Assistant Professor,Jike Han Graduate School of Informatics Assistant Professor,KATO SHOTA Graduate School of Engineering Assistant Professor,Satomi Matsumoto

Target year	3rd year students or above	**Number of credits**	1	**Year/semesters**	2025/First semester
Days and periods	Fri.4,5	**Class style**	Experiment (Face-to-face course)	**Language of instruction**	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

,1time,
,14times,

[Course requirements]

None

(2)

- -

[Evaluation methods and policy]

[Textbooks]

[References, etc.]

   Reference books

[Study outside of class (preparation and review)]

   Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

[Courses delivered by instructors with practical work experience]

(1) Category
A course with practical content delivered by instructors with practical work experience

(2) Details of instructors' practical work experience related to the course

(3) Details of practical classes delivered based on instructors' practical work experience

Course number	U-ENG25 35058 EJ71

| Course title (and course title in English) | Mechanical and System Engineering Laboratory 3 | Instructor's name, job title, and department of affiliation | Graduate School of Engineering Associate Professor,HIROTANI JUN Graduate School of Engineering Associate Professor, Graduate School of Engineering Program-Specific Associate Professor,FURUTA KOZO Graduate School of Engineering Assistant Professor,Susumu Minami Graduate School of Engineering Assistant Professor,ADACHI MASATO Graduate School of Informatics Assistant Professor,HOSHINO　KENTA Graduate School of Engineering Program-Specific Assistant Professor,Jike Han Graduate School of Informatics Assistant Professor,KATO SHOTA Graduate School of Engineering Assistant Professor,Satomi Matsumoto |

Target year	3rd year students or above	Number of credits	1	Year/semesters	2025/Second semester

Days and periods	Thu.4,5	Class style	Experiment (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

Guidance,2times,Guidance on how this class is operated, and how to use computing facility for this class. Basic knowledge on the role of IDS in network security and how machine learning can help the intrusion detection.
Intrusion Detection by Signature-Based IDS,5times,Learn the mechanism of intrusion detection by signature-based IDS by studying open source signature-based IDS and attacks, such as correspondence between alarms issued from IDS and communications, and adding signatures to detect attacks.
Intrusion Detection by Machine Learning,7times,Learn the method of classifying normal and malicious traffic by machine learning algorithms and public dataset for benchmarking intrusion detection performance.
Presentation,1time,Based on the exercise, students presents their methods of intrusion detection using machine learning, and discuss it with other students and instructors.

(2)

[Course requirements]

None

[Evaluation methods and policy]

[Textbooks]

[References, etc.]

Reference books

[Study outside of class (preparation and review)]

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

[Courses delivered by instructors with practical work experience]

(1) Category
A course with practical content delivered by instructors with practical work experience

(2) Details of instructors' practical work experience related to the course

(3) Details of practical classes delivered based on instructors' practical work experience

Course number	U-ENG25 35059 SJ71		

Course title (and course title in English)	Exercise of Machine Design 1	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,NISHIWAKI SHINJI Graduate School of Engineering Associate Professor,NAKAJIMA KAORU Graduate School of Engineering Associate Professor,FUJIMOTO KAZUYA Part-time Lecturer,Akai Kazuki Part-time Lecturer,ISOME YUKA Part-time Lecturer,Kawabata Shinichi Part-time Lecturer,Nishimura Kosuke Part-time Lecturer,Morishima Akichika

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/First semester

Days and periods	Mon.4,5,Fri.4,5	Class style	Seminar (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

,4times,
,3times,
,-times,
,21times,
,21times,
,21times,
,2times,

[Course requirements]

None

(2)

[Evaluation methods and policy]

[Textbooks]

[References, etc.]

　Reference books

[Study outside of class (preparation and review)]

　Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

[Courses delivered by instructors with practical work experience]

(1) Category
A course with practical content delivered by instructors with practical work experience

(2) Details of instructors' practical work experience related to the course

(3) Details of practical classes delivered based on instructors' practical work experience

Course number	U-ENG25 35059 SJ71		

Course title (and course title in English)	Exercise of Machine Design 1	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,NISHIWAKI SHINJI Graduate School of Engineering Associate Professor,SHIKAMA TAIICHI Graduate School of Informatics Senior Lecturer,EGUCHI KANA Part-time Lecturer,NAKAMURA KIMIO

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/First semester

Days and periods	Tue.4,5,Thu.4,5	Class style	Seminar (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

Guidance,2times,Guidance on how this class is operated, and how to use computing facility for this class. Basic knowledge on the role of IDS in network security and how machine learning can help the intrusion detection.
Intrusion Detection by Signature-Based IDS,5times,Learn the mechanism of intrusion detection by signature-based IDS by studying open source signature-based IDS and attacks, such as correspondence between alarms issued from IDS and communications, and adding signatures to detect attacks.
Intrusion Detection by Machine Learning,7times,Learn the method of classifying normal and malicious traffic by machine learning algorithms and public dataset for benchmarking intrusion detection performance.
Presentation,1time,Based on the exercise, students presents their methods of intrusion detection using machine learning, and discuss it with other students and instructors.

[Course requirements]

None

[Evaluation methods and policy]

(2)

[Textbooks]

[References, etc.]

Reference books

[Study outside of class (preparation and review)]

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

[Courses delivered by instructors with practical work experience]

(1) Category
A course with practical content delivered by instructors with practical work experience

(2) Details of instructors' practical work experience related to the course

(3) Details of practical classes delivered based on instructors' practical work experience

Course number	U-ENG25 35059 SJ71

Course title (and course title in English)	Exercise of Machine Design 1	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,NISHIWAKI SHINJI Graduate School of Engineering Associate Professor,MATSUMOTO MITSUHIRO Graduate School of Engineering Senior Lecturer,NAKANISHI HIROAKI Part-time Lecturer,YAMAMURA SHINYA Part-time Lecturer,KANATANI KENICHI

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/First semester
Days and periods	Wed.4,5,Fri.4,5	Class style	Seminar (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

Guidance,2times,Guidance on how this class is operated, and how to use computing facility for this class. Basic knowledge on the role of IDS in network security and how machine learning can help the intrusion detection.

Intrusion Detection by Signature-Based IDS,5times,Learn the mechanism of intrusion detection by signature-based IDS by studying open source signature-based IDS and attacks, such as correspondence between alarms issued from IDS and communications, and adding signatures to detect attacks.

Intrusion Detection by Machine Learning,7times,Learn the method of classifying normal and malicious traffic by machine learning algorithms and public dataset for benchmarking intrusion detection performance.

Presentation,1time,Based on the exercise, students presents their methods of intrusion detection using machine learning, and discuss it with other students and instructors.

[Course requirements]

None

[Evaluation methods and policy]

(2)

- -

[Textbooks]

[References, etc.]

   Reference books

[Study outside of class (preparation and review)]

  Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

[Courses delivered by instructors with practical work experience]

(1) Category
A course with practical content delivered by instructors with practical work experience

(2) Details of instructors' practical work experience related to the course

(3) Details of practical classes delivered based on instructors' practical work experience

Course number	U-ENG25 35060 SJ71

Course title (and course title in English)	Exercise of Machine Design 2	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,KOMORI MASAHARU Graduate School of Engineering Professor,HIRAYAMA TOMOKO Graduate School of Engineering Associate Professor,KOUNO DAISUKE Part-time Lecturer,KANEDA SHUICHI Part-time Lecturer,YUKAWA SHINJIRO

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/Second semester
Days and periods	Mon.1,2,3,4	Class style	Seminar (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

,14times,
,1time,

[Course requirements]

None

[Evaluation methods and policy]

[Textbooks]

(2)

Course number	U-ENG25 25061 PJ71

Course title (and course title in English)	Exercise for Machine Shop Practice	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,MATSUBARA ATSUSHI Graduate School of Engineering Associate Professor,KOUNO DAISUKE Graduate School of Engineering Professor,NISHIWAKI SHINJI Graduate School of Engineering Assistant Professor,KURIYAMA REIKO Institute for Life and Medical Sciences Assistant Professor,Hironori Takeda Graduate School of Engineering Assistant Professor,ADACHI MASATO Graduate School of Engineering Program-Specific Assistant Professor,Jike Han Graduate School of Informatics Assistant Professor,KATO SHOTA Graduate School of Engineering Assistant Professor,Wataru MATSUNAGA Graduate School of Engineering Assistant Professor,GUO Yuting Graduate School of Engineering Assistant Professor,Yinli Wang Part-time Lecturer,Ryuei HAKAMATA Part-time Lecturer,YUKAWA SHINJIRO Part-time Lecturer,KUSUURA TAKAHISA

Target year	2nd year students or above	Number of credits	1	Year/semesters	2025/Second semester

Days and periods	Wed.5	Class style	Practical training (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

In this training, you will gain general knowledge and experience regarding manufacturing.

This training consists of the following three.
(1) Machine manufacturing training to practice the process of creating parts with various machine tools
(2) Lectures by faculty members and mechanical engineers outside the university
(3) Factory tour

Machine manufacturing training will be conducted intensively for about a week from August to September in the machine workshop on the Katsura campus. In particular, we will focus on manufacturing parts for Stirling engines and evaluate performance after assembly. In addition, we will assemble and disassemble commercially available engines to deepen our understanding of actual mechanical elements and systems.

In the lecture, in addition to faculty members, mechanical engineers engaged in design, manufacturing, management, etc. at machine makers were invited as lecturers, and examples of machine development,

knowledge of machine technology required in the field, engine operating principles, etc. Lecture on safety engineering.

In the factory tour, you will tour the factory of the manufacturer and learn about the actual manufacturing in society.

[Course objectives]

Experience the basics of machining such as turning, milling, and drilling, and acquire basic knowledge about machine tools, machining methods, tools, measurement, machining accuracy, etc. through practical learning. Gain general knowledge about safety and manufacturing.

[Course schedule and contents]

Machine tool lecture: 1 time (1 hour)
Lecture on basic knowledge for safely using machine tools (lathes, milling machines, drilling machines) used in practical training.

Stirling engine production training: 3 times (18 hours in total)
Practicing the production of round parts (cylinders, bores, etc.) by lathe work, the production of plates (pedestals, etc.) by milling work, assembly, finishing, and evaluation of rotation speed, and manufacturing Stirling engines in pairs.

Engine operating principle: 1 time (1.5 hours)
Learn the basic knowledge of Stirling engine and diesel engine.

Engine assembly / disassembly: 1 time (7 hours)
Understand the basics of engine mechanism and machine assembly principles through the assembly and disassembly of commercially available diesel engines.

Introduction to Safety Engineering: Once (3 hours)
Lectures and discussions will be given on the mechanism of occupational accidents that occur in factories, disaster prevention technology, fall accidents, malfunctions / malfunctions in crane work, system safety in the equipment industry, etc.
[Lecturer schedule]
Mr. Kunihito Sato, Sato R & D

Manufacturing Seminar: 4 times (1.5 hours each)
Machine engineers engaged in design, manufacturing, management, etc. will be invited as lecturers to give lectures on actual examples of machine development and knowledge of machine technology required in the field.
[Lecturer schedule]
Mr. Atsushi Iejo, Okuma Corporation
Mr. Shinjiro Yukawa, Office YUKAWA
Mr. Takao Kusuura, TechnoProducer Co., Ltd.
Mr. Takashi Iwasaki, Kyoto University (formerly Mitsubishi Electric)

Factory tour: 1 time (actual time of the tour is about 4 hours)
Tour the factories of manufacturers in the Kansai region and learn about the actual manufacturing in society.

(3)

[Course requirements]

None.

[Evaluation methods and policy]

For the credit, students are in principle required to participate in all the classes, and to submit all the reports.

[Textbooks]

A textbook will be handed out in class.

[References, etc.]

Reference books

None.

Related URLs

(None.)

[Study outside of class (preparation and review)]

The review of the class is reuired for repoert writing.
The preparation for the class is occasionally required. The content for the preparation is given through PandA.

Other information (office hours, etc.)

The class overview will be presented in a guidance class for 2nd year students in Undergraduate Course Program of Mechanical and Systems Engineering in April. Detailed schedule will be given at the guidance.
 Please be aware -- a large part of this class will be offered during the summer break.
 A class guidance will be given typically in July. Its announcement will be given on PandA. All the students who want to take this class must come to this guidance.

*Please visit KULASIS to find out about office hours.

[Courses delivered by instructors with practical work experience]

(1) Category
A course with practical content delivered by instructors with practical work experience

(2) Details of instructors' practical work experience related to the course

(3) Details of practical classes delivered based on instructors' practical work experience

Course number	U-ENG25 35062 SJ75

Course title (and course title in English)	Materials Science Laboratory and Exercise 1	Instructor's name, job title, and department of affiliation	Graduate School of Engineering ALL STAFF Graduate School of Engineering Associate Professor,TABATA YOSHIKAZU

Target year	3rd year students or above	Number of credits	3	Year/semesters	2025/First semester

Days and periods	Wed.3,4,Thu.3,4	Class style	Seminar (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

,6times,
,6times,
,6times,
,6times,

[Course requirements]

None

[Evaluation methods and policy]

[Textbooks]

[References, etc.]

 Reference books

[Study outside of class (preparation and review)]

 Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 35063 SJ75		

Course title (and course title in English)	Materials Science Laboratory and Exercise 2	Instructor's name, job title, and department of affiliation	Graduate School of Engineering ALL STAFF Graduate School of Engineering Associate Professor,TABATA YOSHIKAZU

Target year	3rd year students or above	Number of credits	3	Year/semesters	2025/Second semester
Days and periods	Wed.3,4,Thu.3,4	Class style	Seminar (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

,6times,
,6times,
,6times,
,6times,

[Course requirements]

None

[Evaluation methods and policy]

[Textbooks]

[References, etc.]

   Reference books

[Study outside of class (preparation and review)]

   Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 35066 EJ77		
Course title (and course title in English)	Engineering Laboratory in Aeronautics and Astronautics 1	**Instructor's name, job title, and department of affiliation**	Graduate School of Engineering Professor,TAKATA SHIGERU Graduate School of Engineering Professor,SENDA KEI Graduate School of Engineering Assistant Professor,HATTORI MASANARI Graduate School of Engineering Assistant Professor,ISHII YOSUKE

Target year	3rd year students or above	**Number of credits**	1	**Year/semesters**	2025/First semester

Days and periods	Fri.3,4	**Class style**	Experiment (Face-to-face course)	**Language of instruction**	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

,1time,
,4times,
,4times,
,4times,

[Course requirements]

None

[Evaluation methods and policy]

[Textbooks]

(2)

[References, etc.]

   Reference books

[Study outside of class (preparation and review)]

   Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

[Courses delivered by instructors with practical work experience]

(1) Category
A course with practical content delivered by instructors with practical work experience

(2) Details of instructors' practical work experience related to the course

(3) Details of practical classes delivered based on instructors' practical work experience

Course number	U-ENG25 35067 EJ77

Course title (and course title in English)	Engineering Laboratory in Aeronautics and Astronautics 2	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,TAKATA SHIGERU Graduate School of Engineering Associate Professor,URABE KEIICHIRO Graduate School of Engineering Associate Professor,MARUTA ICHIROU Graduate School of Engineering Senior Lecturer,SUGIMOTO HIROSHI

Target year	3rd year students or above	Number of credits	1	Year/semesters	2025/Second semester

Days and periods	Tue.3,4	Class style	Experiment (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

,1time,
,4times,
,4times,
,4times,

[Course requirements]

None

[Evaluation methods and policy]

[Textbooks]

(2)

[References, etc.]

