

2023

Syllabi

Science
(Graduate Courses)

Rikkyo University

Course Title	Special Topics in Mathematical Physics 1		
Instructor	Kitamura Tomotaka		
Semester	Spring Semester	Credit	2 Credits
Course Number	PHY5290	Language	Japanese

Course Objectives

To study the theory of Lie algebra in relation to particle physics.

Course Contents

As a reading course, we discuss the representation theory of Lie algebra.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LA101

Course Title	Quantum Field Theory		
Instructor	Hatsuda Yasuyuki		
Semester	Spring Semester	Credit	2 Credits
Course Number	PHY5490	Language	Japanese

Course Objectives

The aim of this course is to learn basics on quantum field theory.

Course Contents

This course deals with a perturbative formulation of quantum field theory, mainly focusing on Lorentz invariance, canonical quantizations, path integrals, Feynman rules, loop corrections and renormalizations.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LA102

Course Title	Special Topics in Cosmology 1		
Instructor	Kobayashi Tsutomu		
Semester	Fall Semester	Credit	2 Credits
Course Number	PHY5390	Language	Japanese

Course Objectives

The aim of this course is to understand inflation in string theory.

Course Contents

Students learn inflation in string theory.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LA103

Course Title	Special Topics in Particle Physics 1		
Instructor	Hatsuda Yasuyuki		
Semester	Fall Semester	Credit	2 Credits
Course Number	PHY5490	Language	Japanese

Course Objectives

This course is an introduction to string theory.

Course Contents

(Super)String theory is a candidate of "Theory of Everything." Dualities in this theory implies many new perspectives that are usually hard to be found. We learn fundamental properties in bosonic string theory and conformal field theory.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LA104

Course Title	Special Topics in Astrophysics		
Instructor	Kobayashi Tsutomu		
Semester	Spring Semester	Credit	2 Credits
Course Number	PHY5390	Language	Japanese

Course Objectives

The aim of this course is to understand inflation in effective field theory.

Course Contents

Students learn inflation in effective field theory.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LA105

Course Title	Special Topics in Cosmology 2		
Instructor	Toma Kenji		
Semester	Fall Others	Credit	2 Credits
Course Number	PHY5390	Language	Japanese

Course Objectives

The aim is to overview high-energy astrophysics, and particularly to understand the observational properties and basic physics of high-energy phenomena driven by black holes.

Course Contents

Many of the high-energy astrophysical phenomena such as active galactic nucleus jets and gamma-ray bursts are widely believed to be driven by black holes. They are also closely related to the researches of distant universe probe, cosmic-rays, and gravitational waves. In this course, the observational properties of the phenomena and their basic physics will be reviewed.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LA106

Course Title	Special Topics in Gravity		
Instructor	Harada Tomohiro		
Semester	Fall Semester	Credit	2 Credits
Course Number	PHY5290	Language	Japanese

Course Objectives

General relativity has encountered remarkable developments and established its foundation since the middle of the 20th century to become the most successful theory of gravitation in modern physics. Students will learn the theoretical foundation of general relativity in both formal developments and applications.

Course Contents

Students will learn the basics and some of the advanced topics of general relativity by reading a standard text book, in particular, checking equations, interpreting descriptions and solving exercises.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LA107

Course Title	Astrophysics		
Instructor	Harada Tomohiro		
Semester	Fall Semester	Credit	2 Credits
Course Number	PHY5390	Language	Japanese

Course Objectives

Students will learn the basic of astrophysics.

Course Contents

Most of the observed astrophysical phenomena can be basically understood by the combination of elementary Newtonian gravity, fluid dynamics, electromagnetism and radiative processes. In this course, students will learn the basics of theoretical astrophysics by reading an elementary and standard textbook. Students not only from theory sector but also from experiment and observation are encouraged to attend. This course especially focuses on fluid dynamics in the context of astrophysics.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LA108

Course Title	Special Lecture on Electronics		
Instructor	Baba Hidetada		
Semester	Fall Semester	Credit	2 Credits
Course Number	PHY5590	Language	Japanese

Course Objectives

To learn the basic knowledge on pulse circuits and signal processing which are necessary for radiation measurement and nuclear experiments.

Course Contents

Pulse circuits and signal processing techniques, which are often used in radiation measurements, will be the main topics of this lecture. To give students a practical sense, hands on work on electric circuit will be offered.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LA111

Course Title	Special Topics in Techniques for Nuclear and Radiation Physics		
Instructor	Ozaki Sachi		
Semester	Spring Semester	Credit	2 Credits
Course Number	PHY5990	Language	Japanese

Course Objectives

The course objective is to learn the fundamental knowledge about the technique of the radiation measurement which is necessary to the research of nuclear and particle physics.

Course Contents

The course contents are to learn the principle and the application of the radiation detectors by referring a text written in English, as well as to give a presentation about their own understanding, leading to the ability useful to the research activities.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LA112

Course Title	Special Topics in Cosmic Radiation		
Instructor	Kitamoto Shunji		
Semester	Spring Semester	Credit	2 Credits
Course Number	PHY5390	Language	Japanese

Course Objectives

The aim of this course is understanding atomic structures. State transitions as a X-ray emission- or a absorption- mechanism and X-ray line broadening mechanism are also included.

Course Contents

Observation of the Universe provides us various images, time variations, energy spectra and so on. Recent observation with X-rays also gives us detailed spectral information and therefore we need detailed understanding of X-ray emission and absorption mechanisms in order to interpret the observed data. This course covers the study of atomic structure and the state transition, and the line broadening mechanism, in order to understand X-ray emission and absorption mechanism.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LA115

Course Title	Special Lecture in Modern Physics 1		
Instructor	Noumi Toshifumi		
Semester	Spring Others	Credit	2 Credits
Course Number	PHY6090	Language	Japanese

Course Objectives

The purpose of this course is to learn the concept of low-energy effective field theory and ultraviolet completion as a basis of particle physics and cosmology, and explore possible interplay between quantum gravity and phenomenology.

Course Contents

I will introduce recent developments on phenomenological aspects of quantum gravity with an emphasis on the question "What are quantum gravity constraints on particle physics and cosmology?" As a foundation of research in this direction, the lecture will cover basic topics such as the concept of low-energy effective field theory, the S-matrix theory and black hole thermodynamics.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LA123

Course Title	Special Lecture in Modern Physics 2		
Instructor	Tanaka Takahiro		
Semester	Spring Others	Credit	2 Credits
Course Number	PHY6090	Language	Japanese

Course Objectives

An understanding of gravitational waves, the newly added probe of the universe, is an essential tool for advancing cosmology and astrophysics in the future. The goal of this course is to provide an understanding of the extensive fundamentals necessary for this purpose.

Course Contents

After learning about general relativity and the general basics about gravitational waves, an overview of various gravitational wave sources will be given. Next, we will learn about how to theoretically predict gravitational waveforms from binary star systems. Furthermore, the principles of gravitational wave detection and the fundamentals of data analysis will be explained. Finally, the various physics that are expanding from gravitational wave detection will be described and the constraints on the extension of gravitational theories from gravitational wave observations will be examined in detail.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LA124

Course Title	Special Topics in Particle Physics 2		
Instructor	Mitei		
Semester	Fall Semester	Credit	2 Credits
Course Number	PHY5490	Language	Japanese

Course Objectives

To learn the basics of modern quantum field theories.

Course Contents

We discuss quantizations of Yang–Mills theory as a reading course. (The contents and the schedule may be revised when the lecturer is fixed.)

Others

※Please refer to the “Syllabus & Class Schedule Search System” for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LA133

Course Title	Special Topics in Quantum Field Theory		
Instructor	Kitamura Tomotaka		
Semester	Spring Semester	Credit	2 Credits
Course Number	PHY5490	Language	Japanese

Course Objectives

The aim is to learn the fundamentals of quantum field theory in curved spacetime. Furthermore, we try to comprehend ``the QFT in curved spacetime'' from various fields such as elementary particle physics, cosmology, and gravitational physics.

