

Graduate School Guidelines

School of Medicine

2022



Tokyo Women's Medical University

Objectives of the Graduate School

Under the University, the Graduate School is positioned to “train leaders in research, practice, education, and administration in the field of medicine with a focus on basic, social, and clinical medicine and research related to these fields.”

Students will reach the following objectives during the course of study.

I General Information

1) General Knowledge

- Understand the known topics about the structure, function, and pathology of human beings and their relationship to health, the environment, and society.
- Understand the unknown topics about the structure, function, and pathology of human beings and their relationship to health, the environment, and society.
- Explain known and unknowns at the organ, cellular, and molecular levels.
- Recognize the importance and position of one's own research.
- Understand and explain the principles, accuracy, sensitivity, and so on of the research methods used.
- Gain familiarity with laboratory regulations (e.g., handling and processing of toxic substances, poisonous substances, and organic solvents).
- Understand the priority of papers and copyright regulations.
- Familiarity with research ethics.

2) General Techniques

- a) Research Methods
 - Understand the purpose of the research.
 - Be able to formulate a research plan.
 - Carry out research using appropriate methods.
 - Comply with the rules of research.
 - Accurately record results.
 - Appropriately analyze and study results.
 - Logically summarize results and draw conclusions.
 - Objectively and simply explain one's results.
 - Engage in discussions with collaborators.
 - Establish a research topic.
- b) Statistics and Information
 - Perform statistical processing using a variety of statistical methods.
 - Collect and exchange necessary information.
 - Be able to use the Internet.
- c) Literature Search
 - Use libraries.
 - Be able to conduct literature searches (including secondary sources).

- d) Reading Papers Understand the thesis arguments (in both Japanese and English).
 Critically examine papers.
- e) Writing Papers Concisely describe the purpose, method, results, and discussion (in this order).
 Summarize a topic for a conclusion.
 Appropriately prepare figures, tables, and so on.
 Cite appropriate literature.
 Correctly and appropriately respond to reviewers' comments on a submission.
 Write in English.
 Proofread manuscripts for publication (Japanese/English).
 Comply with research ethics regarding double submission, using material from other papers, and citations.
- f) Presentation at Academic Conferences Prepare slides and posters.
 Clearly state the main points of the paper.
 Accurately and succinctly answer questions.
 Understand and evaluate others' presentations.
- 3) Knowledge and Skills Related to Medical Education
- Acquire the basic knowledge of educational fundamentals.
 - Acquire educational techniques.
 - Acquire knowledge and skills related to educational assessment.
- 4) General Attitude (Including Motivation and Interest)
- Maintain motivation to conduct one's own research.
 - Develop an interest in the latest research trends.
 - Be able to conduct self-learning and self-development.
 - Cooperate with other researchers and conduct experiments in collaboration.
 - Be able to listen to and discuss with other researchers.
 - Self-assess one's current abilities and seek opinions from appropriate experts.
 - Gain a familiarity with domestic and international laws and guidelines related to research ethics, conflicts of interest, and so on.
 - Comply with research ethics that prohibit falsification or plagiarism of data, concealment of unfavorable data, and the misuse of research funds.

The Common Curriculum (Compulsory)

Integrated Curriculum for the First and Second Semesters of Graduate School

The purpose of this curriculum is for students to acquire the basic knowledge and skills necessary for research, the medical education required to develop as future leaders, and the attitudes necessary to be researchers in a broad range of fields.

Lectures by Professors (Heads of the Core Fields)

The objective of these lectures is to broaden the students' scientific perspective and to further develop excellent research results through exposure to the research and knowledge of professors (heads of the core fields) who are pioneers in various basic and clinical fields and are also familiar to the students.

Practical Training

The purpose of this curriculum is for students to acquire the basic knowledge and practical skills necessary for conducting research that cannot be acquired in the first and second semesters of the general curriculum.

Clinical Medicine Common Lecture and Clinical Medicine Practicum

This course is intended for graduate students in internal medicine and surgery and aims to provide them with a broad perspective, knowledge, skills, and the ability to apply these abilities through exposure to new medical techniques and advanced specialized technologies not limited to their own field of specialization.