   Reference books

[Study outside of class (preparation and review)]

   Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

[Courses delivered by instructors with practical work experience]

(1) Category
A course with practical content delivered by instructors with practical work experience

(2) Details of instructors' practical work experience related to the course

(3) Details of practical classes delivered based on instructors' practical work experience

Course number	U-ENG25 35069 LJ75

Course title (and course title in English)	Structural Metalic Materials		Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,TSUJI NOBUHIRO

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/Second semester

Days and periods	Thu.2	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

Outline of Lecture,1time,
Microstructure Evolution in Cast Alloys,2times,
Deformation, Recovery, Recrystallization and Grain Growth,3times,
,3times,
Heat Treatment in Steels,5times,
Summary,1time,

[Course requirements]

None

[Evaluation methods and policy]

Attendance, exercises, home-works and exam.

[Textbooks]

[References, etc.]

Reference books

Related URLs

(http://www.tsujilab.mtl.kyoto-u.ac.jp/01TsujiLab/Education/StructMetalMater/)

[Study outside of class (preparation and review)]

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 35070 LJ75

Course title (and course title in English)	Physics of Strength of Materials		Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,INUI HARUYUKI

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/Second semester

Days and periods	Fri.1	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

This course explaines fundamentals of crystal plasticity and strength of materials including plastic deformation of crystals, yielding, work-hardening, solution hardening, precipitation hardening, properties of grain boundaries, based on dislocation theory.

[Course objectives]

This class aims to help students to acquire fundamentals of deformation of crystalline materials and also to acquire ways to interpret strength of crystalline materials based on dislocation theory.

[Course schedule and contents]

(1) Yielding in crystalline materials [2 weeks]
(2) Work hardening, solution hardening and precipitation hardening [3 weeks]
(3) Strength and toughness of composites [1 week]
(4) Dislocations in crystalline materials [6 weeks]
(5) Dislocation motions and thermal activation processes [1 week]
(6) Grain boundaies and crystal plasticity of polycrystals [1 week]
(7) Feedback [1 week]

[Course requirements]

Physics of Crystal Properties and Imperfections

[Evaluation methods and policy]

Evaluation will be based on a written examination. Daily reports may be considered in grading determination.

[Textbooks]

Hand out materials will be provided during the lecture.

[References, etc.]

　Reference books
ISBN:4750702315
J.P. Hirth and J. Lothe　　Theory of Dislocations　　McGraw-Hill　ISBN:TY86299777
J.P. Hirth and J. Lothe　　Theory of Dislocations, 2nd ed.　　Wiley　ISBN:047109125
P.M. Anderson, J.P. Hirth and J. Lothe　　Theory of Dislocations, 3rd ed.　　Cambridge University Press,

(2)

[Study outside of class (preparation and review)]

To review contents covered in the previous lecture.

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

[Courses delivered by instructors with practical work experience]

(1) Category
A course with practical content delivered by instructors with practical work experience

(2) Details of instructors' practical work experience related to the course

(3) Details of practical classes delivered based on instructors' practical work experience

Course number	U-ENG25 45071 LJ71		

Course title (and course title in English)	Physics of Solids	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Associate Professor,NAKAJIMA KAORU

Target year	4th year students or above	Number of credits	2	Year/semesters	2025/First semester

Days and periods	Tue.2	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

Crystal structure,1time,
Diffraction of waves by crystals,3~4times,
Vibrations of crystals,3~4times,
Thermal properties of crystals,2times,
Electronic dtructures of crystals,3~4times,
Assessment of achievement,1time,

[Course requirements]

None

[Evaluation methods and policy]

[Textbooks]

[References, etc.]

Reference books

quotIntroduction to solid state physicsquot by Charles Kittel isbn{}{9780471415268}, international ed. isbn{}{0471680575}

[Study outside of class (preparation and review)]

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 45073 LJ71 U-ENG25 45073 LJ75 U-ENG25 45073 LJ57

Course title (and course title in English)	Statistical Thermodynamics		Instructor's name, job title, and department of affiliation	Graduate School of Engineering Associate Professor,MATSUMOTO MITSUHIRO Graduate School of Engineering Professor,INOUE YASUHIRO

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/First semester

Days and periods	Fri.2	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

Statistical mechanics provides a firm foundation for thermodynamics. I'll give a standard course of statistical mechanics through several basic examples in various fields of science and engineering, including quantum mechanics, solid state physics, heat transfer engineering, and information technology.

[Course objectives]

- Understanding the relation between macroscopic variables and microscopic states.
 - Scientific view of various phenomena in science and engineering based on statistics.

[Course schedule and contents]

1st week: Concepts of statistical physics and Review of basic statistics
2nd week: Counting microscopic states
3rd week: Microcanonical ensemble
4th-6th weeks: Various ensembles and Free energies
7th-8th weeks: Quantum statistics (Bose-Einstein vs. Fermi-Dirac)
9th-10th weeks: Introduction to solid state physics
11th week: Photons and phonons
12th week: Polymer and other classical systems
13th week: Application to informatics
14th week: Examination
15th week: Feedback class

[Course requirements]

Basic knowledge of thermodynamics, calculus, statistics, analytical mechanics, and quantum physics will be useful.

[Evaluation methods and policy]

- Written examination
- Paper assignment

(2)

[Textbooks]

Lecture notes will be provided.

[References, etc.]

Reference books

Introduced during class

[Study outside of class (preparation and review)]

Since this class covers basics in physics with many examples encountered in science and engineering, students of various research fields are welcome.

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 45073 LJ71　U-ENG25 45073 LJ75　U-ENG25 45073 LJ57

Course title (and course title in English)	Statistical Thermodynamics	Instructor's name, job title, and department of affiliation	Graduate School of Energy Science Professor,MIYAKE MASAO

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/Second semester

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

[Overview and purpose of the course]

In this lecture, fundamental ideas of Statistical Thermodynamics which is effective to microscopic understanding of macroscopic systems and some typical applications to condensed matter physics are presentaed.

[Course objectives]

The goals of this lecture are both to understand fundamental idead of Statistical Thermodynamics and to study typical applications to condensed matter physics.

[Course schedule and contents]

Outlines,1time,Basic ideas of Statistical Thermodynamics, thermal equilibrium, fundamentals of Statistics, means of measuremnts, ergodic theory.
Themodynamic functions,1time,Thermodynamic laws, thermodynamic functions, Legendre transform, Maxwell relations, Gibbs-Helmholtz equation, thermodynamic variation, phase equilibrium.
Ideal systems,4times,Phase space of movement, Liouville#039s theorem, micro canonical ensemble,Partition function, relation between Helmholtz free energy and Partition function,Principle of Boltzmann, simple applications of microcanonical ensamble (ideal gas, elastic of gum)
,1time,
Canonical ensemble,2times,Distribution with the maximum probability, Partition function, the 3rd law of thermodynamics, Gibbs#039s paradox, grand canonical ensamble.
Quantum statistics,2times,Grad canonical ensamble of quatum statistics, Fermion and Boson, Bose-Einstein statistics, Fermi-Dirac statistics,ideal Fermi gas, electron specific heat, ideal Bose gas, Bose-Einstein condensation.
Typical applications,4times,Systems with two levels, Schottly type specific heat, Statistics of photons, Planck#039s equation, one dimansional harmonic oscillation, Einstein model and specific heat of solid states.
Evaluation od goals,1time,Understanging of typical applications of statistic themodynamics and submission of homeworks.

[Course requirements]

Students are roughly expected to have mastered basics of mathematics, dynamics, elementary quantum mechanics, thermodynamics and statistics.

(2)

[Evaluation methods and policy]

Situation of voluntary submission of some reports and score of exam are totally evaluated.

[Textbooks]

The textbook is not appointed. Writing on the blackboard is performed in every lecture.

[References, etc.]

Reference books

isbn{}{9784563021399}

N.

isbn{}{4807903225}

isbn{}{4785321342}

isbn{}{4785321350}

isbn{}{9784621027271}

isbn{}{4621048570}

W.   L.   H.

isbn{}{9784431100577}

isbn{}{478532807X}

[Study outside of class (preparation and review)]

Other information (office hours, etc.)

2nd year students may undestand this lecture if they catch on basics of physics.

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 45087 LJ71		

Course title (and course title in English)	Quality Control	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,NISHIWAKI SHINJI Graduate School of Engineering Professor,IZUI KAZUHIRO Part-time Lecturer,Kikkawa Toyotsugu

Target year	4th year students or above	Number of credits	2	Year/semesters	2025/First semester

Days and periods	Wed.4	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

This course deals with the basics of quality control methodologies and reliability engineering techniques.

[Course objectives]

The goal is to understand the concept of numerical and strategic approaches of quality control techniques.

[Course schedule and contents]

Introduction,1time,
Statistics and hypothesis testing,2times,
Statistical process control,2times,
Design of experiments,2times,
Analysis of variance,2times,
Application of design of experiments,2times,
Reliability,4times,

[Course requirements]

None

[Evaluation methods and policy]

The regular examination, in-class examinations and reports are taken into account.

[Textbooks]

Not used

[References, etc.]

  Reference books

[Study outside of class (preparation and review)]

Homework problems are assigned.

 Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 35096 LJ68 U-ENG25 35096 LJ57

Course title (and course title in English)	Molecular Biophysics	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Associate Professor,TSUCHIDA HIDETSUGU Institute for Integrated Radiation and Nuclear Science Professor,TANAKA HIROKI Institute for Integrated Radiation and Nuclear Science Associate Professor,SAKURAI YOSHINORI Institute for Integrated Radiation and Nuclear Science Associate Professor,Watanabe Tsubasa Institute for Integrated Radiation and Nuclear Science Assistant Professor,TAKATA, Takushi Institute for Integrated Radiation and Nuclear Science Assistant Professor,Kondo Natsuko Institute for Integrated Radiation and Nuclear Science Assistant Professor,SANADA YU

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/First semester

Days and periods	Mon.2	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

,1time,
,2times,
,1time,
,1time,
,1time,
,1time,
,1time,
,1time,
,1time,
,1time,
,1time,
,1time,
,1time,
,1time,

(2)

[Course requirements]

None

[Evaluation methods and policy]

[Textbooks]

[References, etc.]

　Reference books

[Study outside of class (preparation and review)]

　Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 45099 LJ71

Course title (and course title in English)	Precision Machining		Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,MATSUBARA ATSUSHI Graduate School of Engineering Associate Professor,KOUNO DAISUKE

Target year	4th year students or above	Number of credits	2	Year/semesters	2025/First semester

Days and periods	Tue.1	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

The concept of precision required for functional parts is described, and then the machining methods and machines such as machine measurement, cutting / grinding / polishing are described. In addition, the beam processing method, special processing method, and additive manufacturing will be explained.

[Course objectives]

Understand the basic items of removal processing, its processing machine, beam processing, which are the basis of precision processing, and their applications. By acquiring the basic knowledge of the latest machine manufacturing, you will be able to explain the mechanism of the machine manufacturing process.

[Course schedule and contents]

1. The accuracy required for parts and measuring instruments, 3 times, precision machine parts are illustrated, and the accuracy required for parts is outlined. In addition, the measuring instrument is described together with the measurement principle, and the processing method of measurement data is described.
2. Precision cutting / grinding / polishing, 4 times, the principle of precision cutting / grinding / polishing, dynamics, typical tool materials and their selection methods are explained.
3. Machine tools, once, describe the basic structure and components of machine tools.
4. The concept and measurement method of motion accuracy, twice, machine tool motion accuracy are described.
5. The basics of beam processing, once, processing using a laser beam or electron beam will be explained.
6. The principle of additional processing, once, and additional processing is described.
7. Special processing methods such as special processing, one-time processing, micro processing, ultra-precision processing, electric discharge machining, and etching will be explained.
8. Latest processing technology, once, the trend of research and development on the latest processing technology and processing technology.
9. Summary / Feedback, 1 time,

[Course requirements]

Knowledge of mechanical design and manufacturing is required. It is desirable to take machine manufacturing training(Kikai Seisaku Jissyu).

(2)

[Evaluation methods and policy]

Depends on the test score. Test whether you can acquire the knowledge shown in the goal and solve the problem by applying it.

[Textbooks]

Not used

[References, etc.]

　　Reference books

[Study outside of class (preparation and review)]

Review the materials distributed after each lecture. Perform the tasks given during the class to deepen your understanding.

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

[Courses delivered by instructors with practical work experience]

(1) Category
A course with practical content delivered by instructors with practical work experience

(2) Details of instructors' practical work experience related to the course

(3) Details of practical classes delivered based on instructors' practical work experience

Course number	U-ENG25 35102 LJ75		

Course title (and course title in English)	Electrochemistry of Materials Processing	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,MURASE KUNIAKI Graduate School of Engineering Professor,FUKAMI KAZUHIRO

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/First semester
Days and periods	Wed.1	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

This course serves the fundamentals related to solution chemistry of electrolytes and electrode reactions, which become the basis of wet processing such as electrolytic refining, electrowinning, corrosion, anticorrosion, and functional electrodeposition.

[Course objectives]

In this course students learn basic technical terms and basic concepts of physical chemistry, which are necessary to study materials science and engineering from the viewpoints of solution chemistry and electrochemistry, to take subsequent advanced courses on materials science and engineering.

[Course schedule and contents]

Overview 1 time

Solution chemistry of electrolytes, 2 times, acid-base reactions, redox reactions, equilibrium of them.

Introduction of electrode potential and its relation to chemical thermodynamics, 4 times, explanation of electrode surface as an interface for exchange the carrier, explanation of the concept of electrode potential and Nernst's equation.

Electrolysis, 1 time, explanation on the importance of three electrode setup (working, counter and reference electrodes).

Electrode reactions, 4 times, explanation on the fundamentals of electrochemical reaction rate on a electrode surface toward understanding of batteries and corrosion, explanation on the relation between current and potential, overpotential, diffusion-limitation of reactants.

Transfer of ions, 2 times, explanation on the transfer of ions in solution for understanding diffusion potential and liquid junction potential.

Summary, 1 time.

(2)

[Course requirements]

Knowledge given in Thermodynamics of Materials 2 (by Prof. Uda) is preferable.

[Evaluation methods and policy]

(1) Class participation, (2) take-home assignments, and (3) exams. Students will sign a roll sheet every class.
Supplementary examination to bail out low-performing students will not be given for any reason.

[Textbooks]

A course booklet written in Japanese will be given out at the first lecture.

[References, etc.]

Reference books

[Study outside of class (preparation and review)]

Reports given in the lectures will return after checking.
Brush up according to the reports returned.

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 45107 SJ77 U-ENG25 45107 SJ57 U-ENG25 45107 SJ28

Course title (and course title in English)	Basic Nuclear Reactor Exercise and Experiments	Instructor's name, job title, and department of affiliation	Institute for Integrated Radiation and Nuclear Science Professor,UNESAKI HIRONOBU Institute for Integrated Radiation and Nuclear Science Professor,MISAWA TSUYOSHI Institute for Integrated Radiation and Nuclear Science Associate Professor,PIYON CHIYORUHO Institute for Integrated Radiation and Nuclear Science Associate Professor,YASUNORI KITAMURA

Target year	4th year students or above	Number of credits	2	Year/semesters	2025/First semester

Days and periods	Mon.3,4	Class style	Seminar (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

Basic reactor physics experiments using Kyoto University Critical Assembly (KUCA) which is a small and low power reactor are carried out. Guidance and lectures before experiments are perfomed at Yoshida main campus, and experiments are perfomed at Research Reactor Institute (Osaka Kumatori-cho).