Course Contents

Quantum field theory in curved spacetime has been an important role to understand elementary particle physics, cosmology, and gravitational physics. In particular, the QFT provides us powerful tools to explain quantum effects in strong gravity such as black hole spacetimes, an expanding universe, and to study quantum theories of gravity related to AdS/CFT correspondence. In this course, we deal with the fundamentals of quantum field theory in curved spacetime and examples of physical phenomena: quantum fluctuations in an expanding universe and particle creations in strong gravitational fields such as the Hawking radiation. We treat topics such as Trace Anomaly and field theories in AdS background if we have enough time. we try to comprehend ``the QFT in curved spacetime'' from various fields such as particle physics, cosmology, and gravitational physics.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LA134

Course Title	Special Lecture in Modern Physics 3		
Instructor	Esumi Shinichi		
Semester	Spring Others	Credit	2 Credits
Course Number	PHY6090	Language	Japanese

Course Objectives

In order to understand a new state of matter called Quark Gluon Plasma (QGP) and QCD phase diagram, the experimental technique with high energy heavy ion collisions and physics data analysis methods are described. The recent experimental results and their interpretations are discussed.

Course Contents

Experimental methods with high energy heavy ion collisions, physics data analysis with soft and hard probes, various temperature measurements including freeze-out stage, collective expansions, partonic energy-loss, hadronization mechanism are described for understanding the nature of QCD phase diagram and Quark Gluon Plasma (QGP) phase transition, and possible existence of Critical Point.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LA146

Course Title	Special Lecture in Modern Physics 4		
Instructor	Suzuki Hidehiko		
Semester	Spring Others	Credit	2 Credits
Course Number	PHY6090	Language	Japanese

Course Objectives

The purpose of this lecture is to understand the basic physical mechanics of the various atmospheric phenomena by applying atmosphere physics which is based on the fluid dynamics and the thermodynamics of the gas.

Course Contents

In atmosphere science, a specific analysis method optimized for the time and spatial scales of focusing phenomena is applied to describe their substantial behavior. In the former part of the lecture, the basis of such an analysis method is introduced. In the latter part of the lecture, the capability of the method to understand the physical mechanism of several basic phenomena on Earth and the planet's atmosphere is demonstrated.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LA147

Course Title	Special Topics in Physics of Planetary Atmospheres		
Instructor	Taguchi Makoto		
Semester	Fall Semester	Credit	2 Credits
Course Number	PHY5390	Language	Japanese

Course Objectives

The aim of this course is to acquire knowledge of phenomena in planetary atmospheres concerning a study of each student.

Course Contents

We read a textbook or a scientific paper on a study field concerning planetary atmospheres, and acquire expertise and technique required for a study in the master's course. The field that seems to be the most effective will be selected among a variety of studies by students. Students are requested to read the literature prior to a class and to introduce its content in a class. A lecturer comments on questions from the students.

[Examples of literature]

E. J. McCartney, Absorption and Emission by Atmospheric Gases

G. G. Shepherd, Spectral Imaging of the Atmosphere

S. J. Bauer and H. Lammer, Planetary Aeronomy

G. W. Petty, A First Course in Atmospheric Radiation

S. W. Bougher, D. M. Hunten, and R. J. Phillips, Venus II

J. R. Holton and G. J. Hakim, Dynamic Meteorology

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LA148

Course Title	Special Topics in Planetary Physics		
Instructor	Kameda Shingo		
Semester	Spring Semester	Credit	2 Credits
Course Number	PHY5390	Language	Japanese

Course Objectives

The aim of this course is to understand the phenomena occurring on planets from the results of research on planetary physics and

Course Contents

We read textbooks or review papers on the planet, and prepare for the latest research. The materials are selected according to the research theme of the students. Basically, we deal with physics related to small bodies and topics related to exoplanets. Students will read through the materials, and the lecturer will support the parts that are difficult to understand.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LA149

Course Title	Special Topics in High Energy Astrophysics		
Instructor	Yamada Shinya		
Semester	Fall Semester	Credit	2 Credits
Course Number	PHY5393	Language	Others

Course Objectives

The course aims to deepen the understanding of high-energy processes occurring in black holes, supernovae remnants, pulsars, relativistic jets, and other sources of non-thermal emission.

Course Contents

Radio, X-ray, and Gamma-ray observations revealed the existence of non-thermal Universe: a broad range of processes related to the creation and propagation of high-energy particles. In this course, one focuses on the foundation of phenomena critical for the understanding of processes taking place in various sources of high energy emission. This includes the special relativity, radiation transfer, and the most relevant non-thermal radiation processes.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LA150

Course Title	General Relativity		
Instructor	Harada Tomohiro		
Semester	Spring Semester	Credit	2 Credits
Course Number	PHY5390	Language	Japanese

Course Objectives

This course introduces the basics of general relativity.

Course Contents

This course is a lecture on general relativity, a theory of spacetime and gravity. General relativity has passed many experimental tests with high accuracy. Its basic ideas are now essential for theoretical physicists in all fields and experimental physicists in gravitational physics. This course is designed for beginning students.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LA201

Course Title	Particle Physics		
Instructor	Kinoshita Shunichiro		
Semester	Spring Semester 1	Credit	2 Credits
Course Number	PHY5490	Language	Japanese

Course Objectives

The aim of this course is to learn the basics of quantum field theory, which is the foundation of modern physics.

Course Contents

Quantum field theory plays important roles in modern physics. In this course, we attempt to understand basic properties of scalar fields, Maxwell fields, and Dirac fields, and quantization of their fields.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LA202

Course Title	Cosmology		
Instructor	Tanahashi Norihiro		
Semester	Spring Semester	Credit	2 Credits
Course Number	PHY5390	Language	Japanese

Course Objectives

The aim of this course is to help students understand the basic concepts of physical cosmology by reading a textbook written in English.

Course Contents

This course deals with the basic concepts of physical cosmology.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LA203

Course Title	Mathematical Physics		
Instructor	Kinoshita Shunichiro		
Semester	Spring Semester 2	Credit	2 Credits
Course Number	PHY5290	Language	Japanese

Course Objectives

The aim of this course is to learn perturbation theory of interacting quantum fields in quantum field theory.

Course Contents

Quantum field theory plays important roles in modern physics. In this course, we learn perturbation theory, path integral quantizations, Feynman rules, renormalizations, in order to deal with interacting quantum fields.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LA205

Course Title	Statistical Physics		
Instructor	Okubo Tsuyoshi		
Semester	Spring Others	Credit	2 Credits
Course Number	PHY5290	Language	Japanese

Course Objectives

This course aims to understand the basics of tensor network representation in statistical physics and quantum many-body problems and to master approximation and computation techniques in tensor networks.

Course Contents

As examples of tensor networks in statistical physics and quantum many-body problems, we will introduce approximate computation by tensor renormalization group and tensor network representation of quantum many-body states. Starting with a review of low-rank approximation of matrices, the lecture will cover the basics and recent developments of tensor networks and their applications.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LA206

Course Title	Nuclear Physics		
Instructor	Murata Jiro		
Semester	Spring Semester	Credit	2 Credits
Course Number	PHY5490	Language	Japanese

Course Objectives

To learn basic knowledge of particle and nuclear physics for the accelerator experiments, including training of the numerical calculation required for experiments.

Course Contents

The 20th century's physics has succeeded in establishing the knowledge and understanding of the fundamental origin of matter and force, by using microscopic and chemical techniques.

In this course, basic knowledge of what was known when radioactivity was discovered, properties of particle and nuclei from atomic nuclei to hadrons, quarks, and leptons investigated using natural radioactivity and accelerators will be lectured to understand the underlying common concepts.

The students will be trained to start experimental research, by applying concrete examples together with the lectures.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LA207

Course Title	Atomic and Molecular Physics		
Instructor	Yamazaki Masakazu		
Semester	Spring Others	Credit	2 Credits
Course Number	PHY5290	Language	Japanese

Course Objectives

Course Contents

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LA209

Course Title	Hadron Physics		
Instructor	Yamaguchi Hidetoshi		
Semester	Spring Semester	Credit	2 Credits
Course Number	PHY5490	Language	Japanese

Course Objectives

Hadrons are fundamental particles that constitute the "matter" in the universe. The hadrons that are most familiar to us are the proton and the neutron, which are the basis of the synthesis of the various elements in the universe. This lecture focuses on the the role of atomic nuclei in the universe, including cutting-edge topics, such as nucleosynthesis and stellar explosions.