Integrated Curriculum for the First Semester of the Graduate School
(for students who enrolled in April 2019 or later)

Course A (for applicants to morphology, functional science, social medicine, advanced biomedical science, internal medicine, or surgery majors)

Asterisks (*) in the Time column indicate that a course will be conducted jointly with Course B

	Time	Lecture and Practical Training Subjects	Faculty in Charge	Location	Contents of Lecture or Practical Training
R4. 4.11 (Monday)	10:35-12:00 *	Fundamentals of Animal Testing (Lecture)	Institute of Laboratory Animals Professor Honda		Animal experiments and laboratory animals: Purpose of and approach to animal experiments, ethics and regulations, animal models, etc.
	13:00-16:00	Fundamentals of Animal Testing (Observation and Practical Training)	Institute of Laboratory Animals Professor Honda Laboratory Staff		Visit to the Institute of Laboratory Animals, demonstration of basic animal testing procedures using various animals
4.12 (Tuesday)	9:00-10:25 *	Introduction to Molecular and Cellular Biology	Professor F. Nakamura		Experimental methods in molecular and cellular biology
	10:35-12:00 *	Introduction to Genetic Medicine	Professor T. Yamamoto		Laws of heredity, gene structure and expression, genetic medicine and ethics
	13:00-14:25	Principles and Practice of Morphological Methods (1)	Assistant Lecturer Kato		Principles of immunohistochemistry
	14:35-16:00	Principles and Practice of Morphological Methods (2)	Lecturer Yokomizo		Principles and demonstration of electron microscopy
4.13 (Wednesday)	9:00-10:25 *	Medical Information	Library Saori Kato		Obtaining and using medical information
	10:35-12:00 *	Processing I (Lectures and Practical Training)	Professor Ishizu		International research and studying abroad
	13:00-14:25	Medical Information	Professor Koga		Obtaining scientific grants and research funds
	14:35-16:00	Processing II (Lectures and Practical Training)	Professor Muragaki		AI and healthcare
	16:10-17:35 *	Research Ethics	Specially Appointed Professor Tsukahara		Responsible research activities, ethical guidelines, clinical research laws, description and consent, personal information, conflicts of interest

4.14 (Thursday)	9:00-10:25 *	Management and Safety of Chemical Substances	Professor Matsuoka		Basics of handling chemical substances, chemical toxicity and health effects, work management, working environment management, etc.
	10:35-12:00 *	Introduction to Regenerative Medicine Engineering (Lecture)	Advanced Biomedical Sciences Laboratory Professor Shimizu		Institute of Advanced BioMedical Engineering and Science, Tissue Engineering
	13:00-16:00	Introduction to Regenerative Medicine Engineering (Lecture)	Advanced Biomedical Sciences Laboratory Professor Yamato, Lecturer Nakayama		Theory and practice of regenerative medicine development Drug delivery systems
4.15 (Friday)	10:35-12:00 *	Basics of Radiation	Lecturer Toramatsu		Basic characteristics of radiation, medical applications of radiation, etc.
	13:00-16:00	Principles and Practice of Research Methods	Medical Research Institute Associate Professor Tanabe		Tour of multidisciplinary joint-use facilities and equipment, explanation of use, etc.

Credit will be granted to those who attend all of the above activities, take the designated courses in the “APRIN e-learning program (eAPRIN)” (see attached), and submit a certificate of completion to the Academic Affairs Division, Faculty of Medicine by the end of May.

Course B (for internal medicine and surgery majors)

Asterisks (*) in the Time column indicates that a course will be conducted jointly with Course A

	Time	Lecture and Practical Training Subjects	Faculty in Charge	Location	Contents of Lecture or Practical Training
R4. 4.11 (Monday)	10:35-12:00 *	Fundamentals of Animal Testing (Lecture)	Institute of Laboratory Animals Professor Honda		Animal experiments and laboratory animals: Purpose and approach to animal experiments, ethics and regulations, animal models, etc.
	13:00-14:25	Overview of Genetic Diagnostics and Therapy	Associate Professor Matsuo		Genetic counseling (general, comprehensive genome analysis and SF, cancer genomics)
4.12 (Tuesday)	9:00-10:25 *	Introduction to Molecular and Cellular Biology	Professor F. Nakamura		Experimental methods in molecular and cellular biology
	10:35-12:00 *	Introduction to Genetic Medicine	Professor T. Yamamoto		Laws of heredity, gene structure and expression, genetic medicine and ethics
	13:00-14:25	Medical Law	Professor Kibayashi		medical law, research and law
	14:35-16:00	Introduction to Clinical Pathology	Professor Nagashima		Clinical examination, pathological analysis, introduction to surgical pathology (histological/cytological diagnosis)
4.13 (Wednesday)	9:00-10:25 *	Medical Information	Library Saori Kato		Obtaining and using medical information
	10:35-12:00 *	Processing I (Lectures and Practical Training)	Professor Ishizu		International research and studying abroad
	14:35-16:00	Introduction to Clinical Pharmacology	Specially Appointed Professor Tsukahara		Expanding the concept of drugs, basics of pharmacology, and pharmacokinetics based on molecular targeted therapeutics
	16:10-17:35 *	Research Ethics			Responsible research activities, ethical guidelines, clinical research laws, description and consent, personal information, conflicts of interest
4.14 (Thursday)	9:00-10:25 *	Management and Safety of Chemical Substances	Professor Matsuoka		Basics of handling chemical substances, chemical toxicity and health effects, work management, working environment management, etc.
	10:35-12:00 *	Introduction to Regenerative Medicine	Advanced Biomedical Sciences		Institute of Advanced BioMedical Engineering and Science, Tissue Engineering