[Course objectives]

Understanding nuclear characteristics and safety system of nuclear reactor through reactor physics experiments

[Course schedule and contents]

Guidance,6times,Guidance and lectures for experiments are performed at Yoshida main campus. Experiment,1time,Experiments are performed at Research Reactor Institute (Kumatori-cho, Osaka) for 1 week. 1) guidance 2) criticality approach experiment 3) control rod caribration experiment 4) neutron flux measurement experiment 5) operation of nuclear reactor

[Course requirements]

Basic knowledge about reactor physic

[Evaluation methods and policy]

reports before and after experiments

[Textbooks]

Korean version is available

[References, etc.]

Reference books

Introduced during class

[Study outside of class (preparation and review)]

Before experiment, several reports related to reactor physics should be submitted.

Other information (office hours, etc.)

English course for this experiment is opened.

*Please visit KULASIS to find out about office hours.

[Courses delivered by instructors with practical work experience]

(1) Category
A course with practical content delivered by instructors with practical work experience

(2) Details of instructors' practical work experience related to the course

(3) Details of practical classes delivered based on instructors' practical work experience

Course number	U-ENG25 15110 LJ71 U-ENG25 15110 LJ77

Course title (and course title in English)	Introduction to Engineering Science A	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,HIRAKATA HIROYUKI Graduate School of Engineering Professor,SHIMADA TAKAHIRO Graduate School of Engineering Professor,KUROSE RYOUICHI Graduate School of Engineering Professor,NAGATA KOJI Graduate School of Engineering Professor,KOH HOSODA Graduate School of Informatics Professor,AZUMA SHUNICHI Graduate School of Engineering Associate Professor,HIROTANI JUN Institute for Life and Medical Sciences Professor,SHINTAKU HIROFUMI Graduate School of Engineering Professor,HASUO MASAHIRO Graduate School of Engineering Associate Professor, Graduate School of Engineering Professor,OOWADA TAKU Graduate School of Engineering Professor,SENDA KEI Graduate School of Engineering Professor,TAKATA SHIGERU Graduate School of Engineering Professor,BIWA SHIRO

Target year	1st year students or above	Number of credits	2	Year/semesters	2025/First semester

Days and periods	Wed.5	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

[Course objectives]

(2)

[Course schedule and contents]

,10times,
,4times,
,1time,

[Course requirements]

None

[Evaluation methods and policy]

[Textbooks]

[References, etc.]

Reference books

[Study outside of class (preparation and review)]

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 15111 LJ28 U-ENG25 15111 LJ77 U-ENG25 15111 LJ75

Course title (and course title in English)	Introduction to Engineering Science B	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,TSUJI NOBUHIRO Graduate School of Engineering Professor,UDA TETSUYA Graduate School of Engineering Professor,MURASE KUNIAKI Graduate School of Engineering Associate Professor,ICHII TAKASHI Graduate School of Engineering Associate Professor,YUGE KORETAKA Graduate School of Energy Science Professor,IMATANI SHIYOUJI Graduate School of Energy Science Professor,MIYAKE MASAO Graduate School of Energy Science Associate Professor,IKENOUE TAKUMI Graduate School of Engineering Senior Lecturer,NARITA EMI Graduate School of Engineering Professor,TAKAGI IKUJI Graduate School of Engineering Professor,YOKOMINE TAKEHIKO Graduate School of Engineering Professor,SAITOU MANABU

Target year	1st year students or above	Number of credits	2	Year/semesters	2025/Second semester

Days and periods	Tue.1	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

,1time,
,5times,
,4times,
,4times,
,1time,

(2)

[Course requirements]

None

[Evaluation methods and policy]

[Textbooks]

[References, etc.]

　Reference books

[Study outside of class (preparation and review)]

　Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

[Courses delivered by instructors with practical work experience]

(1) Category
A course with practical content delivered by instructors with practical work experience

(2) Details of instructors' practical work experience related to the course

(3) Details of practical classes delivered based on instructors' practical work experience

Course number	U-ENG25 35115 LJ53　　U-ENG25 35115 LJ72		
Course title (and course title in English)	Particle Accelerators	**Instructor's name, job title, and department of affiliation**	Graduate School of Engineering Associate Professor,TSUCHIDA HIDETSUGU
Target year	3rd year students or above	**Number of credits** 2 **Year/semesters**	2025/First semester
Days and periods Wed.1	**Class style**	Lecture (Face-to-face course)	**Language of instruction** Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

,2times,
,2times,
,3times,
,2times,
,2times,
,3times,
,1time,

[Course requirements]

None

[Evaluation methods and policy]

[Textbooks]

[References, etc.]

Reference books

[Study outside of class (preparation and review)]

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 35116 LJ60　　U-ENG25 35116 LJ77

Course title (and course title in English)	Radiochemistry		Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,SASAKI TAKAYUKI Graduate School of Engineering Associate Professor,TAISHI KOBAYASHI

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/Second semester

Days and periods	Mon.1	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

Lectures on the use of radionuclides, recycling of spent fuel and disposal of radioactive waste, physicochemical fundamentals related to the reactivity of radioactive materials, and essential analytical methods for material state analysis.

[Course objectives]

The course objective is to develop an understanding of the physicochemical properties and reactivity of radioactive materials, and to learn the latest research and engineering applications based on these principles.

[Course schedule and contents]

The main contents of each class session are as follows:

1) Atoms, nuclei, and isotopes
2) Mass, decay and half-life, radiation equilibrium
3) Nuclide, Dating, Tracer Chemistry
4) Dilution analysis, NAA, Cross section, Applied use (analysis, source)
5-6) Nuclear Fuel Cycle (Cycle Engineering: Nuclear Fuel, Refining, Compounding)
7) Outline of Geological Disposal (Advection Dispersion Diffusion,Chemical Equilibrium)
8) Actinide Chemistry (Analysis, Spectroscopy)
9) Environmental Radioactivity
10-11)Chemical Thermodynamics(complexation,solubility)
12) Electrochemistry (redox, electric double layer)
13) Reprocessing (extraction equilibrium, extractant, countercurrent distribution)
14) Waste treatment (ion exchange reaction, membrane equilibrium)
15) Feedback; confirmation of learning achievement

[Course requirements]

N/A

(2)

[Evaluation methods and policy]

Grading is based on the score of the periodic evaluations. Students will be evaluated based on their demonstrated understanding of the physicochemical properties and reactivity of radioactive materials and the engineering processes involved.

[Textbooks]

Other materials are not specified. Handouts, etc. will be distributed during lectures.

[References, etc.]

Reference books

Other, Radiochemistry and Nuclear Chemistry, 4th ed., G. R. Choppin et al., Elsevier (2013) isbn{9780124058972};
 Nuclear Chemical Engineering, 2nd Ed., M. Benedict et al., McGraw-Hill (1981) isbn{0070045313}, etc.

[Study outside of class (preparation and review)]

Focusing on reviewing lecture content and exercises is advisable.

Other information (office hours, etc.)

Attend as needed. Some materials may be omitted or added depending on the number of classes in the relevant year.

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 35118 LJ75		

Course title (and course title in English)	Thermochemistry for Energy and Materials Science 1	Instructor's name, job title, and department of affiliation	Graduate School of Energy Science Associate Professor,HASEGAWA MASAKATSU

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/First semester
Days and periods	Mon.3	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

This course will provide fundamentals of thermochemistry, which will be necessary to think about environmental-friendly materials production / recycling processes.

[Course objectives]

Students will be able to calculate thermochemical properties of pure substances, mixtures and solutions, and use phase diagrams.

[Course schedule and contents]

1st, 2nd and 3rd laws of thermodynamic(3 weeks)
Ellingham diagram and equilibrium in gas phase(3 weeks)
Activity in binary solution(2 weeks)
Phase diagram of binary system(3 weeks)
Standard state of activity(2 weeks)
Review(1 week)
Feedback(1 week)

[Course requirements]

None

[Evaluation methods and policy]

Results are evaluated by a term-end examination.
However, there are cases where the results of the quizzes in the lectures are considered.

[Textbooks]

Instructed during class

[References, etc.]

Reference books

David R. Gaskell　Introduction to metallurgical thermodynamics　Scripta Pub. Co　ISBN:0070229457
Seshadri Seetharaman ed.　Treatise on process metallurgy, vol.1 Process fundamentals　Elsevier　ISBN: 9780080969862

(2)

Related URLs

http://www.lupin.mtl.kyoto-u.ac.jp/class.html

[Study outside of class (preparation and review)]

In order to be useful for review, quizzes submitted will be returned after checking.

Other information (office hours, etc.)

Please bring a scientific calculator and a ruler.

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 35119 LJ75

Course title (and course title in English)	Thermochemistry for Energy and Materials Science 2	Instructor's name, job title, and department of affiliation	Graduate School of Energy Science Associate Professor,HASEGAWA MASAKATSU

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/Second semester

Days and periods	Mon.2	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

This course will provide fundamentals of thermochemistry, which will be necessary to think about environmental-friendly materials production / recycling processes.

[Course objectives]

Students will be able to calculate thermochemical properties of pure substances, mixtures and solutions, and use phase diagrams.

[Course schedule and contents]

Regular solution model(3 weeks)
Gibbs-Duhem equation(1 week)
Henrian activity(1 week)
Gibbs phase rule(3 weeks)
Phase diagram of ternary system(4 weeks)
Nernst equation(1 week)
Review(1 week)
Feedback(1 week)

[Course requirements]

None

[Evaluation methods and policy]

Results are evaluated by a term-end examination.
However, there are cases where the results of the quizzes in the lectures are considered.

[Textbooks]

Instructed during class

[References, etc.]

Reference books
David R. Gaskell   Introduction to metallurgical thermodynamics   Scripta Pub. Co   ISBN:0070229457
Seshadri Seetharaman ed.   Treatise on process metallurgy, vol.1 Process fundamentals   Elsevier   ISBN: 9780080969862

Related URLs
http://www.lupin.mtl.kyoto-u.ac.jp/class.html

[Study outside of class (preparation and review)]

In order to be useful for review, quizzes submitted will be returned after checking.

Other information (office hours, etc.)

Please bring a scientific calculator and a ruler.

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 35121 LJ75

Course title (and course title in English)	Electon Theory of Solids	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Associate Professor,KUROKAWA SHIYUU

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/First semester

Days and periods	Tue.1	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

This course focuses on the electron theory of solids and its applications. First, we review the concept of energy bands and the basics of band theory. Next, we discuss the fact that the electronic properties of solids such as metals and semiconductors can be explained by thinking in terms of band structure. Next, we gain an understanding of semiconductor properties based on information about bands. We also discuss the main structural characteristics of actual electronic devices such as p-n junctions. Finally, we explain the electronic states and electronic defect states of surfaces/interfaces with interrupted solid periodic potential.

[Course objectives]

Understand concepts that are important in discussing electrons in solids (refer to syllabus). Understand general information concerning the electronic properties of metal and semiconductors.

[Course schedule and contents]

Energy bands, 4 classes: Review free electron theory, the influence of periodic potential, the occurrence of energy gaps, Bloch's theorem, one-dimensional energy bands, reduced zones, expanded zones, periodic zone schemes, reciprocal lattices and Brillouin zones.
Fermi surfaces and band structure of metal, 3 classes: Three-dimensional lattice Fermi surfaces and energy band diagrams, differences between metal and insulators, band structure of metal, rigid band model, Hume-Rothery rules.
Semiconductors, 4 classes: Movement of Bloch electrons in electric fields, concept of effective mass, movement of electron holes, Fermi level and carrier density, intrinsic semiconductors, extrinsic semiconductors, p-n junctions, carrier diffusion, operating principles of transistors.
Surface/interface/defect electronic states, 2 classes: Notation of electron arrangement in crystal surfaces, band structure of surfaces, work functions, surface electronic states.
Latest topics, 1 class: Discuss the latest research and technologies related to the content of the course. Review the course overall and confirm the degree of learning attainment.

[Course requirements]

Students should have completed the solid state physics course offered by the Department of Physical Scienceand Engineering.

(2)

[Evaluation methods and policy]

Final test, quizzes

[Textbooks]

Printouts will be provided

[References, etc.]

Reference books

ISBN:9784621076538
ISBN:9784753655533

[Study outside of class (preparation and review)]

do exercises at course printouts

Other information (office hours, etc.)

In addition, course printouts will be distributed

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 35124 SJ77 U-ENG25 35124 SJ71

Course title (and course title in English)	Internship	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,TSUCHIYA TOSHIYUKI Graduate School of Engineering Professor,NAGATA KOJI

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/Intensive, Second semester

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

[Overview and purpose of the course]

The aim of the internship is experiencing on-site activities involved production, manufacturing, development, designing and research of industrial goods at a factory or a research laboratory of Japanese leading companies. On-site learning of the importance of teamwork and production processes in manufacturing is also the aim.

[Course objectives]

The goal of the internship is to master a general method of thinking and methodology at Mechanical Engineering. Furthermore, by learning the relationship between a human and machines at an industry, motivate oneself to study and think about one's career development.

[Course schedule and contents]

As a general rule, the internship should meet the above purpose. The duration should be not less than two weeks. Thus, the following cases are not approved as an internship; a short internship such as a week, a company tour, a company explanation meeting and so on. Longer term more than two weeks and an overseas internship such as IAESTE can be acceptable.
Internship location: Based on recruitment from companies. You can find them at company's web sites and/or the educational affairs office of the Engineering Science office (Butsuri Kyoumu).

[Course requirements]

None

[Evaluation methods and policy]

Credits (2) are approved based on the summary report (50%) and presentation (50%) about the internship activities.

[Textbooks]

Not used

[References, etc.]

Reference books

[Study outside of class (preparation and review)]

Consult with the internship host location.

Other information (office hours, etc.)

Pre-registration at the educational affairs office of the Engineering Science (Butsuri Kyoumu) is required.

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 35124 SJ77 U-ENG25 35124 SJ71		

Course title (and course title in English)	Internship	Instructor's name, job title, and department of affiliation	Graduate School of Engineering KANKEI KYOIN Graduate School of Engineering Professor,MAJIMA TAKUYA

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/Intensive, Second semester

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

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

,,
,,

[Course requirements]

None

[Evaluation methods and policy]

[Textbooks]

[References, etc.]

  Reference books

(2)

[Study outside of class (preparation and review)]

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

[Courses delivered by instructors with practical work experience]

(1) Category
A course that includes off-campus training classes.

(2) Details of instructors' practical work experience related to the course

(3) Details of practical classes delivered based on instructors' practical work experience

Course number	U-ENG25 35125 LE77 U-ENG25 35125 LE48		

Course title (and course title in English)	English for Engineering Science	Instructor's name, job title, and department of affiliation	Graduate School of Engineering KANKEI KYOIN Graduate School of Engineering Professor,HINOKI TATSUYA Graduate School of Engineering Professor,MAJIMA TAKUYA
Target year	4th year students or above	**Number of credits** 2	**Year/semesters** 2025/Intensive, First semester
Days and periods	Intensive	**Class style** Lecture (Face-to-face course)	Language of instruction Japanese and English

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

,14times,
,1time,

[Course requirements]

None

[Evaluation methods and policy]

[Textbooks]

[References, etc.]