Course Contents

It was in the middle of 20th century that the atomic nuclei are found to play essential roles in the evolution of the universe and origin of elements. A variety of elements exist in this world have been synthesized through nuclear reactions from hydrogen atoms, which is on going even today. All these synthesis of elements mainly took place at the early universe (100 seconds after Big bang), and in the main sequence stars that have been created and destroyed for 10 billion years. Nuclear reactions are also dominating the stellar evolution process in producing the energy to shine the stars, and eventually could induce a supernova explosion. Challenges have been made to study these nuclear reactions experimentally on the earth. For example, the RI beam factory (RIBF) at RIKEN, they create various nuclides which have never been produced by mankind before, to know the origin of the elements. Our knowledge on the nucleosynthesis is still not complete, e.g., the synthesis of heavy elements was once considered to be well-known, but recent studies revealed some deficit in our understanding. In this lecture, an overview on the role of atomic nuclei in stellar phenomena is given, and the research method to study that is introduced.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LA211

Course Title	Cosmic Radiation		
Instructor	Kitamoto Shunji		
Semester	Spring Semester	Credit	2 Credits
Course Number	PHY5390	Language	Japanese

Course Objectives

This course presents our recent understanding of the universe, especially based on observational results with X-ray. The overview of the interaction between X-rays and matter is also explained in order to interpret the observational results.

Course Contents

In this course, students will first learn recent concepts about the structure and evolution of the universe. Then students will review interaction between X-rays and matter. The results of the X-ray observation, including recent topics, will be provided and students will understand various astronomical phenomena. X-ray optics and detectors will be introduced.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LA213

Course Title	Radiation Therapy Physics		
Instructor	Sugimoto Satoru		
Semester	Fall Semester	Credit	2 Credits
Course Number	PHY5590	Language	Japanese

Course Objectives

This course aims to learn the basics of medical physics in cancer radiotherapy and to obtain the knowledge necessary to work in a hospital as a medical physicist.

Course Contents

This course will help you understand the dose measurement, dose calculation, and treatment techniques necessary for radiotherapy. In addition, you will participate in a field trip to a clinical site to observe the practice of medical physicists. The field trip will be scheduled according to your availability if offered outside of class hours.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LA221

Course Title	Introduction to Medicine		
Instructor	Shikama Naoto		
Semester	Fall Semester	Credit	2 Credits
Course Number	PHY5940	Language	Japanese

Course Objectives

The role of radiotherapy in multidisciplinary treatment for cancers will be introduced, and the role of science and technology for medical science will be clarified.

Course Contents

Mortality due to cancers are still high, and the basic law for cancer control has been enacted as one of the important medical policies. Knowledge of biology, physics, and biostatistics is required to learn radiation therapy in cancer treatment, and the characteristics of cancer cells, radiation sensitivity, ingenuity to reduce toxicity, characteristics of new radiotherapy technology, etc. In order to practice patient-centered medical care, close cooperation with various medical staffs such as medical doctors, nurses, radiologists, medical physicists, clinical engineers, and laboratory engineers is essential. Clinical trials are important for the development of cancer treatment strategy, and various academic fields including biostatistics, behavioral medicine, and medical judgment are required. In order to understand the roles of various medical staffs and develop better medical care, active contributions of the science and engineering fields are desired, and we would like to consider the possibility together.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LA223

Course Title	Internship(Medical Physicist)		
Instructor	Kurita Kazuyoshi/Sugimoto Satoru		
Semester	Summer Session	Credit	1 Credit
Course Number	PHY5940	Language	Japanese

Course Objectives

This class is designed for the minor in medical physics. It enables student to deepen the understanding of the medical physicists by experiencing the actual tasks in clinical environment.

Course Contents

This class is an intensive training course. Details will be given by the instructors at the organization. The training will be offered at Juntendo University Hospital in this JFY.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LA224

Course Title	Planetary Physics		
Instructor	Kameda Shingo		
Semester	Spring Semester	Credit	2 Credits
Course Number	PHY5390	Language	Japanese

Course Objectives

This course aims to develop knowledge about the phenomena observed in the recent lunar and planetary exploration program; the observation results of the astronomical objects and the latest results from the planetary and satellite landing surveys. Students also come to understand the nature of the exoplanets.

Course Contents

In Japan's lunar and planetary exploration program, the moon orbiting satellite Kaguya and the asteroid explorer have observed an astronomical object with no atmosphere. Subsequently, the asteroid explorer Hayabusa2 and Mervury Explorer Mio was launched. The Mars satellite exploration plan MMX is in preparation. The moon, asteroids and Mercury are all objects with almost no atmosphere. In this course, we will study the latest research results on these objects and the scientific purpose of future exploration plans. On the moon, Mercury surface is near vacuum but there is a dilute metallic atmosphere. We will discuss the origin of the dilute atmosphere using observations from ground-based telescopes and observations from spacecraft. As for asteroids, I will focus on Ryugu on which Hayabusa 2 performed observations and other similar objects, and introduce scientific results obtained by sample return.

In addition, many observations of exoplanets by telescopes have been made, and planets expected to be similar to the Earth have been discovered.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LA226

Course Title	Colloquium 2		
Instructor	※		
Semester	Fall Others	Credit	1 Credit
Course Number	PHY6800	Language	Japanese

Course Objectives

The aim is to deepen the understanding of the research area of students, expand their interest and understanding to the surrounding areas and improve their presentation skills.

Course Contents

Students deepen their understanding by reading and introducing the relevant papers and textbooks and by presentation and discussion on their research theme.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LA352

Course Title	Research for Master's Thesis 2		
Instructor	※		
Semester	Fall Others	Credit	3 Credits
Course Number	PHY6080	Language	Japanese

Course Objectives

The aim is to understand the background, purpose, and method of the research of each student. Through research activities, students acquire specialized knowledge, technique, and physical thinking ability, and develop problem-solving ability. Moreover, they will acquire skills for research presentation and response to questions and comments.

Course Contents

Under the guidance of a supervisor, students will determine the research theme of their own. They implement research after understanding the background, purpose and method of the research theme. They can proceed to more advanced theme through the careful investigation of the obtained results and the discussions with their supervisor.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LA561

Course Title	Master's Thesis		
Instructor	※		
Semester	Fall Others	Credit	3 Credits
Course Number	PHY6080	Language	Japanese

Course Objectives

The aim is to understand the background, purpose, and method of the research of each student. Through research activities, students acquire specialized knowledge, technique, and physical thinking ability, and develop problem-solving ability. Moreover, they will acquire skills for research presentation and response to questions and comments. Students write master theses based on the research results in the course "Special Research (Theory)".

Course Contents

Under the guidance of a supervisor, students will determine the research theme of their own. They write master theses based on the research results

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LA651

Course Title	Lecture on Analytical Chemistry		
Instructor	Miyabe Kanji/Iwahata Daigo		
Semester	Spring Others	Credit	2 Credits
Course Number	CHE5390	Language	Japanese

Course Objectives

To understand the basics, characteristics, and basic principles (separation mechanisms, etc.) of high-performance separation analysis methods (high-performance liquid chromatography, gas chromatography, capillary electrophoresis, etc.), and to learn about their use in actual applications and acquire various related knowledge.

Course Contents

First, the position of separation analysis as one of the instrumental analysis methods is outlined, and the basics of high-performance liquid chromatography (HPLC) and gas chromatography are explained. Next, the analytical theory of separation behavior and the practical aspects of experimental equipment are explained. This is followed by a discussion of recent technological trends in the development of high-performance, high-speed separation methods. In addition, capillary electrophoresis will be outlined, and its application to the analysis of intermolecular interactions and interfacial permeation phenomena will be explained. In the latter half of the lecture, we will discuss various uses of analytical techniques in actual manufacturing sites and production processes.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LB101

Course Title	Lecture on Organic Chemistry		
Instructor	Morimoto Masakazu/Yamanaka Masahiro/Minoura Mao		
Semester	Spring Semester	Credit	2 Credits
Course Number	CHE5490	Language	Japanese

Course Objectives

Learn the basic principles of organic chemistry. Generally review the basic concepts and laws that are important for understanding organic reactions.