		Engineering (Lecture)	Laboratory Professor Shimizu		
	13:00-13:50	Social Security/Medical Economics	Lecturer Nakajima		Social security system, long-term care insurance system, actual health care economy, social security benefits, national health care expenses, etc.
	14:00-14:50	Patient Safety	Associate Professor Kato		Patient safety, medical risk management, team medicine, medical accident investigation system, etc.
4.15 (Friday)	10:35-12:00 *	Basics of Radiation	Lecturer Toramatsu		Basic characteristics of radiation, medical applications of radiation, etc.
	13:00-14:25	Introduction to Clinical Trials	Professor Tokita		Clinical research design, observational studies, interventional studies, clinical trials
	14:35-16:00	Introduction to EBM	Professor Nohara		Fundamentals of statistical epidemiology, statistical tests, and evidence summary
	16:10-17:35	Introduction to Aging Medicine	Associate Professor Sato		Biology of aging, geriatric syndromes, and comprehensive functional assessment

Credit will be granted to those who attend all of the above activities, take the designated courses in the "APRIN e-learning program (eAPRIN)" (see attached), and submit a certificate of completion to the Academic Affairs Division, Faculty of Medicine by the end of May.

(Attachment) Integrated Curriculum for the First Semester of the Graduate School
(for students who enrolled in April 2019 or later)

Required course items for the APRIN e-learning program (eAPRIN)

Field: Under the Responsible Conduct of Research (RCR), credit will be granted to those who take the following courses and submit a certificate of completion to the Academic Affairs Division, Faculty of Medicine by the end of May after taking all items of Course A or B of the integrated curriculum for the first semester.

Unit Name	Description
Responsible Conduct of Researchers (RCR)	The research community is competitive. Since researchers are responsible for the development of science, we are expected to take the initiative in eliminating counterproductive acts of misconduct occurring in our society. Learn about the origins of the various laws, regulations, and guidelines as well as their paths.
Research Misconduct RCR	Of the various kinds of research misconduct, fabrication, falsification, and plagiarism substantially set back public trust in researchers and jeopardize their support for scientific research. We want to ensure that the world's trust in research publications originating in Japan is unshakable.
Data Handling RCR	Research misconduct does not always occur consciously. Students must learn basic research procedures to avoid the biases and assumptions that often arise among researchers.
Rules for Collaborative Research RCR	Research today is becoming increasingly collaborative with the goal of ensuring scale and quantity. Students must learn the basics of avoiding issues that are likely to arise in the future such as intellectual property rights.
Conflicts of Interest RCR	Conflicts of interest may influence research conclusions. Many researchers in Japan misunderstand conflicts of interests and thus find it difficult to comply with international standards. This problem will be explained starting from the fundamentals.
Authorship RCR	"Authorship" is not only an honor but also an important factor in obtaining jobs, positions, and research funding. Students will learn the international standards of rights and responsibilities regarding authorship and prepare for international publication.
What is Plagiarism? RCR	"Plagiarism" in research is misconduct used to inflate one's achievements. Students will learn the "line" that must not be crossed on this issue, a question that Japanese researchers are considered to be less aware of than their Western counterparts.
Managing Public Research Funds RCR	"Public research funds" is money from public taxes entrusted to fund research. Students will learn the ways in which researchers become complacent in making use of these funds and how to maximize the effective use of such funds in cooperation with administrative staff.