   Reference books

[Study outside of class (preparation and review)]

   Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 25127 LJ71		

Course title (and course title in English)	Design and Manufacturing Processes	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,MATSUBARA ATSUSHI Graduate School of Engineering Professor,NISHIWAKI SHINJI

Target year	2nd year students or above	Number of credits	2	Year/semesters	2025/First semester

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

[Overview and purpose of the course]

In lectures, students are taught how production efficiency and production cost in machine production correlate with dimension and shape accuracy, quality, life span, and performance of a product. In addition, lectures explain the processing principles and practice of various processing methods used during production in machine manufacturing.

[Course objectives]

To acquire basic and general knowledge about the structure of machines, design of systems, and manufacturing methods.

[Course schedule and contents]

Mechanisms of machine products & outline of machine manufacturing, 3 sessions, an outline is given on the mechanisms of machine products. In addition, the relationship between the function, shape and precision required for machine products, and how these qualities relate to manufacturing cost are explained, and an overview is given on the methods used to process parts and the procedure for these methods.
Manufacture of semi-finished materials, 4 sessions, the principles and practice of processing methods such as casting, forging, welding, and fabricating sheet metal for the manufacture of semi-finished materials are described, and an explanation is given on which methods are suited for manufacturing the semi-finished materials of different parts.
Methods of finish processing, 7 sessions, the principles and practice of the process in which machine parts are manufactured by applying finish processing (represented by cutting, grinding, and abrasive machining) to semi-finished materials are described, and an explanation is given on which methods of finish processing should be applied to the semi-finished materials of different parts.
Confirmation of learning achieved, 1 session

[Course requirements]

None

[Evaluation methods and policy]

Evaluation is based on performance in teaching sessions and an end-of-term examination. As a general rule, the examination makes up 80% of the final grade, while performance in teaching sessions makes up 20%.

(2)

[Textbooks]

Not used

[References, etc.]

Reference books

Chichiiwa, K. (ed.), Kikai seisaku-hou tsuuron-jou, (University of Tokyo Press, 1982) ISBN: 4130650343

[Study outside of class (preparation and review)]

Report assignments may be assigned.

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

[Courses delivered by instructors with practical work experience]

(1) Category
A course with practical content delivered by instructors with practical work experience

(2) Details of instructors' practical work experience related to the course

(3) Details of practical classes delivered based on instructors' practical work experience

Course number	U-ENG25 35128 LJ77

Course title (and course title in English)	Systems Engineering	Instructor's name, job title, and department of affiliation	Graduate School of Energy Science Professor,KAWANABE HIROSHI

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/Second semester

Days and periods	Wed.1	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

Systems engineering is basic idea about a system assembled with some elements. In the course, modeling method of a system, function analysis, economical evaluation, optimization method and reliability analysis are offered. Also, energy system as one of application cases; a thermal and power plant is lectured.

[Course objectives]

- To understand a variety of method and characteristics of system analysis.

- To acquire the basic knowledge to optimize the energy systems.

[Course schedule and contents]

1. Introduction of systems engineering(2): Lectures on definition and structure of a system and basic performance of a system. Also, lecture the basics of systems engineerings.

2. Schedule planning method(2): Lectures on the method of a program for work processes. "Program Evaluation and Review Technique" and "Critical Path Method" are lectured.

3. Linear programming(5): Lectures on LP method for the optimization of a system. For the application example, analysis of energy system is also offered.

4. Decision-making problem(2): Lectures on a modeling of decision-making process and method for optimization.

5. System reliability analysis(2): Lectures on a system design and reliability analysis method.

6. Application for a energy system(2): Systems engineering method is applied to thermal and power plants.

[Course requirements]

None

(2)

[Evaluation methods and policy]

Evaluate by report(s) and examination.

[Textbooks]

Instructed during class

[References, etc.]

Reference books

Introduced during class

[Study outside of class (preparation and review)]

Instruct in class.

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

[Courses delivered by instructors with practical work experience]

(1) Category

(2) Details of instructors' practical work experience related to the course

(3) Details of practical classes delivered based on instructors' practical work experience

Course number	U-ENG25 35129 LJ75

Course title (and course title in English)	Structural Properties of Materials		Instructor's name, job title, and department of affiliation	Graduate School of Engineering Associate Professor,NOSE YOSHITAROU Graduate School of Engineering Professor,TSUJI NOBUHIRO
Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/First semester
Days and periods	Tue.3	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

The properties of metals and alloys strongly depend on thier microstructures, which are controlled by processing. We give the lecture on formation mechanism on micro- and nano-structures in metals and alloys from the atomistic viewpoints and thermodynamics. Through the lecture, how to control or utilize practical materials are studied.

[Course objectives]

To study relationship between microstructures and properties in metals and alloys. To understand formation mechanism of microstructures through each phase transformation and its control.

[Course schedule and contents]

(1) Thermodynamics and phase diagram in alloy systems [7 weeks]
(2) Thermodynamics and atomic diffusion [1-2 weeks]
(3) Phase transformation through diffusion [5-6 weeks]
(4) Feedback [1 week]

[Course requirements]

None

[Evaluation methods and policy]

Evaluation will be based on a written examination.
In some cases, reports and quizzes are considered.

[Textbooks]

Utilizing resumes provided in the lecture.

[References, etc.]

Reference books
Introduced during class

[Study outside of class (preparation and review)]

To review contents in the last time before the lecture.
See lecture videos if necessary.

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 25133 LJ75

Course title (and course title in English)	Fundamentals of Materials Science	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,MURASE KUNIAKI

Target year	2nd year students or above	Number of credits	2	Year/semesters	2025/First semester

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

[Overview and purpose of the course]

Based primarily on the solid-state chemistry, this course serves the outline of notation (descriptive method) and analytical techniques for solid substances, which become the basis of materials science and materials engineering.

[Course objectives]

Basic knowledges of physics, chemistry, mathematics, etc. are requires to learn materials science and materials engineering. In this course students learn basic technical terms and develop fundamental concepts of solid-state materials chemistry, to take subsequent advanced courses on materials science and materials engineering.

[Course schedule and contents]

Substances and materials, 1 time, Three states of matter; Amorphous and glasses; Liquid crystal; Materials structures and properties in our surrounding living environment.
Fundamentals of crystal structures, 3 times, Close packing and holes; Crystal structure of metals; Point symmetry and space symmetry; Lattice and unit structure; Crystal system and Bravais lattice; Depiction of lattice plane and lattice direction; Fractional coordinates.
Fundamentals of chemical bond theory, 2 times, Electronic configuration and shielding; Size of atoms and ions; Covalency and ionicity; Definition of electronegativity.
Inorganic solid-state materials, 3 times, Structure of important ionic crystals; Stoichiometry and lattice defects; Ionic conduction and solid electrolytes; Crystal field and optical properties of d-block elements.
Fundamentals of diffraction crystallography, 5 times, Generation and properties of X-ray; Fundamentals of X-ray scattering and diffraction (Bragg condition, structure factor, extinction rule); Powder X-ray diffractometry; Laue method
Self-assessment of achievement, 1 time, Review of the course contents

[Course requirements]

Knowledge of physics and chemistry for the entrance examination of Kyoto University.

(2)

- -

[Evaluation methods and policy]

(1) Class participation, (2) take-home assignments (approx. 50% in total), and (3) exams (approx. 50%). Students will sign a roll sheet every class. Ten written take-home assignments are due throughout the semester. Supplementary examination to bail out low-performing students will not be given for any reason.

[Textbooks]

No textbook is required for this course. A course booklet will be given out at the first lecture.

[References, etc.]

Reference books

B. D. Cullity, S.R. Stock   Elements of X-Ray Diffraction (3rd ed.)   Prentice Hall   ISBN: 9780201610918
L. Smart, E. Moore   Solid State Chemistry: An Introduction (4th ed.)   CRC Press   ISBN: 9781439847909
A. R. West   Solid State Chemistry and Its Applications (2nd ed.)   Wiley   ISBN:9781119942948

Related URLs

(Not available)

[Study outside of class (preparation and review)]

The take-home assignments and their suggested answers should effectively be used for preparation and review.

Other information (office hours, etc.)

Not available

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 25134 LJ75		

Course title (and course title in English)	Statistical Physics of Materials	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Associate Professor,TABATA YOSHIKAZU Graduate School of Engineering Associate Professor,YUGE KORETAKA

Target year	2nd year students or above	Number of credits	2	Year/semesters	2025/Second semester

Days and periods	Tue.2	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

First and second law of thermodynamics, Irreversible process,2times,
Thermodynamic functions, Phase Equilibrium and Phase Transition,2times,
Analytical mechanics and concept of statistical mechanics,3times,
Basic of classical statistical thermodynamics,2times,
,3times,
Quantum statistical thermodynamics,3times,
Check of acquisition,1time,

[Course requirements]

None

[Evaluation methods and policy]

[Textbooks]

[References, etc.]

　　Reference books

[Study outside of class (preparation and review)]

　Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 25135 LJ75

Course title (and course title in English)	Fundamentals of Materials Science 1	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,KISHIDA KIYOUSUKE Graduate School of Engineering Associate Professor,NOSE YOSHITAROU

Target year	2nd year students or above	Number of credits	2	Year/semesters	2025/Second semester

Days and periods	Wed.1	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

To understand structures in solids, mainly metal crystals, from the viewpoint of atomic interaction. Based on the knowledge, to study fundamental characteristics of lattice defects and properties in crystalline solid materials controlled by it, in particular diffusion and mechanical strength.

[Course objectives]

The aim of this lecture is to learn a way of considering to understand diffusion and mechanical properties in addition to fundamental studies on crystals and lattice defects.

[Course schedule and contents]

(1) Structure of solids   1 week
(2) Lattice defects   1 week
(3) Phenomenology of diffusion in crystals   1 week
(4) Microscopic understanding of diffusion   2 weeks
(5) Thermodynamics and diffusion   2 weeks
(6) Mid-term exam   1 week
(7) Deformation of crystalline materials   2 weeks
(8) Plastic deformation of single crystals of metallic materials   2 weeks
(9) Plastic deformation of polycrystalline metals   2 weeks
(10) Deformation twinning and creep deformation   1 week

[Course requirements]

None

[Evaluation methods and policy]

A end-term examination will be a main part of grading determination. Mid-term exam and daily reports may be considered in grading determination. The allocation of marks is 50 for each Kishida's and Nose's part. The students will fail as zero if they do not submit any reports.

(2)

[Textbooks]

Utilizing resumes provided in the lecture.

[References, etc.]

Reference books

Introduced during class

[Study outside of class (preparation and review)]

To review contents in the last time before the lecture.
See lecture videos if necessary.

Other information (office hours, etc.)

A part of themes will be added or omitted depending on a number of classes in the term.

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 25136 LJ75

Course title (and course title in English)	Fundamentals of Materials Science 2		Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,FUKAMI KAZUHIRO Graduate School of Engineering Associate Professor,ICHII TAKASHI

Target year	2nd year students or above	Number of credits	2	Year/semesters	2025/Second semester

Days and periods	Thu.2	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

This lecture focuses on symmetry, tensor and elastodynamics that are of importance for materials science.

[Course objectives]

To understand the role of symmetry, tensor and elastodynamics on materials science.

[Course schedule and contents]

Vector and tensor,4-5times,Fundamentals of vector and tensor
Symmetry in molecules and crystals,4-5times,Fundamentals of symmetry in molecules and crystals
Elastodynamics,4-5times,Fundamentals of elastodynamics

[Course requirements]

Fundamentals of thermodynamics

[Evaluation methods and policy]

Grading is due to the term-end examination. The record of attendance may be taken into account.

[Textbooks]

Handouts will be given in lectures.

[References, etc.]

   Reference books

[Study outside of class (preparation and review)]

   Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 35139 LJ76

Course title (and course title in English)	Energy Chemistry 1		Instructor's name, job title, and department of affiliation	Graduate School of Energy Science Professor,MATSUMOTO KAZUHIKO

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/First semester

Days and periods	Tue.2	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

Fundamental chemistry such as quantum chemistry, solid state chemistry, physical chemistry will be described in this course for deeper understanding of energy conversion and applications. Especially chemical bonding and structures and their energetics will be discussed in this course.

[Course objectives]

Deeper understanding of energy conversion and applications from the viewpoint of chemistry

[Course schedule and contents]

Atomic structure,2times,Understanding of fundamentals of inorganic chemistry such as atomic orbital, electronic structure of many-electron atoms, atomic radii, ionic radii, lanthanide contraction, ionization potential, electron affinity and electronegativ.
,3times,Understanding of fundamentals of inorganic solid state chemistry such as crystal lattice, symmetry of crystal, close packing structure, metals, alloys, intermetallic compounds, ionic crystals and covalent crystals
,2times,The factors such as ionic radii, coordination number, lattice energy affecting the crystal structure will be described. Thermochemistry of solid compounds will be discussed.
,3times,Chemical bonding theory and energetics such as Lewis structure, resonance structure, valence bond theory, molecular geometry and VSEPR theory, hybridization orbital, molecular orbital, bond length, bonding radii, bond energy will be described.
,2times,Symmetry operation and symmetry elements, molecular point groups will be described. Applications to molecular orbitals, molecular vibration, vibrational spectroscopies will be discussed.
,3times,Concepts and theory of Bronsted acids and bases, Lewis acids and bases, their reactions, solvent effects will be described. Learning achievement evaluation will be made in the last class.

[Course requirements]

None

[Evaluation methods and policy]

Overall evaluation of the activity in the class, homework, and term-end exam

(2)

[Textbooks]

Shriver amp Atkins#039 Inorganic Chemistry, the 6th ed., Oxford University Press.

[References, etc.]

Reference books

[Study outside of class (preparation and review)]

Other information (office hours, etc.)

Homeworks will be occasionally assigned as supplementary exercises. Depending on the progress in the class, schedule may be partially changed. Homeworks and supplementary materials are provided at URL:http://www.echem.energy.kyoto-u.ac.jp The text book will be used in Energy chemistry II held in fall semester.

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 35140 LJ76

Course title (and course title in English)	Energy Chemistry 2		Instructor's name, job title, and department of affiliation	Graduate School of Energy Science Professor,MATSUMOTO KAZUHIKO

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/Second semester

Days and periods	Fri.4	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

The lecturer teaches fundamental matters in inorganic chemistry related to energy conversion and storage. In particular, Redox reactions, analytical methods, molecular geometries, and coordination chemistry as well as electrochemical energy conversion devices will be lectured.

[Course objectives]

Understanding fundamental matters on energy conversion and utilization related inorganic chemistry as well as their relations to daily life and state-of-the-art researches

[Course schedule and contents]

1. Oxidation and Reduction, 3 times,
reduction potentials, redox stability, diagrammatic presentation of potential data, chemical extraction of the elements
2. Molecular symmetry, 3 times,
an introduction to symmetry analysis, applications of symmetry, symmetries of molecular orbitals, representations
3. An introduction to coordination chemistry, 2 times
language of coordination chemistry, constitution and geometry, isomerism and chirality, thermodynamics of complex formation
4. Physical techniques in inorganic chemistry, 2 times
diffraction methods, absorption spectroscopy, resonance techniques, ionization-based techniques, chemical analysis, magnetometry, electrochemical techniques, microsope techniques
5. Exercises and comments, 4 times
Exercises and comments on the topics in this lecture
6. Summary, once

[Course requirements]

Students are supposed to understand the lecture "Energy Chemistry 1".