Course Contents

The lecturer will explain the basic reaction patterns based on electron movement so that the students will understand it from principle. First, after confirming fundamental electron movement through organic chemical reactions, the lecturer will explain acids and bases, nucleophilic addition reaction, nucleophilic substitution reaction, electrophilic addition reaction, electrophilic substitution reaction, elimination reaction, oxidization and deoxidization, and various other organic chemical reactions, and also touch upon substituent effects and solvent effects. The lecturer will also explain how to plan rational synthetic strategies in organic synthesis.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LB108

Course Title	Advanced Lecture on Organic Chemistry 1		
Instructor	Ishida Shintaro		
Semester	Fall Others	Credit	2 Credits
Course Number	CHE5490	Language	Japanese

Course Objectives

This class aims at in-depth understanding the structure and characteristics of organic compounds containing main group elements.

Course Contents

The chemistry of organic main group element compounds is systematically reviewed. In particular, characteristic reactions of 1, 2, and 13–15 element compounds is presented based on their structure and properties. Among these, silicon and phosphorus chemistry is explained in detail.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LB109

Course Title	Lecture on Physical Chemistry		
Instructor	Mochizuki Yuji/Nagano Shusaku/Tanabe Ichiro		
Semester	Fall Semester	Credit	2 Credits
Course Number	CHE5290	Language	Japanese

Course Objectives

This class provides a deep understanding of molecular electronic states and interactions between molecules and light (i.e. electromagnetic waves) based on quantum theory. Besides, students will study the basic concepts for intermolecular forces as a basis for soft matter chemistry and structural analysis method of molecular ordered structure.

Course Contents

In the first part, students study the intermolecular and surface forces, condensed phase of molecules, and structural analysis for soft matter. In the latter part, the class covers the interaction between molecules and light in classical and quantum mechanics and theoretical understandings of molecular vibration, light absorption, and emission processes.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LB140

Course Title	Advanced Lecture on Physical Chemistry 2		
Instructor	Nagano Shusaku		
Semester	Fall Semester	Credit	2 Credits
Course Number	CHE5290	Language	Japanese

Course Objectives

In this course, students study the behavior and functions of soft materials (surfactants, liquid crystals and polymers) based on colloid chemistry, interface science and polymer chemistry.

Course Contents

Soft matter (soft materials) such as polymers, liquid crystals, gels, and molecular films exhibit strong synergistic effects and provides fascinating molecular organized structures and material systems in both basic science and practical applications. For designing the soft mater, understanding chemistry on the molecular organization is essential. In this class, students study the behavior of molecular and macromolecular aggregates based on colloid/interface science, organization process, structures, properties, functions (mainly photofunctions), etc. The class will cover the basics and the latest research topics on molecular organizations.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LB142

Course Title	Advanced Lecture on Organic Chemistry 4		
Instructor	Konishi Genichi		
Semester	Fall Semester	Credit	2 Credits
Course Number	CHE5490	Language	Japanese

Course Objectives

The purpose of this course is to understand the characteristics of polymers, synthesis methods, basic physical properties, and the essence of the polymer industry.

Course Contents

This lecture covers the characteristics of polymers, synthesis methods, basic physical properties, and the essence of the polymer industry. In addition, process chemistry of polymers is also introduced.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LB147

Course Title	Special Lecture 1		
Instructor	Aikawa Kohsuke/Kano Taichi		
Semester	Spring Others	Credit	2 Credits
Course Number	CHE6090	Language	Japanese

Course Objectives

The following three elements are important for the synthesis of target compounds.

(1) Construction of carbon skeleton, (2) functional group transformation, oxidation and reduction, (3) control of stereochemistry
 In this lecture, we will learn the tactics (various selective reactants, etc.) and strategies (retrosynthetic analysis, etc.) of target compound synthesis, focusing on these three elements. I would like you to realize just how easily the problems that previous researchers overcome with special ingenuity can now be easily solved through tactical advances.

Course Contents

Synthetic Organic Chemistry/Organometallic Chemistry directed toward Organic Synthesis

- Trace the history of synthetic organic chemistry (synthesis of quinine, longifolene, and prostaglandins)
- Multi-step synthesis design (retrosynthetic analysis)
- Stereocontrol (chiral pool method, chiral induced method, asymmetric synthesis method)
- Transition metal catalysis for organic synthesis
- Catalytic asymmetric synthesis (transition metal catalysts, organic molecular catalysts)
- Organofluorine Chemistry

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LB151

Course Title	Special Lecture 4		
Instructor	Kikkawa Haruhiko		
Semester	Fall Semester	Credit	2 Credits
Course Number	CHE6090	Language	Japanese

Course Objectives

The safe handling of chemical substances is in the process of changing from management through legal regulations based on environmental problems to management through risk assessment which takes into account hazardousness and toxicity as well as dietary intake. In the lecture, the students will understand the risk assessment of chemical substances, and acquire the ability to judge in general various situations which occur in research and technical professions.

Course Contents

Among chemical substances, there are those which carry the danger of explosiveness and inflammability, and those which pose a hazardous risk to human health and living organisms in the environment. The lecturer will explain the legal regulations, dangers, and toxicity of chemical substances, and furthermore broaden to risk assessment taking into account dietary intake and risk communication. The lecturer will lecture on the fact that the approach to risk is connected to a broad approach when making technical judgments regarding society.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LB154

Course Title	Special Lecture 7		
Instructor	Yasuike Tomokazu		
Semester	Fall Semester	Credit	2 Credits
Course Number	CHE6090	Language	Japanese

Course Objectives

The aim of this course is to enable students to correctly distinguish various elementary processes behind optical functions of molecular systems, and to understand theoretical frameworks for dealing with these processes.

Course Contents

In order to realize highly efficient artificial photosynthesis and solar cells, which have been strongly demanded in recent years, it is necessary to understand the elementary processes that support the optical functions in molecular systems. In this lecture, we will explain the theoretical framework for dealing with light absorption, excitation energy transfer, and electron transfer in molecules and molecular assemblies. Recent developments in artificial photosynthesis, solar cells, and organic semiconductor devices will be reviewed, and problems to be overcome will be identified.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LB157

Course Title	Chemical English		
Instructor	Masuda Mari		
Semester	Spring Semester	Credit	2 Credits
Course Number	CHE5993	Language	Others

Course Objectives

Many scientific papers are published in English, and there are increasing opportunities to participate in international conferences to present and discuss research results. It is also becoming commonplace to conduct research with students from overseas and communicate with them in a global environment while in Japan. In addition, an increasing number of scientific conferences, even those held in Japan, are incorporating English as an official language. The goal of this course is to help students acquire the ability to present and discuss their research results more effectively and confidently in English.

Course Contents

Students will learn technical terms and practical expressions in English. They will also learn how to write an abstract of their research in English and how to speak confidently about their research. They will have the opportunity to give presentations and Q&A sessions using slides they have prepared. In addition, CV (Curriculum Vitae), cover letter, and email writing will be introduced in class. The content (e.g., presentation opportunities) and objectives may change depending on the students' English level and the number of students enrolled.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LB159

Course Title	Special Lecture 10		
Instructor	Wada Tohru		
Semester	Fall Semester	Credit	2 Credits
Course Number	CHE6090	Language	Japanese

Course Objectives

The lecturer will touch upon advanced sciences stretching across a wide range of fields, and the students will master a broad knowledge while deepening their understanding.

Course Contents

Part-time lecturers engaged in various fields will lecture on recent information about both their research and the relevant fields.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LB162

Course Title	Advanced Lecture on Inorganic Chemistry 2		
Instructor	Wada Tohru		
Semester	Spring Semester	Credit	2 Credits
Course Number	CHE5590	Language	Japanese

Course Objectives

The purpose of this class is to understand the relationship between reactivity and structure of transition-metal complex catalysts aiming for energy conversion. We also learn basic electrochemistry of transition-metal complexes.