(Attachment) Integrated Curriculum for the First Semester of the Graduate School
(for students enrolled in 2018 and before)

Required course items for the APRIN e-learning program (eAPRIN)

Field: It is recommended that the following courses be taken under the Responsible Conduct of Research (RCR). Only those who have completed the course are required to submit a certificate of completion to the Academic Affairs Division, Faculty of Medicine as soon as possible after completion. (Attendance is not mandatory.)

Unit Name	Description
Responsible Conduct of Researchers (RCR)	The research community is competitive. Since researchers are responsible for the development of science, we are expected to take the initiative in eliminating counterproductive acts of misconduct occurring in our society. Learn about the origins of the various laws, regulations, and guidelines as well as their paths.
Research Misconduct RCR	Of the various kinds of research misconduct, fabrication, falsification, and plagiarism substantially set back public trust in researchers and jeopardize their support for scientific research. We want to ensure that the world's trust in research publications originating in Japan is unshakable.
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Conflicts of Interest RCR	Conflicts of interest may influence research conclusions. Many researchers in Japan misunderstand conflicts of interests and thus find it difficult to comply with international standards. This problem will be explained starting from the fundamentals.
Authorship RCR	"Authorship" is not only an honor but also an important factor in obtaining jobs, positions, and research funding. Students will learn the international standards of rights and responsibilities regarding authorship and prepare for international publication.
What is Plagiarism?	"Plagiarism" in research is misconduct used to inflate one's achievements. Students will learn the "line" that must not be crossed on this issue, a question that Japanese researchers are considered to be less aware of than their Western counterparts.
Managing Public Research Funds RCR	"Public research funds" is money from public taxes entrusted to fund research. Students will learn the ways in which researchers become complacent in making use of these funds and how to maximize the effective use of such funds in cooperation with administrative staff.

2022 Integrated Curriculum for the Second Semester of Graduate School

Students are required to take all of the following courses.

	Time	Lecture and Practical Training Subjects	Faculty in Charge
1. 27. 2023 (Friday)	13:00-14:30	Research Ethics Group work based on case studies	Specially Appointed Professor Tsukahara
	14:30-15:30	Writing of Papers Composition of papers other than original papers	Associate Professor Satoshi Saito
1. 30 (Monday)	9:00-11:00	Planning of Medical Research Drafting a research plan • Research objectives and questions to be addressed • Research style in response to the questions Collection of relevant literature and its verification	Professor Takahiro Okamoto
	11:00-12:30	Medicine Research Planning Drafting a research plan • Medical statistics in research planning	Professor Babazono
	13:30-15:30	Ethics of Publication Legal issues Evaluation of journals for submission and submission process	Professor Katsura
	15:30-16:30	Review of Papers (Practical Training)	Professor Kitagawa
2. 1 (Tuesday)	13:00-14:30	Writing of Papers Composition of original papers	Professor Tanaka
	14:30-15:30	Planning of Medical Research Basic questions Types of research	Nephrology professor of the field

Place:

I. Medical Research Planning and Writing of Papers	Total hours: 11 hours and 30 minutes (person responsible)	
1. When drafting the research plan		1 hour Nephrology Professor of the field
1-1 Basic issues (1) Human rights and ethics (2) Animal ethics (3) Agreements with joint researchers 1-2 Types of research (1) Clinical research, applied research, and basic research (2) Types of papers: original papers, case reports, reviews Other (rapid communication, note, letter to the editor, etc.)		
1-3 Research planning		2 hours Professor Takahiro Okamoto
(1) Research objectives and questions to be addressed (2) Collection of relevant literature and its verification (critically assessing evidence) Objectives 1. Being able to explain the procedures of research activities 2. Being able to explain the collection and examination of literature 3. Methods according to research objectives Explain research traditions Keywords ● Questions to be answered or hypotheses to be tested in the research ● Research design ● Data collection(selection of participants,observation,or measurement) ● Data analysis ● Interpretation and conclusion ● Systematic collection ● Systematic review (critical review) ● Validity of research ● Method for biology ● Method for agriculture ● Method for epidemiology ● Method for ethnography		
(3) Medical statistical aspects in research planning 1) Hypothesis formulation and design for testing 2) Data collection methods 3) Data analysis and presentation methods		
2. Methods of presenting research results (drafting of papers)		1 hour 30 minutes Professor Babazono
2-1 Composition of original papers (1) How to create a title 1) Aim of a title 2) Conditions for a good title 3) Points to remember when writing a title (2) Introduction 1) Elements of an introduction 2) What an introduction should contain 3) Points to remember when writing an introduction (3) Methods 1) Objectives of subjects and methods 2) Standard structure 3) Tips for writing 4) How to write headings 5) Contents and order (4) Results 1) Main objectives 2) Notes on the contents of a description 3) Order of description 4) Necessary elements 5) Role and structure of tables 6) Effective use of figures 7) Description of figures (5) Discussion 1) Significance of discussion Components of discussion 3) Points to remember when writing a description 4) Structuring paragraphs (6) Parts other than IMRAD 1) How to write acknowledgments 2) Importance of references and selection criteria		