[Evaluation methods and policy]

Evaluation will be based on quizes and exercises (40 %) and final examination (60%).

(2)

[Textbooks]

Shriver & Atkins; Inorganic Chemistry (6th Ed.) ISBN 9784807908981 which is used in Energy Chemistry 1.
isbn{}{9784807908981}

[References, etc.]

Reference books

[Study outside of class (preparation and review)]

Reading the textbook and reviewing the assignments are recommended.

Other information (office hours, etc.)

Quizes are given every week to support understanding of the lecture.

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 25142 LJ71 U-ENG25 25142 LJ77			
Course title (and course title in English)	Fluid Dynamics 1		**Instructor's name, job title, and department of affiliation**	Graduate School of Engineering Professor,NAGATA KOJI Graduate School of Engineering Associate Professor,Watanabe Tomoaki
Target year	2nd year students or above	**Number of credits**	2	**Year/semesters**	2025/Second semester
Days and periods	Tue.2	**Class style**	Lecture (Face-to-face course)	**Language of instruction**	Japanese

[Overview and purpose of the course]

Fundamental of fluid dynamics: introduction, fluid properties, governing equations (Navier-Stokes equations, N-S equations), solution methods of N-S equations, laminer/turbulent flows, boundary layer flow.

[Course objectives]

Understanding of the principle of fluid flow.

[Course schedule and contents]

1 time : Introduction
2 time : Stationary fluid
4 times: Viscous fluid (Laminar flow /Turbulent flow)
5 times: Macroscopic expression of fluid motion
2 times: Exercise
1 times: Summary

[Course requirements]

N/A

[Evaluation methods and policy]

Term-end exam

[Textbooks]

Instructed during class

[References, etc.]

Reference books

[Study outside of class (preparation and review)]

Instructed during class.

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 25142 LJ71　U-ENG25 25142 LJ77

Course title (and course title in English)	Fluid Dynamics 1		Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,OOWADA TAKU Graduate School of Engineering Senior Lecturer,SUGIMOTO HIROSHI

Target year	2nd year students or above	Number of credits	2	Year/semesters	2025/Second semester

Days and periods	Tue.2	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

Guidance,2times,Guidance on how this class is operated, and how to use computing facility for this class. Basic knowledge on the role of IDS in network security and how machine learning can help the intrusion detection.

Intrusion Detection by Signature-Based IDS,5times,Learn the mechanism of intrusion detection by signature-based IDS by studying open source signature-based IDS and attacks, such as correspondence between alarms issued from IDS and communications, and adding signatures to detect attacks.

Intrusion Detection by Machine Learning,7times,Learn the method of classifying normal and malicious traffic by machine learning algorithms and public dataset for benchmarking intrusion detection performance.

Presentation,1time,Based on the exercise, students presents their methods of intrusion detection using machine learning, and discuss it with other students and instructors.

[Course requirements]

None

[Evaluation methods and policy]

[Textbooks]

[References, etc.]

　Reference books

(2)

[Study outside of class (preparation and review)]

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 35143 LJ77　　U-ENG25 35143 LJ71		
Course title (and course title in English)	Fluid Dynamics 2	**Instructor's name, job title, and department of affiliation**	Graduate School of Engineering Professor,HANAZAKI HIDESHI
Target year	3rd year students or above	**Number of credits** 2	**Year/semesters** 2025/First semester
Days and periods	Thu.2	**Class style** Lecture (Face-to-face course)	**Language of instruction** Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

,2times,
,4times,
,2times,
,3times,
,1time,
,2times,
,　times,

[Course requirements]

Fluid Dynamics 1

[Evaluation methods and policy]

[Textbooks]

[References, etc.]

　Reference books
G. K. Batchelor, An Introduction to Fluid Dynamics (Cambridge University Press, 1967). isbn{}{052104118X}, (　, 2000) isbn{}{9780521663960}

[Study outside of class (preparation and review)]

　Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 35143 LJ77 U-ENG25 35143 LJ71				
Course title (and course title in English)	Fluid Dynamics 2		**Instructor's name, job title, and department of affiliation**	Graduate School of Engineering Professor,OOWADA TAKU Graduate School of Engineering Senior Lecturer,SUGIMOTO HIROSHI	
Target year	3rd year students or above	**Number of credits**	2	**Year/semesters**	2025/First semester
Days and periods	Thu.2	**Class style**	Lecture (Face-to-face course)	**Language of instruction**	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

,2times,
,3times,
,3times,
,6times,
,1time,

[Course requirements]

None

[Evaluation methods and policy]

[Textbooks]

[References, etc.]

　Reference books

[Study outside of class (preparation and review)]

　Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 45144 LJ71		
Course title (and course title in English)	Microfabrication	**Instructor's name, job title, and department of affiliation**	Graduate School of Engineering Professor,YOKOKAWA RYUUJI Graduate School of Engineering Associate Professor,HIROTANI JUN Graduate School of Engineering Associate Professor,FUJIMOTO KAZUYA
Target year	4th year students or above	**Number of credits**	2	**Year/semesters**	2025/First semester
Days and periods	Fri.1	**Class style**	Lecture (Face-to-face course)	**Language of instruction**	Japanese

[Overview and purpose of the course]

This course covers microfabrication technology for MEMS as well as semiconducors.

[Course objectives]

[Course schedule and contents]

,1time,
,2times,
,3times,
,2times,
,2times,
,2times,
,2times,
,1time,

[Course requirements]

None

[Evaluation methods and policy]

[Textbooks]

(2)

[References, etc.]

Reference books

[Study outside of class (preparation and review)]

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

[Courses delivered by instructors with practical work experience]

(1) Category
A course with practical content delivered by instructors with practical work experience

(2) Details of instructors' practical work experience related to the course

(3) Details of practical classes delivered based on instructors' practical work experience

Course number	U-ENG25 45145 LJ77		

Course title (and course title in English)	Engineering Exercise in Aeronautics and Astronautics	Instructor's name, job title, and department of affiliation	Graduate School of Engineering ALL STAFF Graduate School of Engineering Professor,TAKATA SHIGERU

Target year	4th year students or above	Number of credits	2	Year/semesters	2025/First semester

Days and periods	Tue.3,4	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

,,

[Course requirements]

None

[Evaluation methods and policy]

[Textbooks]

[References, etc.]

Reference books

(2)

[Study outside of class (preparation and review)]

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

[Courses delivered by instructors with practical work experience]

(1) Category
A course with practical content delivered by instructors with practical work experience

(2) Details of instructors' practical work experience related to the course

(3) Details of practical classes delivered based on instructors' practical work experience

Course number	U-ENG25 35147 LJ75

Course title (and course title in English)	Condensed Matter Physics		Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,NAKAMURA HIROYUKI Graduate School of Engineering Associate Professor,TABATA YOSHIKAZU

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/Second semester

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

[Overview and purpose of the course]

Basic concept of magnetic and superconducting properties of matters.

[Course objectives]

Understanding of basic concept of magnetic and superconducting properties of matters.

[Course schedule and contents]

Review of electromagnetism, 2times, magnetic field, definition and detection of vector potential, Hamiltonian for charged particle in electromagnetic field, etc.
Magnetism and superconductivity, 12 times, angular momentum of electron, spin and exchange interaction, atomic magnetism and effect of crystal field, magnetic moment in crystals, molecular field model, interatomic exchange interaction, metallic magnetism, magnetization process, magnetic anisotropy, phase transitions, magnetic measurements, etc.
Assessment, 1time, Assessment

[Course requirements]

None

[Evaluation methods and policy]

Evaluation will be based on a final examination.

[Textbooks]

Not used

[References, etc.]

Reference books
S. Blundel   Magnetism in Condensed Matter (Oxford Master Series in Physics)   Oxford University Press ISBN:0198505914
C. Kittel   Introduction to Solid State Physics   Wiley   ISBN:9780471415268

[Study outside of class (preparation and review)]

Basics of quantum mechanics and statistical mechanics is necessary.

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 25150 LJ57 U-ENG25 25150 LJ28 U-ENG25 25150 LJ77

Course title (and course title in English)	Introduction to Nuclear Engineering 1	Instructor's name, job title, and department of affiliation	Graduate School of Engineering ALL STAFF Graduate School of Engineering Professor,SASAKI TAKAYUKI

Target year	2nd year students or above	Number of credits	2	Year/semesters	2025/First semester

Days and periods	Mon.2	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

Study of basic concepts necessary for understanding the principles of various nuclear engineering studies from the physicochemical properties of atoms, nuclei, and radiation to the generation and use of energy by fission reactions.

[Course objectives]

The course objective is to understand the link between basic science and the latest research in the field of nuclear engineering, and to understand the latest advancements made in basic and applied research and future issues.

[Course schedule and contents]

Introduction to Radiation 1
1) Discovery of radiation
2) History of radiation
3) Basics of radiation
4) Interaction with substances
5) Detection of radiation
6) Generation of radiation
7) Industrial uses of radiation
Energy generation and utilization 1
8) Energy situation and nuclear power
9) Basics of reactor physics
10) Reactor control
11) Reactor selection-present
12) Reactor selection-past
13) Reactor selection-next generation reactor
14) Viewpoints on nuclear energy utilization and development
15) Feedback; confirmation of learning achievement

[Course requirements]

None

(2)

[Evaluation methods and policy]

Evaluation will be based on a written periodic examination. 5 or more absences from class will result in a failing grade (feedback sessions will not be included in the attendance count). The examination will test the basic knowledge and understanding of atoms, nuclei, radiation, quantum calculations, etc. discussed in each lecture.

[Textbooks]

Other materials are not specified. Handouts, etc. will be distributed during lectures.

[References, etc.]

Reference books

N/A

[Study outside of class (preparation and review)]

Review mainly the contents of each lecture and the exercises during the lecture is advisable.

Other information (office hours, etc.)

Attend as needed. Some materials may be omitted or added depending on the number of classes in the relevant year. Attending Introduction to Nuclear Engineering 2 at the same time as this course is desirable.

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 25151 LJ28　U-ENG25 25151 LJ77　U-ENG25 25151 LJ57

Course title (and course title in English)	Introduction to Nuclear Engineering 2	Instructor's name, job title, and department of affiliation	Graduate School of Engineering ALL STAFF Graduate School of Engineering Professor,SASAKI TAKAYUKI

Target year	2nd year students or above	Number of credits	2	Year/semesters	2025/Second semester

Days and periods	Mon.2	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

Study of the fundamentals of radiation properties and their control, and energy utilization and management, necessary for understanding the principles of various nuclear engineering studies.

[Course objectives]

The course objective is to understand the association between basic science and the latest research in the field of nuclear engineering, and to understand the latest advancements made to basic and applied research and future issues.

[Course schedule and contents]

Introduction to Radiation 2
1) Radiation biology
2) Medical application of radiation
3) Effects of radiation on the human body
4) Safe use of radiation
5) Radiation-related laws and regulations
Energy generation and utilization 2
6) History and fundamentals of nuclear fusion
7) Fusion reactor development
8) Prediction and Control of Fusion Reactor
9) Power reactor systems
10) Ensuring safety
11) Advanced Materials Development
12) Radiation in the environment
13) Nuclear fuel cycle
14) Radioactive waste disposal
15) Feedback; confirmation of learning achievement

[Course requirements]

Attending Introduction to Nuclear Engineering 1 is desirable.

[Evaluation methods and policy]

Evaluation will be based on a written periodic examination. 5 or more absences from class will result in a failing grade (feedback sessions will not be included in the attendance count). The examination will test the

(2)

basic knowledge and understanding of atoms, nuclei, radiation, quantum calculations, etc. discussed in each lecture.

[Textbooks]

Other materials are not specified. Handouts, etc. will be distributed during lectures.

[References, etc.]

Reference books

N/A

[Study outside of class (preparation and review)]

Review mainly the contents of each lecture and the exercises during the lecture is advisable.

Other information (office hours, etc.)

Exercises and report tasks will be assigned as necessary. Some materials may be omitted or added depending on the number of classes in the relevant year.

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 35152 LJ71 U-ENG25 35152 LJ77

Course title (and course title in English)	Fluid Flow and Heat Transfer	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,YOKOMINE TAKEHIKO

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/Second semester

Days and periods	Mon.2	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

This lecture provides the following subjects: thermal radiation, steady and unsteady heat conduction, laminar and turbulent convective heat transfer, phase change phenomena (boiling and condensation). The main goals are to understand the basic theory of fluid dynamics, thermodynamics, heat transfer and their allocation through the understandings of the mechanisms of heat transfer; especially thermal hydraulics in a nuclear reactor as a typical energy conversion system will be discussed including a safety engineering point of view.

[Course objectives]

In order to understand the relation between heat and fluid based on the basic theory of fluid dynamics, thermodynamics, heat transfer and their allocation. It is very important to

[Course schedule and contents]

,1.0times,
,1.0times,
,2.0times,
,4.0times,
,1.0times,
,5.0times,
,   .0times,

[Course requirements]

None

[Evaluation methods and policy]

Evaluation based on the written examination, but it is also rating a student#039s class performance.

[Textbooks]

[References, etc.]

  Reference books

(2)

[Study outside of class (preparation and review)]

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 35153 LJ71		

Course title (and course title in English)	Heat Transfer	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,KUROSE RYOUICHI

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/Second semester
Days and periods	Fri.1	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

This course focuses on the heat transfer phenomena at the foundation of heating, cooling, and insulation techniques, that is heat conduction, convection heat transfer, and thermal radiation. With respect to heat conduction, we will discuss the steady-unsteady phenomenon and the theory of extended surface heat transfer. With respect to convective heat transfer, we will discuss single-phase forced convection/natural convection and the boiling and condensation transfer accompanying phase transitions. With respect to thermal radiation, we will discuss the basic theory.

[Course objectives]

Provide basic knowledge and deepen understanding of heat transfer phenomena (heat conduction, convective heat transfer, thermal radiation).

[Course schedule and contents]

(1)
General information: Based on multiple examples of energy conversion requiring heating, cooling, and insulation techniques, and temperature control of equipment, explain the importance of heat transfer engineering and the basic mechanisms of heat transfer phenomena.
(2-4)
Heat conduction: Explain the basics of heat conduction phenomena, specifically heat flux, thermal conductivity and Fourier's law, and the derivation of the equation of heat conduction, with reference to basic case examples. Explain thermal contact resistance, steady heat conduction, and heat conduction resistance in flat plates, pipes, etc., the theory of extended surfaces (fins), and so on.
(5)
Basic information on convective heat transfer: Formularize the governing equations of flow in heat transfer. Explain dimensionless numbers such as Prandtl number, Nusselt number, Stanton number, Grashof number, and Rayleigh number. Derive the momentum and energy equations for the boundary layer flow and heat transfer.
(6-9)
Convective heat transfer without phase change: Explain specific examples of forced convective heat transfer, as well as general information. As examples of external flow heat transfer, explain laminar and turbulent boundary layer flow over a flat plate accompanying heat transfer. Also, as an example of internal flow heat transfer, explain heat transfer of flows within tubes. Also, explain natural convection along a vertical heated plate.
(10, 11)
Convective heat transfer accompanying phase changes: With respect to boiling heat transfer, explain the

boiling curve in pool boiling and nucleate boiling, transition boiling, film boiling heat transfer mechanisms, and the effects of various factors that affect nucleate boiling heat transfer and methods to enhance heat transfer. With respect to condensation heat transfer, explain the difference between dropwise condensation and film condensation, phenomena in condensation interfaces, and the Nusselt solution in vertical plate film condensation.