Course Contents

In this class, basic principles of electrochemical measurement and its experimental methods, which are indispensable for the research for redox catalysts, will be described. Furthermore, catalytic reactions of transition-metal complexes aiming for energy conversion will be explained. We learn specific examples of research on the evaluation of redox behavior and catalytic activity of complexes revealed by electrochemical measurements. Over the course of several lessons, we will introduce one research topic and understand the background and significance of that research, and how the structure of a precisely designed complex expresses its function.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LB165

Course Title	Advanced Lecture on Analytical Chemistry 2		
Instructor	Tabuchi Mari		
Semester	Fall Semester	Credit	2 Credits
Course Number	CHE5590	Language	Japanese

Course Objectives

The students will learn methods of statistical data analysis in bioinorganic analysis. Moreover, the students will learn measuring techniques for particles of bioinorganic samples.

Course Contents

In bioinorganic analysis, the statistical data analysis obtained will become essential. Accordingly, the students will learn about methods of statistical data analysis from the 1st to the 9th class. Generally, the data in repeated experiments is analyzed as something which obeys Gaussian distribution. Nevertheless, in biological samples, there is not only Gaussian distribution, and there are also frequent instances where the data quantity is small. Therefore, in the first half, the students will learn about regular parametric significance tests, and in the latter half, nonparametric tests. By solving practice problems, students will deepen their understanding of the material (each student must bring a scientific calculator). From the 10th to the 13th class, the students will learn about measuring methods for particles and their principals and practice.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LB166

Course Title	Colloquium 1		
Instructor	※		
Semester	Spring Others	Credit	1 Credit
Course Number	CHE6980	Language	Japanese

Course Objectives

In this course, students will intensely study literature related to the field of their Graduation Research and present the information they have learned. In addition to acquiring the knowledge necessary to complete their Graduation Research, this course aims to help students sharpen their literature reading comprehension skills along with their presentation skills.

Course Contents

In this course, students will intensely study literature (specialized publications and academic papers) related to the field of their Graduation Research. Students will present the information they have learned along with progress updates on their research project. Through lively group discussions with the instructor and other lab members, students will acquire knowledge in various fields of research while sharpening their presentation skills and cultivating a logical way of thinking.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LB301

Course Title	Colloquium 1		
Instructor	※		
Semester	Spring Others	Credit	1 Credit
Course Number	CHE6980	Language	Japanese

Course Objectives

In this course, students will intensely study literature related to the field of their Graduation Research and present the information they have learned. In addition to acquiring the knowledge necessary to complete their Graduation Research, this course aims to help students sharpen their literature reading comprehension skills along with their presentation skills.

Course Contents

In this course, students will intensely study literature (specialized publications and academic papers) related to the field of their Graduation Research. Students will present the information they have learned along with progress updates on their research project. Through lively group discussions with the instructor and other lab members, students will acquire knowledge in various fields of research while sharpening their presentation skills and cultivating a logical way of thinking.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LB302

Course Title	Colloquium 1		
Instructor	※		
Semester	Spring Others	Credit	1 Credit
Course Number	CHE6980	Language	Japanese

Course Objectives

In this course, students will intensely study literature related to the field of their Graduation Research and present the information they have learned. In addition to acquiring the knowledge necessary to complete their Graduation Research, this course aims to help students sharpen their literature reading comprehension skills along with their presentation skills.

Course Contents

In this course, students will intensely study literature (specialized publications and academic papers) related to the field of their Graduation Research. Students will present the information they have learned along with progress updates on their research project. Through lively group discussions with the instructor and other lab members, students will acquire knowledge in various fields of research while sharpening their presentation skills and cultivating a logical way of thinking.

Others

※Please refer to the “Syllabus & Class Schedule Search System” for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LB303

Course Title	Colloquium 2		
Instructor	※		
Semester	Fall Others	Credit	1 Credit
Course Number	CHE6980	Language	Japanese

Course Objectives

In this course, students will intensely study literature related to the field of their Graduation Research and present the information they have learned. In addition to acquiring the knowledge necessary to complete their Graduation Research, this course aims to help students sharpen their literature reading comprehension skills along with their presentation skills.

Course Contents

In this course, students will intensely study literature (specialized publications and academic papers) related to the field of their Graduation Research. Students will present the information they have learned along with progress updates on their research project. Through lively group discussions with the instructor and other lab members, students will acquire knowledge in various fields of research while sharpening their presentation skills and cultivating a logical way of thinking.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LB356

Course Title	Colloquium 2		
Instructor	※		
Semester	Fall Others	Credit	1 Credit
Course Number	CHE6980	Language	Japanese

Course Objectives

In this course, students will intensely study literature related to the field of their Graduation Research and present the information they have learned. In addition to acquiring the knowledge necessary to complete their Graduation Research, this course aims to help students sharpen their literature reading comprehension skills along with their presentation skills.

Course Contents

In this course, students will intensely study literature (specialized publications and academic papers) related to the field of their Graduation Research. Students will present the information they have learned along with progress updates on their research project. Through lively group discussions with the instructor and other lab members, students will acquire knowledge in various fields of research while sharpening their presentation skills and cultivating a logical way of thinking.

Others

※Please refer to the “Syllabus & Class Schedule Search System” for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LB357

Course Title	Colloquium 3		
Instructor	※		
Semester	Spring Others	Credit	1 Credit
Course Number	CHE6980	Language	Japanese

Course Objectives

In this course, students will intensely study literature related to the field of their Graduation Research and present the information they have learned. In addition to acquiring the knowledge necessary to complete their Graduation Research, this course aims to help students sharpen their literature reading comprehension skills along with their presentation skills.

Course Contents

In this course, students will intensely study literature (specialized publications and academic papers) related to the field of their Graduation Research. Students will present the information they have learned along with progress updates on their research project. Through lively group discussions with the instructor and other lab members, students will acquire knowledge in various fields of research while sharpening their presentation skills and cultivating a logical way of thinking.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LB402

Course Title	Colloquium 4		
Instructor	※		
Semester	Fall Others	Credit	1 Credit
Course Number	CHE6980	Language	Japanese

Course Objectives

In this course, students will intensely study literature related to the field of their Graduation Research and present the information they have learned. In addition to acquiring the knowledge necessary to complete their Graduation Research, this course aims to help students sharpen their literature reading comprehension skills along with their presentation skills.

Course Contents

In this course, students will intensely study literature (specialized publications and academic papers) related to the field of their Graduation Research. Students will present the information they have learned along with progress updates on their research project. Through lively group discussions with the instructor and other lab members, students will acquire knowledge in various fields of research while sharpening their presentation skills and cultivating a logical way of thinking.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LB457

Course Title	Research for Master's Thesis 1		
Instructor	※		
Semester	Spring Others	Credit	3 Credits
Course Number	CHE6180	Language	Japanese

Course Objectives

The students will conduct research on each topic, master the expertise, technique, as well as ability to think scientifically, and develop problem-solving skills. In addition, the students will carry out research after learning its relevant ethics. Moreover, through the midterm report (oral presentation), the students will cultivate their research presentation skills as well as their Q&A skills.

Course Contents

The students will set their research theme through consultation with their mentor, and carry out a discussion of their research method, the formulation of their research plan, etc., and based on those, proactively incorporate it into their research. The students will carefully examine the obtained research findings, and while organizing them through discussions with their mentor, proceed with their research, as well as link them to advanced research. In addition, the students will attend research ethics lecture classes and safety training, and acquire and practice research ethics. During the course, the students will give a midterm report about their research progress.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LB501

Course Title	Research for Master's Thesis 1		
Instructor	※		
Semester	Spring Others	Credit	3 Credits
Course Number	CHE6180	Language	Japanese

Course Objectives

The students will conduct research on each topic, master the expertise, technique, as well as ability to think scientifically, and develop problem-solving skills. In addition, the students will carry out research after learning its relevant ethics. Moreover, through the midterm report (oral presentation), the students will cultivate their research presentation skills as well as their Q&A skills.

Course Contents

The students will set their research theme through consultation with their mentor, and carry out a discussion of their research method, the formulation of their research plan, etc., and based on those, proactively incorporate it into their research. The students will carefully examine the obtained research findings, and while organizing them through discussions with their mentor, proceed with their research, as well as link them to advanced research. In addition, the students will attend research ethics lecture classes and safety training, and acquire and practice research ethics. During the course, the students will give a midterm report about their research progress.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LB502

Course Title	Research for Master's Thesis 1		
Instructor	※		
Semester	Spring Others	Credit	3 Credits
Course Number	CHE6180	Language	Japanese

Course Objectives

The students will conduct research on each topic, master the expertise, technique, as well as ability to think scientifically, and develop problem-solving skills. In addition, the students will carry out research after learning its relevant ethics. Moreover, through the midterm report (oral presentation), the students will cultivate their research presentation skills as well as their Q&A skills.

Course Contents

The students will set their research theme through consultation with their mentor, and carry out a discussion of their research method, the formulation of their research plan, etc., and based on those, proactively incorporate it into their research. The students will carefully examine the obtained research findings, and while organizing them through discussions with their mentor, proceed with their research, as well as link them to advanced research. In addition, the students will attend research ethics lecture classes and safety training, and acquire and practice research ethics. During the course, the students will give a midterm report about their research progress.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LB503

Course Title	Research for Master's Thesis 2		
Instructor	※		
Semester	Fall Others	Credit	3 Credits
Course Number	CHE6180	Language	Japanese

Course Objectives

The students will conduct research on each topic, master the expertise, technique, as well as ability to think scientifically, and develop problem-solving skills. In addition, the students will carry out research after learning its relevant ethics. Moreover, through the midterm report (oral presentation), the students will cultivate their research presentation skills as well as their Q&A skills.

Course Contents

The students will set their research theme through consultation with their mentor, and carry out a discussion of their research method, the formulation of their research plan, etc., and based on those, proactively incorporate it into their research. The students will carefully examine the obtained research findings, and while organizing them through discussions with their mentor, proceed with their research, as well as link them to advanced research. In addition, the students will attend research ethics lecture classes and safety training, and acquire and practice research ethics. During the course, the students will give a midterm report about their research progress.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LB556

Course Title	Research for Master's Thesis 2		
Instructor	※		
Semester	Fall Others	Credit	3 Credits
Course Number	CHE6180	Language	Japanese

Course Objectives

The students will conduct research on each topic, master the expertise, technique, as well as ability to think scientifically, and develop problem-solving skills. In addition, the students will carry out research after learning its relevant ethics. Moreover, through the midterm report (oral presentation), the students will cultivate their research presentation skills as well as their Q&A skills.

Course Contents

The students will set their research theme through consultation with their mentor, and carry out a discussion of their research method, the formulation of their research plan, etc., and based on those, proactively incorporate it into their research. The students will carefully examine the obtained research findings, and while organizing them through discussions with their mentor, proceed with their research, as well as link them to advanced research. In addition, the students will attend research ethics lecture classes and safety training, and acquire and practice research ethics. During the course, the students will give a midterm report about their research progress.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LB557

Course Title	Research for Master's Thesis 3		
Instructor	※		
Semester	Spring Others	Credit	3 Credits
Course Number	CHE6180	Language	Japanese

Course Objectives

The students will conduct research on each topic, master the expertise, technique, as well as ability to think scientifically, and develop problem-solving skills. In addition, the students will carry out research after learning its relevant ethics. Moreover, through the midterm report (oral presentation), the students will cultivate their research presentation skills as well as their Q&A skills.

Course Contents

The students will set their research theme through consultation with their mentor, and carry out a discussion of their research method, the formulation of their research plan, etc., and based on those, proactively incorporate it into their research. The students will carefully examine the obtained research findings, and while organizing them through discussions with their mentor, proceed with their research, as well as link them to advanced research. In addition, the students will attend research ethics lecture classes and safety training, and acquire and practice research ethics. During the course, the students will give a midterm report about their research progress.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LB602

Course Title	Master's Thesis		
Instructor	※		
Semester	Fall Others	Credit	3 Credits
Course Number	CHE6180	Language	Japanese

Course Objectives

The students will carefully examine their obtained research findings from specialized research 1-3, and through their arrangement, acquire a logical mind as they prepare their master's thesis. Moreover, through the final exam (oral presentation), the students will master their research presentation skills as well as their Q&A skills.

Course Contents

The students will carefully examine their obtained research findings from specialized research 1-3, reflecting on which they will pursue their active study on the themes established during discussions with their mentors. The students will arrange the findings obtained from those research works and prepare their master's thesis. Moreover, the students will take a final exam (oral presentation) concerning their master's thesis.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LB651

Course Title	Master's Thesis		
Instructor	※		
Semester	Fall Others	Credit	3 Credits
Course Number	CHE6180	Language	Japanese

Course Objectives

The students will carefully examine their obtained research findings from specialized research 1-3, and through their arrangement, acquire a logical mind as they prepare their master's thesis. Moreover, through the final exam (oral presentation), the students will master their research presentation skills as well as their Q&A skills.

Course Contents

The students will carefully examine their obtained research findings from specialized research 1-3, reflecting on which they will pursue their active study on the themes established during discussions with their mentors. The students will arrange the findings obtained from those research works and prepare their master's thesis. Moreover, the students will take a final exam (oral presentation) concerning their master's thesis.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LB652

Course Title	Master's Thesis		
Instructor	※		
Semester	Fall Others	Credit	3 Credits
Course Number	CHE6180	Language	Japanese

Course Objectives

The students will carefully examine their obtained research findings from specialized research 1-3, and through their arrangement, acquire a logical mind as they prepare their master's thesis. Moreover, through the final exam (oral presentation), the students will master their research presentation skills as well as their Q&A skills.

Course Contents

The students will carefully examine their obtained research findings from specialized research 1-3, reflecting on which they will pursue their active study on the themes established during discussions with their mentors. The students will arrange the findings obtained from those research works and prepare their master's thesis. Moreover, the students will take a final exam (oral presentation) concerning their master's thesis.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LB653

Course Title	Research in Mathematics 2		
Instructor	※		
Semester	Fall Others	Credit	3 Credits
Course Number	MAT6080	Language	Japanese

Course Objectives

Under their supervisors, each graduate student will, according primarily to the seminar format, read either books on their field of expertise or papers. As needed, the supervisors will also teach expertise in the form of a lecture.

The faculty will provide guidance so that the graduate students will be able to face mathematics with an awareness for problems.

Ultimately, the goal will be to prepare a master's thesis. Therefore, the students will digest either appropriate technical books or papers regarding their research field, and set their research problems and solve them.

Course Contents

In Research in Mathematics 1–4, the graduate students will proactively conduct mathematical research, and the supervisors will provide advice as well as instruction in the necessary knowledge while being mindful of research direction. First of all, each graduate student will, under the advice of their supervisors, decide the details of their research field and select technical books on it. In 1 and 2, the students will read those technical books and absorb the necessary knowledge for research. In 3, the students will reference technical papers, etc. and set their research problems. From the latter half of 3 through 4, the students will continue their inquiries into problem solving through the reading of literature regarding their set problems. This stage is the most important part of the class, and the supervisors will support the students' inquiries through debates with the graduate students and advice. Finally, the supervisors will provide guidance on bringing together the students' findings regarding their research problems as master's theses.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LC021

Course Title	Presentation Seminar1		
Instructor	Sugiyama Kenichi/Nishino Takeo/Abe Takuro		
Semester	Spring Semester	Credit	2 Credits
Course Number	MAT5090	Language	Japanese

Course Objectives

The students will review fundamental contents in algebra, mathematical analysis, and geometry that they learned in classes in the department. Moreover, through solving problems, the students will practice to write mathematical manuscripts.