(12-14)

Radiation heat transfer: Discuss black bodies and gray bodies, Kirchhoff's law, Planck's law, and Wien's displacement law, Stefan-Boltzmann's law, radiation transfer between black body surfaces and radiation in actual surfaces, and the properties of radiation in gases.

(15)

Confirmation of learning attainment.

[Course requirements]

Students are required to have completed "Thermodynamics 1" and "Fluid Dynamics 1".

[Evaluation methods and policy]

A final examination will be held. In-class reports will be factored in.

[Textbooks]

ISBN:ISBN978-4-88898-120-0

[References, etc.]

Reference books

[Study outside of class (preparation and review)]

Students are required to have completed "Thermodynamics 1" and "Fluid Dynamics 1".

Other information (office hours, etc.)

The order of classes listed above and their timing may differ depending on the year.

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 35154 LJ75

Course title (and course title in English)	Fundamentals of Materials 2	Instructor's name, job title, and department of affiliation	Graduate School of Energy Science Associate Professor,OKUMURA HIDEYUKI

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/First semester

Days and periods	Wed.2	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

,3times,
,2times,
,2times,
,2times,
,1time,
,1time,
,3times,
,1time,

[Course requirements]

None

[Evaluation methods and policy]

[Textbooks]

Text book can be bought at the society of material science, Japan at Hyakumanben near Kyoto university.
http://www.jsms.jp/

(2)

Course number	U-ENG25 35155 LJ71

Course title (and course title in English)	Design Engineering 1	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,KOMORI MASAHARU Graduate School of Engineering Professor,HIRAYAMA TOMOKO

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/First semester

Days and periods	Mon.1	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

,1time,
,4times,
,3times,
,3times,
,2times,
,2times,
,1time,
,1time,

[Course requirements]

None

[Evaluation methods and policy]

[Textbooks]

(2)

[References, etc.]

Reference books

[Study outside of class (preparation and review)]

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 35156 LJ71		

Course title (and course title in English)	Design Engineering 2	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,KOMORI MASAHARU Graduate School of Engineering Professor,MATSUBARA ATSUSHI Graduate School of Engineering Professor,NISHIWAKI SHINJI

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/Second semester

Days and periods	Tue.2	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

,5times,
,3times,
,2times,
,4times,
,1time,

[Course requirements]

None

[Evaluation methods and policy]

[Textbooks]

[References, etc.]

　Reference books

(2)

[Study outside of class (preparation and review)]

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

[Courses delivered by instructors with practical work experience]

(1) Category
A course with practical content delivered by instructors with practical work experience

(2) Details of instructors' practical work experience related to the course

(3) Details of practical classes delivered based on instructors' practical work experience

Course number	U-ENG25 35157 EJ28		
Course title (and course title in English)	Design Practice and Experiments for Applied Energy Science and Engineering 1	Instructor's name, job title, and department of affiliation	Graduate School of Energy Science Associate Professor,OKUMURA HIDEYUKI Graduate School of Energy Science Associate Professor,ABE MASATAKA Graduate School of Energy Science Associate Professor,IKENOUE TAKUMI Graduate School of Energy Science Professor,IMATANI SHIYOUJI Graduate School of Energy Science Associate Professor,OGAWA TAKAYA Graduate School of Energy Science Associate Professor,KINOSHITA KATSUYUKI Graduate School of Energy Science Associate Professor,HASEGAWA MASAKATSU Graduate School of Energy Science Associate Professor,HACHIYA KAN Graduate School of Energy Science Professor,Jun HAYASHI Graduate School of Energy Science Associate Professor,HORIBE NAOTO Graduate School of Energy Science Professor,MATSUMOTO KAZUHIKO Graduate School of Energy Science Professor,MIYAKE MASAO Graduate School of Energy Science Assistant Professor,MATSUI RYUTARO Graduate School of Energy Science Assistant Professor,HWANG JINKWANG Graduate School of Energy Science Assistant Professor,OKAZAKI YUTAKA Graduate School of Energy Science Assistant Professor,TOMIDOKORO TAKUYA Graduate School of Energy Science Senior Lecturer,KAWAI EMI Graduate School of Energy Science Associate Professor,KAWANISHI SAKIKO

Target year	3rd year students or above	Number of credits	3	Year/semesters	2025/First semester
Days and periods	Wed.3,4,Thu.3,4	Class style	Experiment (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

(2)

- -

[Course objectives]

[Course schedule and contents]

,6times,
,6times,
,6times,
,6times,

[Course requirements]

None

[Evaluation methods and policy]

[Textbooks]

[References, etc.]

　Reference books

[Study outside of class (preparation and review)]

　Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 35158 EJ77 U-ENG25 35158 EJ57 U-ENG25 35158 EJ53

Course title (and course title in English)	Nuclear Engineering Laboratory 1	Instructor's name, job title, and department of affiliation	Graduate School of Engineering ALL STAFF Graduate School of Engineering Assistant Professor,IMAI MAKOTO

Target year	3rd year students or above	Number of credits	3	Year/semesters	2025/First semester

Days and periods	Thu.1,2,3,4	Class style	Experiment (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

Basic knowledge of a wide range of scientific and engineering fields (e.g. physics, chemistry, biology, electrical engineering, mechanical engineering, and materials engineering) that form the basis of nuclear engineering, as well as basic proficiency with standards related to radiation and quantum beam technologies specific to nuclear engineering. In addition, students will study experimental procedures through practical training as well as procedures for the safe handling of radioisotopes and radiation generators, methods for processing experimental data, and how to prepare scientific reports.

[Course objectives]

Cultivate familiarity with experimental procedures and a sense of engineering best practices.

Acquire basic knowledge and skills related to science and engineering with a mind towards practical application.

Cultivate the ability to acquire and utilize basic knowledge and technology related to nuclear engineering.

Learn how to conduct experiments while considering personal and environmental safety.

Cultivate the ability to work effectively, independently, and continuously on various tasks.

[Course schedule and contents]

Course will cover the following themes. Some of the themes also serve as new instruction and training regarding the handling of radioisotopes.
The order of lectures differs for each experimental group, and the content of corresponding exercises may change.

Lecture 1: Overview of experiments: Provide an overview of each experimental task, text distribution, pre-learning instructions and precautions, etc. will be given as necessary.

Lecture 2: Basics of creating engineering reports: Lecture will focus on creating experimental reports, as well as exercises to learn the basics of creating experimental reports.

Lecture 3: Radioactive isotope (RI) safety training seminar: Students will learn safe procedures for handling RIs. Students will study safe procedures for handling nuclear fuel materials.

Lecture 4: Mechanical drawing: Exercises and lectures on basic aspects of mechanical drawing.

Lecture 5: Circuit meter training and electronic safety training: Students will learn the operating principles and usage of analog and digital testers. Students will assemble various circuits and learn safe and reliable circuit manufacturing techniques.

Lecture 6: X-ray diffraction: Using a powder X-ray diffractometer, students will learn the basic properties of X-rays and gain an understanding of the relationship between diffraction patterns and crystal structures.

Lectures 7 and 8: The properties of radiation   -ray: Students will learn about the characteristics of   -ray attenuation in matter and the detection method of   particles using a semiconductor detector.

Lecture 9: Electron beams/vacuums: Students will focus on an electron beam by electric and magnetic fields to learn the functions of electrostatic and magnetic lenses and understand the fundamental principles of vacuum technology.

Lectures 10 and 11: Neutron Detection: Students will focus on the principles of neutron generation and detection using a 241Am-Be neutron source and 3He detector, and learn about the behavior of neutrons in moderator (paraffin).

Lectures 12 and 13: Absorption of   and   -rays: Students will study procedures for the safe handling of RIs through experiments on energy absorption by   and   -ray-emitting substances.

Lecture 14: Radiochemistry: Students will learn the safe handling of unsealed Cs-137 through milking, and the principles of its separation.

Lecture 15: Report check: Confirmation of the content of students' submitted reports and provision of guidance regarding resubmission of deficient reports to confirm learning achievement.

[Course requirements]

N/A

[Evaluation methods and policy]

Students will prepare a report for each task, and performance will be evaluated on a scale of 1 to 3 with respect to the degree of achievement of each learning objective, and the total score is converted into a score out of 100.

Note that completing all assignments and submitting reports is a prerequisite for receiving credit.

Reports submitted late may be penalized, and messy or incomplete reports may require correction and resubmission.

[Textbooks]

Texts and reference materials will be distributed for each experimental theme.

(3)

[References, etc.]

Reference books

Other materials will be introduced as needed for each experimental theme.

[Study outside of class (preparation and review)]

Submit reports on all experimental themes within the deadline.

In addition, follow the instructions in the experiment outline description for each experiment theme.

Other information (office hours, etc.)

The method of contacting the faculty in charge of each experimental theme will be given in the instructional material for each experiment.
Taking this course together with Nuclear Engineering Experiment 2 is desirable.

*Please visit KULASIS to find out about office hours.

[Courses delivered by instructors with practical work experience]

(1) Category
A course with practical content delivered by instructors with practical work experience

(2) Details of instructors' practical work experience related to the course
  RI   RI

(3) Details of practical classes delivered based on instructors' practical work experience
  RI

Course number	U-ENG25 35159 SJ28					
Course title (and course title in English)	Design Practice and Experiments for Applied Energy Science and Engineering 2		**Instructor's name, job title, and department of affiliation**	Graduate School of Energy Science Associate Professor,OKUMURA HIDEYUKI Graduate School of Energy Science Associate Professor,ABE MASATAKA Graduate School of Energy Science Associate Professor,HACHIYA KAN Graduate School of Energy Science Associate Professor,IKENOUE TAKUMI Graduate School of Energy Science Professor,IMATANI SHIYOUJI Graduate School of Energy Science Associate Professor,OGAWA TAKAYA Graduate School of Energy Science Associate Professor,KINOSHITA KATSUYUKI Graduate School of Energy Science Associate Professor,HASEGAWA MASAKATSU Graduate School of Energy Science Professor,Jun HAYASHI Graduate School of Energy Science Associate Professor,HORIBE NAOTO Graduate School of Energy Science Professor,MATSUMOTO KAZUHIKO Graduate School of Energy Science Professor,MIYAKE MASAO Graduate School of Energy Science Assistant Professor,MATSUI RYUTARO Graduate School of Energy Science Assistant Professor,HWANG JINKWANG Graduate School of Energy Science Assistant Professor,OKAZAKI YUTAKA Graduate School of Energy Science Assistant Professor,TOMIDOKORO TAKUYA Graduate School of Energy Science Senior Lecturer,KAWAI EMI Graduate School of Energy Science Associate Professor,KAWANISHI SAKIKO		
Target year	3rd year students or above	**Number of credits**	3	**Year/semesters**		2025/Second semester
Days and periods	Wed.3,4,Thu.3,4	**Class style**	Seminar (Face-to-face course)	**Language of instruction**		Japanese

[Overview and purpose of the course]

(2)

[Course objectives]

[Course schedule and contents]

,6times,
,6times,
,6times,
,6times,
,1time,

[Course requirements]

None

[Evaluation methods and policy]

[Textbooks]

[References, etc.]

Reference books

[Study outside of class (preparation and review)]

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 35160 EJ57 U-ENG25 35160 EJ53 U-ENG25 35160 EJ77

Course title (and course title in English)	Nuclear Engineering Laboratory 2	Instructor's name, job title, and department of affiliation	Graduate School of Engineering ALL STAFF Graduate School of Engineering Assistant Professor,IMAI MAKOTO

Target year	3rd year students or above	Number of credits	3	Year/semesters	2025/Second semester

Days and periods	Thu.1,2,3,4	Class style	Experiment (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

Basic knowledge of a wide range of scientific and engineering fields (e.g. physics, chemistry, biology, electrical engineering, mechanical engineering, materials engineering) that form the basis of nuclear engineering, as well as basic proficiency with standards related to radiation and quantum beam technologies specific to nuclear engineering. In addition, students will study practical experimental procedures through practical training as well as procedures for the safe handling of radioisotopes and radiation generators, methods for processing experimental data, and how to prepare scientific reports.

[Course objectives]

Cultivate familiarity with experimental procedures and a sense of engineering best practices.

Acquire basic knowledge and skills related to science and engineering with a mind towards practical application.

Cultivate the ability to acquire and utilize basic knowledge and technology related to nuclear engineering.

Learn how to conduct experiments while considering personal and environmental safety.

Cultivate the ability to work effectively, independently, and continuously on various tasks.

[Course schedule and contents]

Course will cover the following themes.
The order of lectures differs for each experimental group, and the content of corresponding exercises may change.

Lecture 1: Overview of experiments: Provide an overview of each experimental task, text distribution, pre-learning instructions and precautions, etc. will be given as necessary.

Lecture 2: Numerical experiment 1: Students will focus on the basic grammar of Python and practice data processing and graph creation using libraries.

Lecture 3: Numerical experiment 2: Students will learn a fluid simulation code and perform analysis using the created code.

Lectures 4 and 5: In-air PIXE and RBS analysis: Using electrostatic ion accelerators, students will observe

the trajectory of a proton beam in the atmosphere. They will also learn elemental analysis using Particle-Induced X-ray Emission (PIXE) and Rutherford Backscattering Spectrometry (RBS).

Lecture 6: Digital measurement: Students will study the characteristics of digital measurements, as well as the principles of impedance matching and sampling, by actually creating circuits in practice.

Lectures 7 and 8: Uranium chemistry: Lectures will focus on the separation of uranium thorium radiative equilibrium solutions (ion exchange, oxidation-reduction reaction) and will perform colorimetric quantitative analysis as study of the handling of nuclear fuel.

Lecture 9: Radiation detection: Students will attempt detection of -rays emitted from substances existing in nature by using a Ge semiconductor detector as well as the identification and quantification of emitted nuclides. Students will also deepen their understanding of radiation and radioactive materials by measuring contamination using a survey meter and by measuring the decay process of nearby radioisotopes.

Lecture 10: Slow neutron beams: Students will measure neutrons from accelerator driven neutron source using a neutron counter to learn about the properties of neutrons and their interaction with matter.

Lecture 11: Numerical experiment 3: Students will learn about simulation using numerical calculation libraries.

Lectures 12 - 15: Report check: Confirmation of the content of students' submitted reports and provision of guidance regarding resubmission of deficient reports to confirm learning achievement.

[Course requirements]

N/A

[Evaluation methods and policy]

Students will prepare a report for each task, and performance will be evaluated on a scale of 1 to 3 with respect to the degree of achievement of each learning objective, and the total score is converted into a score out of 100.

Note that completing all assignments and submitting reports is a prerequisite for receiving credit.

Reports submitted late may be penalized, and messy or incomplete reports may require correction and resubmission.

[Textbooks]

Texts and reference materials will be distributed for each experimental theme.

[References, etc.]

Reference books

Other materials will be introduced as needed for each experimental theme.

(3)

- -

[Study outside of class (preparation and review)]

Submit reports on all experimental themes within the deadline.