Course Contents

The supervisors will review fundamental contents in algebra, mathematical analysis, and geometry. The students solve exercises, either by presenting them at the blackboard or submitting their solutions as reports, and give explanations and corrective guidance. Regarding algebra, mathematical analysis, and geometry, the plan is to discuss each topic for about four or five times each.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LC081

Course Title	Presentation Seminar2		
Instructor	Yasuda Masaya/Geisser, Thomas/Mizusawa Yasushi		
Semester	Fall Semester	Credit	2 Credits
Course Number	MAT5080	Language	Japanese

Course Objectives

The goal will be to acquire the communication skills necessary as a graduate student majoring in mathematics—that is to say, the skills to accurately communicate one's research contents to others. Likewise, upon listening to a presentation as an audience member, another goal will be to mathematically engage in communication regarding those contents.

Course Contents

At first, as guidance, the teacher in charge will explain the fundamental points for giving a mathematical presentation. Afterwards, the teacher in charge will give a model presentation and hold a discussion on it. Additionally, the class members will introduce solutions of various problems in mathematics, each of their research contents or the relevant literature, and learn the presentation skills through them. Furthermore, the students will help to improve each other's mathematical communication skills by discussing the contents as well as criticizing the presentation of the other participants' presentations.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LC082

Course Title	Special Lecture on Math. Analysis 1		
Instructor	Yamada Yuji		
Semester	Spring Semester	Credit	2 Credits
Course Number	MAT6390	Language	Japanese

Course Objectives

Using the knowledge of the undergraduate course of analysis, we study more advanced mathematics courses.

Course Contents

There are rich theorems and conjectures in number theory, especially in prime numbers.

Though it is known since the era of Euclid that there is an infinite number of primes, the theorem of arithmetic progressions of Dirichlet was proved recently in the 19th century. The proof is done using the Dirichlet series and L-functions.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LC139

Course Title	Special Lecture on Math. Analysis 4		
Instructor	Yamada Yuji		
Semester	Fall Semester	Credit	2 Credits
Course Number	MAT6390	Language	Japanese

Course Objectives

We study theta functions as typical examples of meromorphic functions and learn their quasi-periodicities and infinite product expressions. As an application of theta functions, we give some solutions to the Yang-Bater equation. We also study the commutative sets of transfer matrices in solvable statistical mechanics.

Course Contents

We study theta functions as typical examples of meromorphic functions and learn their quasi-periodicities and infinite product expressions. As an application of theta functions, we give some solutions to the Yang-Bater equation. We also study the commutative sets of transfer matrices in solvable statistical mechanics.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LC142

Course Title	Special Lecture on Math. Analysis 5		
Instructor	Kakei Saburou		
Semester	Spring Semester	Credit	2 Credits
Course Number	MAT6390	Language	Japanese

Course Objectives

Course Contents

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LC143

Course Title	Special Lecture on Algebra 1		
Instructor	Kumakawa Naoki		
Semester	Spring Semester	Credit	2 Credits
Course Number	MAT6190	Language	Japanese

Course Objectives

The main purpose of this lecture is to study arithmetic properties of integers from the viewpoint of complex analysis.

Course Contents

In most cases, problems in elementary number theory are easy to understand their statements.

However, their solutions often require deep knowledge of other areas of mathematics.

For example, the theory of special functions such as the Riemann zeta function and the gamma function is connected to the theory of numbers. In this lecture, we will study some fundamental properties of these functions and give the proofs of some theorems such as the quadratic reciprocity law and Dirichlet's theorem on arithmetic progressions.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LC147

Course Title	Special Lecture on Algebra 6		
Instructor	Shibata Kazuki		
Semester	Fall Semester	Credit	2 Credits
Course Number	MAT6190	Language	Japanese

Course Objectives

The purpose of this course is for students to learn the basics of commutative algebra. After students learn the definition and basic properties of commutative rings, the course explains specific examples of graded rings to facilitate students' deeper understanding of commutative algebra.

Course Contents

Commutative algebra has a deep relationship with other fields such as manifolds and combinatorics. The field is actively researched and has produced many recent findings. In its first half, this course aims to lecture on the definition and properties of commutative rings. In its latter half, the course aims to cover combinatorial commutative rings, and their properties are described through concrete examples.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LC152

Course Title	Special Lecture on Geometry 2		
Instructor	Sugiyama Kenichi		
Semester	Fall Semester	Credit	2 Credits
Course Number	MAT6290	Language	Japanese

Course Objectives

In this course, we will discuss a theory of minimal surfaces, harmonic maps and surfaces of constant mean curvature in Euclid space of three dimension, after a brief review of fundamental invariants of a surface.

Course Contents

Minimal surfaces and surfaces of a constant mean curvature (which will be denoted by CMC for brevity) are related to holomorphic function via the Weierstrass representation theorem. In this lecture, after a brief review of fundamental theorems of minimal surfaces and CMC, we will explain the Hopf's theorem which says that an immersed CMC in \mathbb{R}^3 is a round sphere and a notion of conjugacy of CMC.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LC156

Course Title	Special Lecture on Statistics 1		
Instructor	Mano Shuhei		
Semester	Spring Semester	Credit	2 Credits
Course Number	MAT6590	Language	Japanese

Course Objectives

Studying discrete and stochastic mathematics in quantum computation.

Course Contents

Fundamentals of quantum computation are explained, and algorithms with applied mathematical interests are introduced. Knowledges of physics, nor information science, nor statistics, are not assumed.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LC167

Course Title	Special Lecture on Information Science 1		
Instructor	Shinohara Naoyuki		
Semester	Spring Semester	Credit	2 Credits
Course Number	MAT6490	Language	Japanese

Course Objectives

Cultivate a better understanding of RSA cryptography, which is commonly used in TLS, to learn about the safety value of public key encryption.

Course Contents

TLS is a protocol that encrypts and transmits information over the Internet, which uses public key encryption and secret key cryptography. In particular, RSA cryptography is widely used for public key encryption with security based upon the difficulty of calculating prime factorization, and research institutes in each country are conducting research on its safety value.

This lecture explains various algorithms related to implementing and deciphering RSA cryptography. Students learn the efficiency of them by either implementing them on the free software Risa/Asir and performing numerical experiments or hand calculation based on those algorithms.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LC191

Course Title	Special Lecture on Information Science 3		
Instructor	Yasuda Masaya		
Semester	Fall Semester	Credit	2 Credits
Course Number	MAT6490	Language	Japanese

Course Objectives

We introduce a basic part of algebraic geometry. Specifically, we aim to have a geometric image of curves in the projective plane and to understand the correspondence between commutative algebra and algebraic varieties. Furthermore, while learning a basic theory on algebraic curves, we will finally aim to understand the group structure of elliptic curves. In addition, we introduce several methods for point-counting on an elliptic curve over a finite field.

Course Contents

We introduce a basic part of algebraic geometry and several methods for point-counting on an elliptic curve over a finite field with the following four chapters:

Chapter 1: Projective plane and plane curves (3 lectures)

Chapter 2: Commutative rings and algebraic varieties (5 lectures)

Chapter 3: Algebraic curve Theory and elliptic curves (4 lectures)

Chapter 4: Point-counting on an elliptic curve over finite fields (2 lectures)

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LC193

Course Title	Probability Theory 2		
Instructor	Suda Hayate		
Semester	Fall Semester	Credit	2 Credits
Course Number	MAT6590	Language	Japanese

Course Objectives

This course will provide the fundamentals of finite Markov chains. Through this theory, participants will become familiar with the basic concepts of probability theory.

Course Contents

A Markov chain is a stochastic process whose state space is discrete and has "Markov property", which is an important generalization of "independence". In this lecture, we focus on Markov chains, especially when the state space is finite, and learn the basics of Markov chains. The lecture will begin with a review of basic terminology, followed by definitions and properties of Markov chains, and then explain mixing time, one of the important topics in Markov chains. The prerequisites for attending this lecture are basic knowledge of analysis and linear algebra, and no prior knowledge of measure theory and measure-theoretic probability theory is required.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LC200

Course Title	Mathematical Statistics 1		
Instructor	Konno Yoshihiko		
Semester	Fall Semester	Credit	2 Credits
Course Number	MAT6590	Language	Japanese

Course Objectives

It is important in the modern society how to draw information from data generated by phenomenon with randomness. In this lecture we learn mathematical foundation on statistical inference. This method consists of ingredients such as probability models which generate random data and inference of the models.

Course Contents

We start by the definition of probability space, random variables, their expectations, and mode of convergence of variables. Next we discuss popular statistical modelling and sampling distributions theory (mainly normal distribution theory). Based on these knowledge, we learn statistical inference such as point estimation, interval estimation, and hypothesis testing. Finally we learn how to evaluate the accuracy of these methods.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LC202

Course Title	Introduction to Molecular Biology		
Instructor	Shiomi Daisuke		
Semester	Spring Semester	Credit	2 Credits
Course Number	LFS5190	Language	Japanese

Course Objectives

Students will learn about regulatory mechanisms of bacterial cell division, morphogenesis and antibiotics resistance. These are regulated by supramolecular complexes. Students learn the functions and structures of supramolecular complexes.

Course Contents

The lecturer will lecture on prokaryotes, particularly with a focus on the advancing analysis of Escherichia coli. As needed, the lecturer will also introduce Bacillus subtilis, Streptococcus, Staphylococcus, thermophilic bacterium, etc. The lecturer will lecture about bacterial cell division, morphogenesis, antibiotics resistance and so on. Additionally, the students will read in turn recent, relevant papers as well as reviews, and discuss with their class members. The students will not only learn about the biological significance of phenomena, but also experimental methods.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LD102

Course Title	Introduction to Cell Biology		
Instructor	Mashima Keisuke		
Semester	Fall Semester	Credit	2 Credits
Course Number	LFS5390	Language	Japanese

Course Objectives

The students will learn the molecular mechanisms of intracellular signal transduction in animal cells.

Course Contents

Cells receive various signals from outside the cell and have intracellular signal transduction mechanisms that respond to those signals. Accordingly, the lecturer will explain the fundamentals of the molecular mechanisms of signal transduction in animal cells. Afterward, the lecturer will introduce the signal transduction mechanisms of immunocompetent cells. Additionally, in the latter half, the students will read literature or technical book regarding various kinds of cellular signal transduction, give presentations and hold discussions on them.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LD105

Course Title	Special Topics in Molecular Biology 2		
Instructor	Sekine Yasuhiko		
Semester	Fall Semester	Credit	2 Credits
Course Number	LFS6190	Language	Japanese

Course Objectives

The students will learn about the mechanisms of the genomes of organisms that give rise to variability and how they have come to change the adaptation and evolution of organisms.

Course Contents

Organisms securely maintain genetic information and pass it on to the next generation, and on the other hand, have mechanisms that change and diversify genomes by assimilating various spontaneous mutations. In the lecture, the lecturer will explain the dynamic kinetics of genomes caused by DNA recombination and their biological significance. Additionally, the students will read English literature regarding genome kinetics.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LD108

Course Title	Special Topics in Cell Biology		
Instructor	Higuchi Maiko		
Semester	Fall Semester	Credit	2 Credits
Course Number	LFS6390	Language	Japanese

Course Objectives

The aim of this course is to understand the molecular mechanisms and the physiological significance of intracellular signal transduction, cell proliferation and migration.

Course Contents

The course will use a combination of lectures, discussions of scientific papers and student-led presentations concerning about intracellular signal transduction, cell proliferation and cell migration.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LD109

Course Title	Special Topics in Biochemistry 1		
Instructor	Suetsugu Masayuki		
Semester	Fall Semester	Credit	2 Credits
Course Number	LFS6290	Language	Japanese

Course Objectives

Course Contents

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LD111

Course Title	Special Topics in Biochemistry 2		
Instructor	Iwakawa Hirooki		
Semester	Spring Semester	Credit	2 Credits
Course Number	LFS6290	Language	Japanese

Course Objectives

RNA plays a central role in gene expression and its regulation. This course is designed to teach students about current RNA biology and to enhance students' understanding of the diverse functions of RNA.

Course Contents

RNA plays a central role in protein biosynthesis as messenger RNA, transfer RNA, and ribosomal RNA. Recently, it has also become clear that small non-coding RNAs and long non-coding RNAs play important roles in the regulation of gene expression. In this course, students will learn about eukaryotic translation mechanisms, the functions of small RNAs such as microRNAs, small interfering RNAs, and piRNAs, and the functions of various long non-coding RNAs such as lincRNAs to understand the diverse functions of RNA.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LD112

Course Title	Special Lecture in Life Science 2		
Instructor	Shiomi Daisuke		
Semester	Spring Semester	Credit	2 Credits
Course Number	LFS5190	Language	Japanese

Course Objectives

The students will thoroughly understand leading-edge research.

Course Contents

Regarding advanced research, the students will learn leading-edge research from world's top researchers.

In addition to the research contents, the students will actually experience for themselves how to proceed with and approach research.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LD116

Course Title	Colloquium 1		
Instructor	※		
Semester	Spring Others	Credit	1 Credit
Course Number	LFS6880	Language	Japanese

Course Objectives

In this course, students will engage in intensive reading of the literature of specific fields of research, which is relate to their own Graduation Research, while giving reports on the progress of their Graduation Research. In doing so, they will sharpen their presentation skills while deepening their knowledge of various fields.

Course Contents

This course should be taken in one's final year studying in the Department of Life Science, and is supposed to be taken in conjunction with one's Graduation Research. During this course, students are to obtain knowledge from various fields necessary to complete their Graduation Research while honing their ability to think in a logical manner. Students will also be able to sharpen their presentation skills. Each individual will be given a plan of study from a supervisor, which they are to follow over the course of the year.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LD301

Course Title	Colloquium 2		
Instructor	※		
Semester	Fall Others	Credit	1 Credit
Course Number	LFS6880	Language	Japanese

Course Objectives

In this course, students will engage in intensive reading of the literature of specific fields of research, which is relate to their own Graduation Research, while giving reports on the progress of their Graduation Research. In doing so, they will sharpen their presentation skills while deepening their knowledge of various fields.

Course Contents

This course should be taken in one's final year studying in the Department of Life Science, and is supposed to be taken in conjunction with one's Graduation Research. During this course, students are to obtain knowledge from various fields necessary to complete their Graduation Research while honing their ability to think in a logical manner. Students will also be able to sharpen their presentation skills. Each individual will be given a plan of study from a supervisor, which they are to follow over the course of the year.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LD356

Course Title	Research for Master's Thesis 1		
Instructor	※		
Semester	Spring Others	Credit	3 Credits
Course Number	LFS6880	Language	Japanese

Course Objectives

The purpose of this class is to familiarize students with a series of research processes, including planning a research plan, conducting experiments, summarizing results and data, concluding and discussing the results, and presenting the results.

Course Contents

Discuss and develop a research plan. Carry out the experimental procedures as instructed. Compile the results and data. Discuss and summarize conclusions and discussion. Make a presentation of the research.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LD501

Course Title	Research for Master's Thesis 2		
Instructor	※		
Semester	Fall Others	Credit	3 Credits
Course Number	LFS6880	Language	Japanese

Course Objectives

The purpose of this class is to familiarize students with a series of research processes, including planning a research plan, conducting experiments, summarizing results and data, concluding and discussing the results, and presenting the results.

Course Contents

Discuss and develop a research plan. Carry out the experimental procedures as instructed. Compile the results and data. Discuss and summarize conclusions and discussion. Make a presentation of the research.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LD556

Course Title	Master's Thesis		
Instructor	※		
Semester	Fall Others	Credit	3 Credits
Course Number	LFS6880	Language	Japanese

Course Objectives

The purpose of this class is to familiarize students with a series of research processes, including planning a research plan, conducting experiments, summarizing results and data, concluding and discussing the results, and presenting the results.

Course Contents

Discuss and develop a research plan. Carry out the experimental procedures as instructed. Compile the results and data. Discuss and summarize conclusions and discussion. Make a presentation of the research.

Others

※Please refer to the "Syllabus & Class Schedule Search System" for details including course schedule, evaluations, textbooks and others.

<URL>

https://sy.rikkyo.ac.jp/web/preview.php?nendo=2023&kodo_2=LD651