In addition, follow the instructions in the experiment outline description for each experiment theme.

Other information (office hours, etc.)

The method of contacting the faculty in charge of each experimental theme will be given in the instructional material for each experiment.
Taking this course together with Nuclear Engineering Experiment 1 is desirable.

*Please visit KULASIS to find out about office hours.

[Courses delivered by instructors with practical work experience]

(1) Category
A course with practical content delivered by instructors with practical work experience

(2) Details of instructors' practical work experience related to the course
　RI　　　　　　　　　　　　　　　　　　　　RI

(3) Details of practical classes delivered based on instructors' practical work experience
　RI

Course number	U-ENG25 45161 LJ71		

Course title (and course title in English)	Strength and Fracture of Materials	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,HIRAKATA HIROYUKI Graduate School of Engineering Professor,SHIMADA TAKAHIRO

Target year	4th year students or above	Number of credits	2	Year/semesters	2025/First semester

Days and periods	Thu.2	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

,2times,
,2times,
,3times,
,1?2times,
,1?2times,
,1?2times,
,1?2times,
,1time,

[Course requirements]

None

[Evaluation methods and policy]

[Textbooks]

Continue to **(2)**

(2)

[References, etc.]

   Reference books

[Study outside of class (preparation and review)]

   Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 25162 LJ71 U-ENG25 25162 LJ57 U-ENG25 25162 LJ77		
Course title (and course title in English)	Thermodynamics 1	**Instructor's name, job title, and department of affiliation**	Graduate School of Engineering Professor,IWAI HIROSHI Graduate School of Engineering Associate Professor,KISHIMOTO MASASHI
Target year	2nd year students or above	**Number of credits** 2	**Year/semesters** 2025/First semester
Days and periods Fri.1	**Class style**	Lecture (Face-to-face course)	**Language of instruction** Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

0

[Course requirements]

None

[Evaluation methods and policy]

[Textbooks]

[References, etc.]

   Reference books

[Study outside of class (preparation and review)]

   Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 25162 LJ71 U-ENG25 25162 LJ57 U-ENG25 25162 LJ77

Course title (and course title in English)	Thermodynamics 1		Instructor's name, job title, and department of affiliation	Graduate School of Energy Science Associate Professor,HASEGAWA MASAKATSU

Target year	2nd year students or above	Number of credits	2	Year/semesters	2025/First semester

Days and periods	Fri.1	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

In this course, Thermodynamics 1, the basic laws of thermodynamics are introduced. Also discussed are fundamental items including state changes of ideal and real gases, cycles, phase transformation, free energy, phase equilibrium and the phase rule, single-component phase diagrams, etc.

[Course objectives]

Students will gain an understanding of the meaning and significance of the first and second laws of thermodynamics, fundamental concepts for thermodynamics. Students will also be able to quantitatively deal with changes in thermodynamic quantity that accompany state changes.

[Course schedule and contents]

Introduction (1 class)
system, phase, state quantity

The first law of thermodynamics (2 classes)
heat, work, quasi-static process, enthalpy, heat capacity/specific heat

The second law of thermodynamics (4 classes)
reversible process, heat engine, Thomson's principle, Clausius' principle,
Carnot's theorem, thermodynamic temperature, Mayer's relation,
Poisson's law, Carnot cycle, Clausius' inequality, entropy

Free energy and thermodynamic equilibrium (3 classes)
Helmholtz energy, Gibbs energy, Maxwell relations,
Gibbs-Helmholtz equation, Joule's experiment, Joule-Thomson experiment,
open system and chemical potential,
conditions and stabilities of equilibrium state, Gibbs-Duhem equation

State quantities of gas phase (1 class)
ideal gas, van der Waals gas

Phase equilibrium and transformation (1 class)
Gibbs' phase rule, phase diagram of single-component system,
Clapeyron-Clausius equation, critical point

(2)

Gas mixture and solution (1 class)
ideal gas mixture, ideal solution, entropy of mixing,
elevation of boiling point, depression of freezing point

Review (1 class)

Feedback (1 class)

[Course requirements]
None

[Evaluation methods and policy]
Results are evaluated by a term-end examination.

[Textbooks]
Not used

[References, etc.]
Reference books
Thermodynamics and statistical mechanics (A. Harajima, Baifukan) (in Japanese). isbn{ }{9784563021399}

[Study outside of class (preparation and review)]
It is better to prepare and review the lecture materials posted on PandA.

Other information (office hours, etc.)
Depending on the number of course classes scheduled for each school year and other factors, a portion of the Syllabus may be omitted, or additions may be made thereto.

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 35169 SJ71

Course title (and course title in English)	Seminar on Mechanical and System Engineering	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Associate Professor, Graduate School of Engineering Associate Professor,MATSUMOTO MITSUHIRO

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/Intensive, Second semester

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

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

,,
,,
,,
,,
,,
,,
,,
,,
,,
,,
,,
,,
,,
,,
,,
,,
,,

[Course requirements]

None

(2)

[Evaluation methods and policy]

[Textbooks]

[References, etc.]

　Reference books

[Study outside of class (preparation and review)]

　Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

[Courses delivered by instructors with practical work experience]

(1) Category
A course with practical content delivered by instructors with practical work experience

(2) Details of instructors' practical work experience related to the course

(3) Details of practical classes delivered based on instructors' practical work experience

Course number	U-ENG25 45170 SJ71		

Course title (and course title in English)	Fabrication and Analysis of Micromaterials	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,TSUCHIYA TOSHIYUKI Graduate School of Engineering Professor,SUZUKI MOTOFUMI Graduate School of Engineering Professor,YOKOKAWA RYUUJI Graduate School of Engineering Associate Professor,HIROTANI JUN Graduate School of Engineering Associate Professor,FUJIMOTO KAZUYA

Target year	4th year students or above	Number of credits	2	Year/semesters	2025/Intensive, Second semester

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

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

,1time,
,1time,
,1time,
,1time,
,1time,
,3times,
,3times,
,1time,
,2times,
,1time,

[Course requirements]

None

[Evaluation methods and policy]

(2)

[Textbooks]

[References, etc.]

　Reference books

[Study outside of class (preparation and review)]

　Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

[Courses delivered by instructors with practical work experience]

(1) Category
A course with practical content delivered by instructors with practical work experience

(2) Details of instructors' practical work experience related to the course

(3) Details of practical classes delivered based on instructors' practical work experience

Course number	U-ENG25 45171 LJ71		

Course title (and course title in English)	Intelligent Systems Engineering	Instructor's name, job title, and department of affiliation	Graduate School of Informatics Professor,KANOU MANABU Graduate School of Engineering Senior Lecturer,NAKANISHI HIROAKI

Target year	4th year students or above	Number of credits	2	Year/semesters	2025/First semester

Days and periods	Wed.2	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

,2times,
,2times,
,2times,
,2times,
,2times,
,2times,
,2-3times,

[Course requirements]

None

[Evaluation methods and policy]

[Textbooks]

(2)

[References, etc.]

  Reference books

[Study outside of class (preparation and review)]

  Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

[Courses delivered by instructors with practical work experience]

(1) Category
A course with practical content delivered by instructors with practical work experience

(2) Details of instructors' practical work experience related to the course

(3) Details of practical classes delivered based on instructors' practical work experience

Course number	U-ENG25 25172 LJ75

Course title (and course title in English)	Fundamentals of Materials Science 3	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Associate Professor,TOYOURA KAZUAKI

Target year	2nd year students or above	Number of credits	2	Year/semesters	2025/Second semester

Days and periods	Fri.1	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

,1time,
,1time,
,1time,
,3times,
,4times,
,4times,
,1time,

[Course requirements]

None

[Evaluation methods and policy]

[Textbooks]

isbn{}{9784254240184}

[References, etc.]

   Reference books
isbn{}{9784563067120} isbn{}{9784563067137}
D.A.Porter and K.E.Easterling: Phase Transformations in Metals and Alloys isbn{}{0412450305}

[Study outside of class (preparation and review)]

   Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 35173 LJ75

Course title (and course title in English)	Fundamentals of Microstructure of Materials	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,HIDEYUKI YASUDA

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/Second semester

Days and periods	Mon.1	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

Physical and chemical properties of materials depend on not only lattice structure and composition but also microstructure. In this lecture, the microstructure evolution during phase transformation (i.e. solidification) will be explained by using thermodynamics and kinetics (atomic diffusion, thermal energy transport and momentum transport). Students study the fundamentals of microstructure evolution (nucleation, growth mechanism, solute partition, microstructure selection, dendritic growth, eutectic growth and equilibrium / non-equilibrium processes).

[Course objectives]

1. To understand relationship between microstructure evolution and thermodynamics / kinetics.
2. To be able to use thermodynamics and kinetics for understanding microstructure in materials.

[Course schedule and contents]

1. Introduction (1): fundamentals of thermodynamics and kinetics, which are required for understanding this class
2. Nucleation (1): classical nucleation theory and curvature effect
3. Interface morphology (1): interface morphology (atomic scale), macroscopic interface shape
4. Growing interface (3): local equilibrium at interface, solute partition, stability of interface
5. Dendritic growth (2): mechanism of dendritic growth, selection mechanism
6. Solute partition and segregation (2): solute partition at interface, segregation (non-uniform distribution of solutes)
7. Eutectic growth (1): cooperative growth (eutectic growth) of multiple phases, selection of microstructure
8. Non-equilibrium phase transformation (1): rapid solidification, non-equilibrium and metastable phases
9. Microstructure evolution (2): relationship between microstructure evolution and phase diagram, selection rules in phase transformation
10. Learning achievement evaluation, and feedback (1)

[Course requirements]

Fundamentals of Microstructure of Materials 1,2 and 3

[Evaluation methods and policy]

Evaluation method: Evaluation will be based on one written examination at the end of semester.
Evaluation standard: The result of a written examination should be 60 and above out of 100. (60 and above:

Continue to   (2)

(2)

Passed, 59 and below: Failed)
Evaluation may include short reports.

[Textbooks]

ISBN:9784254240184

[References, etc.]

Reference books

[Study outside of class (preparation and review)]

Students are required to carry out a review of class.

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 35174 LJ72　U-ENG25 35174 LJ53

Course title (and course title in English)	Radiation Detection and Measurement	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Associate Professor,TSUCHIDA HIDETSUGU

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/First semester

Days and periods	Wed.2	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

1

1

1

1

4

1

(2)

2

1

2

1

[Course requirements]

[Evaluation methods and policy]

[Textbooks]

[References, etc.]

　Reference books

　ibid{}{TW86012413} ibid{}{BB01056431}

[Study outside of class (preparation and review)]

　Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 25175 LJ75

Course title (and course title in English)	Thermodynamics of Materials	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,UDA TETSUYA

Target year	2nd year students or above	Number of credits	2	Year/semesters	2025/First semester

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

[Overview and purpose of the course]

-

-pH

[Course objectives]

-

-pH

[Course schedule and contents]

        <4 >   2

      <3 >   -dG

   <1 >

     <2 >

    (-pH)<3 >3   -pH

    <1 >

   <1 >

(2)

[Course requirements]

None

[Evaluation methods and policy]

[Textbooks]

Not used

[References, etc.]

Reference books

　　　　　　　　　　　　　（　　　　　） ISBN:9784254240115
　　　　　　　　　　　　（　　　　　　　） ISBN:4889030115
D.R.Gaskell　Introduction to the Thermodynamics of Materials　ISBN:9781591690436

[Study outside of class (preparation and review)]

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 35200 LJ75				

Course title (and course title in English)	Introduction to Polymer Materials		Instructor's name, job title, and department of affiliation		Part-time Lecturer,SAWAMOTO MITSUO Graduate School of Engineering Associate Professor,ICHII TAKASHI
Target year	3rd year students or above	**Number of credits**	2	**Year/semesters**	2025/First semester
Days and periods	Mon.2	**Class style**	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

,1time,
,3times,
,4times,
,4times,
,2times,
,1time,

[Course requirements]

None

[Evaluation methods and policy]

[Textbooks]

[References, etc.]

　Reference books

[Study outside of class (preparation and review)]

　Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 35203 LJ77 U-ENG25 35203 LJ52 U-ENG25 35203 LJ28

Course title (and course title in English)	Nuclear Reactor Physics	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,HINOKI TATSUYA

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/First semester

Days and periods	Fri.1	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

,4times,
,4times,
,3times,
,3times,
,1time,

[Course requirements]

None

[Evaluation methods and policy]

[Textbooks]

[References, etc.]

  Reference books

(2)

[Study outside of class (preparation and review)]

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

[Courses delivered by instructors with practical work experience]

(1) Category
A course with practical content delivered by instructors with practical work experience

(2) Details of instructors' practical work experience related to the course

(3) Details of practical classes delivered based on instructors' practical work experience

Course number	U-ENG25 35233 LJ75

Course title (and course title in English)	Xray Diffraction		Instructor's name, job title, and department of affiliation	Part-time Lecturer,OKUDA HIROSHI

Target year	3rd year students or above	Number of credits	2	Year/semesters	2025/Second semester

Days and periods	Fri.2	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

Structural analyses by X-ray diffraction method will be given. In the lecture, the properties of X-rays, X-ray diffraction phenomena, crystallography, and diffraction by powder samples will be lectured.

[Course objectives]

Students will learn the crystal structure analyses by X-rays through the course works of X-ray properties, crystalline structures, diffraction conditions, and reciprocal lattices.

[Course schedule and contents]

Basic properties of x-rays,3times,1.X-rays2.Continuous x-rays3.Characteristic x-rays4.X-ray absorption5.X-ray filter6.Generation of x-rays

Crystallography,3times,1.One dimensional crystal symmetry2.7 crystal systems and 14 Bravais#039 lattices3. Practical examples of crystals4. Body-centered cubic, face-centered cubic and hexagonal close-packed lattices6. Crystalline structures of several compounds

Description of crystal planes and directions,1time,1. Description of lattice planes and directions2. Stereo projection

Diffraction by crystals,3times,1. Diffraction by crystalline lattice2. Bragg conditions and scattering angle3. Calculation of structure factors

Diffraction by a powder sample,1time,1. Principle of diffractometer2. X-ray diffraction by powder sample

Structural analyses of cubic systems,time,1. Determination of a lattice parameter in cubic systems2. Determination of Bravais#039 lattice in cubic systems

Reciprocal lattice and diffraction condition,3times,1. Definition of reciprocal lattices2. Reciprocal lattice and real lattice3. Reciprocal lattice and diffraction condition

[Course requirements]

None

[Evaluation methods and policy]

The course will be evaluated from the scores of a midterm examination (40%) and a final examination (60%).

(2)

[Textbooks]

Instructed during class

[References, etc.]

Reference books

[Study outside of class (preparation and review)]

Concentrate on a lecture, and review the contents which you got by a lecture by rearanging your lecture note and studying any questions of lecture contents for at least 4 hours in each lecture.

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 25300 LJ71　　U-ENG25 25300 LJ77

Course title (and course title in English)	Introduction to Electronics	Instructor's name, job title, and department of affiliation	Graduate School of Informatics Associate Professor,AWANO HIROMITSU Graduate School of Informatics Associate Professor,UENO REI

Target year	2nd year students or above	Number of credits	2	Year/semesters	2025/First semester

Days and periods	Mon.4	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

In this course, students will learn about the basic characteristics of electronic circuits, digital circuits that are indispensable in today's information society, and computer architecture as hardware for running programs.

[Course objectives]

In this course, students will learn the minimum level of electronic circuits required for research in the Department of Physics and the Department of Computer Science, and as researchers and engineers.

[Course schedule and contents]

The order and number of lectures for each topic are not fixed, and are subject to change by the lecturer depending on the lecture policy of the instructor and the background and understanding of the students.

* Fundamentals of Electronic Circuits (3 clases) Learn DC, AC, and transient analysis.
* Amplification Circuits (1 class) Learn about amplification circuits using operational amplifiers.
* Fundamentals of digital logic circuits (1 class) Learn fundamentals of logic circuits including Boolean algebra, Karnaugh diagrams, etc.
* Sequential circuits (1 class) Learn how to construct circuits with internal states.
* Circuit Delay (1 class) Learn about what determines the operating speed of a circuit.
* Digital representation of numbers (1 class) Learn how to represent numbers including floating point format, which is often used in scientific and technological calculations.
* Arithmetic logic circuits (1 class) Learn about the structure of arithmetic circuits for digitally represented numbers.
* Overview of computer architecture (1 class) Learn about the configuration of computers, the hardware that executes programs.
* Machine language (1 class) Learn about the relationship between high-level languages such as C and instructions that can be interpreted by hardware.
* Composition of computer architecture (2 classes) Learn about the composition and operation of computers, using a processor that can execute simple instructions as an example.
* Integrated circuit manufacturing process (1 class)
* Feedback (1 class)

Translated with www.DeepL.com/Translator (free version)

(2)

[Course requirements]

Students who do not specialize in electrical and electronic engineering can take this course if they have some prior knowledge of high school physics.

[Evaluation methods and policy]

Multiple report assignments will be given during the course to evaluate the achievement of the objectives.

[Textbooks]

Not used

[References, etc.]

Reference books

Introduced during class

[Study outside of class (preparation and review)]

Students are required to review mathematical expressions using complex numbers in advance.

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 35301 LJ51　　U-ENG25 35301 LJ25　　U-ENG25 35301 LJ71		
Course title (and course title in English)	Biomechanical Engineering	**Instructor's name, job title, and department of affiliation**	Institute for Life and Medical Sciences Professor,SHINTAKU HIROFUMI Institute for Life and Medical Sciences Professor,ADACHI TAIJI Graduate School of Engineering Professor,YOKOKAWA RYUUJI Graduate School of Engineering Professor,INOUE YASUHIRO
Target year	3rd year students or above	**Number of credits**	2	**Year/semesters**	2025/Second semester
Days and periods	Wed.4	**Class style**	Lecture (Face-to-face course)	**Language of instruction**	Japanese

[Overview and purpose of the course]

[Course objectives]

2

[Course schedule and contents]

1

DNA

1

(2)

1

Microphysiological systems (MPS)

iPS

MPS

1   1   1

1

(3)

[Study outside of class (preparation and review)]

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 35302 LJ75		
Course title (and course title in English)	Electronic Structures of Inorganic Materials	**Instructor's name, job title, and department of affiliation**	Graduate School of Engineering Professor,SEKO ATSUTO

Target year	3rd year students or above	**Number of credits**	2	**Year/semesters**	2025/Second semester
Days and periods	Tue.2	**Class style**	Lecture (Face-to-face course)	**Language of instruction**	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

,1 ,
,2 ,

(1),4 ,

(2),3 ,
-
,2 ,

,2 ,
,1 ,

[Course requirements]

[Evaluation methods and policy]

(2)

- -

[Textbooks]

[References, etc.]

Reference books

A.   N.S.   ,   ,
ISBN:9784130621113
ISBN:9784785330736

Related URLs

http://cms.mtl.kyoto-u.ac.jp/seko.html

[Study outside of class (preparation and review)]

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 45995 GJ77

Course title (and course title in English)	Graduation Thesis 1		Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,NISHIWAKI SHINJI

Target year	4th year students or above	Number of credits	4	Year/semesters	2025/Intensive, First semester

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

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

[Course requirements]

[Evaluation methods and policy]

[Textbooks]

[References, etc.]

Reference books

( ) ISBN:9784121006240

[Study outside of class (preparation and review)]

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 45995 GJ77		

Course title (and course title in English)	Graduation Thesis 1		Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,NISHIWAKI SHINJI

Target year	4th year students or above	Number of credits	4	Year/semesters	2025/Intensive, Second semester

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

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

[Course requirements]

[Evaluation methods and policy]

[Textbooks]

[References, etc.]

Reference books

(   )   ISBN:9784121006240

[Study outside of class (preparation and review)]

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 45995 GJ77

Course title (and course title in English)	Graduation Thesis 1		Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,KISHIDA KIYOUSUKE Graduate School of Engineering Associate Professor,ICHII TAKASHI

Target year	4th year students or above	Number of credits	4	Year/semesters	2025/Intensive, First semester

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

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

3
6
6

[Course requirements]

[Evaluation methods and policy]

[Textbooks]

[References, etc.]

Reference books

[Study outside of class (preparation and review)]

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 45995 GJ77		

Course title (and course title in English)	Graduation Thesis 1	Instructor's name, job title, and department of affiliation	Graduate School of Energy Science Professor,IMATANI SHIYOUJI

Target year	4th year students or above	Number of credits	4	Year/semesters	2025/Intensive, First semester

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

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

[Course requirements]

[Evaluation methods and policy]

[Textbooks]

Not used

[References, etc.]

  Reference books

[Study outside of class (preparation and review)]

  Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 45995 GJ77		
Course title (and course title in English)	Graduation Thesis 1	**Instructor's name, job title, and department of affiliation**	Graduate School of Engineering KANKEI KYOIN Graduate School of Engineering Professor,HINOKI TATSUYA Graduate School of Engineering Professor,MAJIMA TAKUYA

Target year	4th year students or above	**Number of credits**	4	**Year/semesters**	2025/Intensive, First semester
Days and periods	Intensive	**Class style**	Seminar (Face-to-face course)	**Language of instruction**	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

[Course requirements]

[Evaluation methods and policy]

[Textbooks]

Not used

[References, etc.]

　Reference books

[Study outside of class (preparation and review)]

　Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 45995 GJ77		

Course title (and course title in English)	Graduation Thesis 1	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,TAKATA SHIGERU

Target year	4th year students or above	Number of credits	4	Year/semesters	2025/Intensive, First semester
Days and periods	Intensive	Class style	Seminar (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

[Course requirements]

[Evaluation methods and policy]

[Textbooks]

Not used

[References, etc.]

   Reference books

[Study outside of class (preparation and review)]

  Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 45995 GJ77

Course title (and course title in English)	Graduation Thesis 1		Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,KISHIDA KIYOUSUKE Graduate School of Engineering Associate Professor,ICHII TAKASHI

Target year	4th year students or above	Number of credits	4	Year/semesters	2025/Intensive, Second semester
Days and periods	Intensive	Class style	Seminar (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

3
6
6

[Course requirements]

[Evaluation methods and policy]

[Textbooks]

[References, etc.]

　　Reference books

[Study outside of class (preparation and review)]

　Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 45995 GJ77

Course title (and course title in English)	Graduation Thesis 1		Instructor's name, job title, and department of affiliation	Graduate School of Energy Science Professor,IMATANI SHIYOUJI

Target year	4th year students or above	Number of credits	4	Year/semesters	2025/Intensive, Second semester

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

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

[Course requirements]

[Evaluation methods and policy]

[Textbooks]

Not used

[References, etc.]

Reference books

[Study outside of class (preparation and review)]

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 45995 GJ77		

Course title (and course title in English)	Graduation Thesis 1	Instructor's name, job title, and department of affiliation	Graduate School of Engineering KANKEI KYOIN Graduate School of Engineering Professor,HINOKI TATSUYA Graduate School of Engineering Professor,MAJIMA TAKUYA

Target year	4th year students or above	Number of credits	4	Year/semesters	2025/Intensive, Second semester

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

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

[Course requirements]

[Evaluation methods and policy]

[Textbooks]

Not used

[References, etc.]

　Reference books

[Study outside of class (preparation and review)]

　Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 45998 GJ77

Course title (and course title in English)	Graduation Thesis 2		Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,NISHIWAKI SHINJI

Target year	4th year students or above	Number of credits	6	Year/semesters	2025/Intensive, Second semester

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

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

[Course requirements]

[Evaluation methods and policy]

(2)

[Textbooks]

[References, etc.]

Reference books

                                          (   )   ISBN:9784121006240

[Study outside of class (preparation and review)]

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 45998 GJ77		

Course title (and course title in English)	Graduation Thesis 2	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,NISHIWAKI SHINJI

Target year	4th year students or above	Number of credits	6	Year/semesters	2025/Intensive, First semester
Days and periods	Intensive	Class style	Seminar (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

[

[Course objectives]

[Course schedule and contents]

[Course requirements]

[Evaluation methods and policy]

(2)

[Textbooks]

[References, etc.]

Reference books

( )　ISBN:9784121006240

[Study outside of class (preparation and review)]

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 45998 GJ77		
Course title (and course title in English)	Graduation Thesis 2	**Instructor's name, job title, and department of affiliation**	Graduate School of Engineering Professor,KISHIDA KIYOUSUKE Graduate School of Engineering Associate Professor,ICHII TAKASHI

Target year	4th year students or above	**Number of credits**	6	**Year/semesters**	2025/Intensive, Second semester

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

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

[Course requirements]

[Evaluation methods and policy]

[Textbooks]

[References, etc.]

   Reference books

(2)

[Study outside of class (preparation and review)]

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 45998 GJ77		

Course title (and course title in English)	Graduation Thesis 2	Instructor's name, job title, and department of affiliation	Graduate School of Energy Science Professor,IMATANI SHIYOUJI

Target year	4th year students or above	Number of credits	6	Year/semesters	2025/Intensive, Second semester

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

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

[Course requirements]

[Evaluation methods and policy]

(2)

[Textbooks]

Not used

[References, etc.]

   Reference books

[Study outside of class (preparation and review)]

   Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 45998 GJ77					
Course title (and course title in English)	Graduation Thesis 2			**Instructor's name, job title, and department of affiliation**	Graduate School of Engineering KANKEI KYOIN Graduate School of Engineering Professor,HINOKI TATSUYA Graduate School of Engineering Professor,MAJIMA TAKUYA	
Target year	4th year students or above	**Number of credits**	6	**Year/semesters**	2025/Intensive, Second semester	
Days and periods	Intensive	**Class style**	Seminar (Face-to-face course)	**Language of instruction**	Japanese	

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

(   )

[Course requirements]

[Evaluation methods and policy]

(   )

[Textbooks]

Not used

[References, etc.]

Reference books
Introduced during class

[Study outside of class (preparation and review)]

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 45998 GJ77		

Course title (and course title in English)	Graduation Thesis 2	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,TAKATA SHIGERU

Target year	4th year students or above	Number of credits	6	Year/semesters	2025/Intensive, Second semester

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

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

[Course requirements]

[Evaluation methods and policy]

(2)

[Textbooks]

Not used

[References, etc.]

　Reference books

[Study outside of class (preparation and review)]

　Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 45998 GJ77		

Course title (and course title in English)	Graduation Thesis 2	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Professor,KISHIDA KIYOUSUKE Graduate School of Engineering Associate Professor,ICHII TAKASHI

Target year	4th year students or above	Number of credits	6	Year/semesters	2025/Intensive, First semester

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

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

[Course requirements]

[Evaluation methods and policy]

[Textbooks]

[References, etc.]

   Reference books

(2)

[Study outside of class (preparation and review)]

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 45998 GJ77		

Course title (and course title in English)	Graduation Thesis 2	Instructor's name, job title, and department of affiliation	Graduate School of Energy Science Professor,IMATANI SHIYOUJI

Target year	4th year students or above	Number of credits	6	Year/semesters	2025/Intensive, First semester

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

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

[Course requirements]

[Evaluation methods and policy]

(2)

[Textbooks]

Not used

[References, etc.]

  Reference books

[Study outside of class (preparation and review)]

  Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG25 45998 GJ77				
Course title (and course title in English)	Graduation Thesis 2		**Instructor's name, job title, and department of affiliation**	Graduate School of Engineering KANKEI KYOIN Graduate School of Engineering Professor,HINOKI TATSUYA Graduate School of Engineering Professor,MAJIMA TAKUYA	
Target year	4th year students or above	**Number of credits**	6	**Year/semesters**	2025/Intensive, First semester
Days and periods	Intensive	**Class style**	Seminar (Face-to-face course)	**Language of instruction**	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

(   )

[Course requirements]

[Evaluation methods and policy]

(   )

[Textbooks]

Not used

[References, etc.]

　Reference books
Introduced during class

[Study outside of class (preparation and review)]

　Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG26 16063 LJ72

Course title (and course title in English)	Fundamentals of Circuit Theory	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Associate Professor,HISAKADO TAKASHI

Target year	1st year students or above	Number of credits	2	Year/semesters	2025/First semester

Days and periods	Tue.5	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

The course introduces the fundamentals of the electric circuit. Topics covered include: resitive elemnts and networks; independent sources; switches and dynamics of first- and second-order networks; phasor analysis; 2-port circuits.

[Course objectives]

Students are expected to learn the transient analysis by differential equation and steady state analysis by phasor.

[Course schedule and contents]

DC circuit,3times,We introduce Kirchhoff#039s current law and Kirchhoff#039s voltage law, Ohm#039s law and independent sources.
Differential equation of circuit,5times,We introduce inductors and capacitors and explain the differential equation of circuit.
AC circuit,4times,We introduce phasor and explain the steady state analysis.
two-port circuit,2times,We extend one-port elements to two-port circuits.
academic achievement test,1time,The level of understanding on this lecture will be confirmed.

[Course requirements]

None

[Evaluation methods and policy]

Reports and examinations

[Textbooks]

ISBN:4254227469

[References, etc.]

Reference books

[Study outside of class (preparation and review)]

After the lesson, solve problems in the text.

Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG29 39025 LJ55 U-ENG29 39025 LJ10

Course title (and course title in English)	Numerical Analysis		Instructor's name, job title, and department of affiliation	Graduate School of Advanced Integrated Studies in Human Survivability Program-Specific Professor,YOSHIKAWA HITOSHI

Target year	2nd year students or above	Number of credits	2	Year/semesters	2025/Second semester

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

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

,1time,
,6times,
,3times,
,4times,
,1time,

[Course requirements]

None

[Evaluation methods and policy]

[Textbooks]

[References, etc.]

   Reference books

[Study outside of class (preparation and review)]

  Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.

Course number	U-ENG29 49118 LJ55 U-ENG29 49118 LJ10

Course title (and course title in English)	Analysis in Mathematical Sciences		Instructor's name, job title, and department of affiliation	Graduate School of Advanced Integrated Studies in Human Survivability Program-Specific Professor,YOSHIKAWA HITOSHI

Target year	4th year students or above	Number of credits	2	Year/semesters	2025/First semester

Days and periods	Thu.4	Class style	Lecture (Face-to-face course)	Language of instruction	Japanese

[Overview and purpose of the course]

[Course objectives]

[Course schedule and contents]

,1time,
,5times,
,3times,
,2times,
,1time,
,1time,
,1time,
,1time,

[Course requirements]

None

[Evaluation methods and policy]

[Textbooks]

(2)

[Study outside of class (preparation and review)]

  Other information (office hours, etc.)

*Please visit KULASIS to find out about office hours.