2-2 Structure of papers other than original papers (1) Case reports (2) Review articles (3) Other		1 hour Satoshi Saito Associate Professor
3. Ethics of publication 3-1 Misconduct in research and publication 3-2 Double submission 3-3 Copyright and co-authorship agreements 3-4 Conflicts of interest		2 hours Professor Katsura
4. Evaluation of journals for submission process 4-1 Citation index, impact factor 4-2 Submission (1) Compliance with posting regulations (2) Writing letters to the editor (3) Writing letters to reviewers		2 hours Professor Katsura
5. How to write a paper in English		1 hour Professor Kitagawa
6. Evaluation of the paper (practical training) Providing papers for students to review		1 hour Professor Kitagawa
7. Research ethics Group work based on case studies		1 hour 30 minutes Tsukahara Specially Appointed Professor

Lectures by Professors (heads of the core fields)

Place:

For evaluation, in addition to attending each lecture, students are expected to submit designated reports, questionnaires, etc.

No.	Day of Lecture	Person Responsible & Affiliation	Lecture Title	Lecture Overview
2022 -1	May 16, 2022 (Monday) 17:00-19:30	Microanatomy and Morphogenesis Professor Ayako Ishizu	Analysis of Hematopoietic Stem Cell Regulatory Mechanisms	All mature blood cells have a lifespan. The major source of all mature blood cells are the hematopoietic stem cells in the bone marrow. Therefore, regulation of HSC maintenance, self-replication, and differentiation is essential for lifelong hematopoiesis. The focus here is on the latest research in HSC regulatory mechanisms.
2022 -2	June 20, 2022 (Monday) 17:00-19:30	Public Health Professor Michiko Nohara	Reforming the Work Styles of Doctors: How Do Doctors Want to Work?	The Work Style Reform Act stipulates a new ceiling on overtime work, and starting in April 2024, the ceiling will be applicable to medical practitioners, taking into consideration factors such as securing community medical care and improving intensive skills. Therefore, after presenting research results, we will exchange opinions with students on how doctors assess their own work styles and how they would prefer to work.
2022 -3	July 11, 2022 (Monday) 17:00-19:30	Endocrinology Professor Michio Otsuki	Understanding Endocrinology through Clinical Research and Case Analyses	In using clinical research and case analyses to understand endocrinology, results are immediately reflected on the patients. However, it is important to clarify the question that needs to be resolved for patients. I would like to share my fascination with clinical endocrinology through specific clinical studies and case analyses I have conducted.
2022 -4	September 12, 2022 (Monday) 17:00-19:30	Pathology Diagnostics Professor Yoji Nagashima	Pathology of Renal Tumors	Renal tumors are an infrequent but common complication of various familial tumor syndromes. Examinations of these cases have revealed genes that are important in the development of tumors. This lecture reviews the correlation between cancer-related genes such as VHL, c-met, and FCLN and the histology of renal tumors and their relationship to metabolomics.
2022 -5	October 18, 2022 (Tuesday) 17:00-19:30	Rehabilitation Science Professor Hidetaka Wakabayashi	Rehabilitation Nutrition and Clinical Research Experience	Rehabilitation nutrition approaches both rehabilitation and nutrition management to maximize the life functions and quality of life of disabled and frail older adults. Here, we cover how the concept of rehabilitation nutrition was created and our contributions to it through conducting clinical research as a means rather than an end.
2022 -6	November 22, 2022 (Tuesday) 17:00-19:30	Lower Gastrointestin al Surgery Professor Shigeki Yamaguchi	Advances in the Surgical Treatment of Colorectal Cancer	Surgical treatment of colorectal cancer has progressed from extended dissection for healing to function-preservation surgery for quality of life and minimally invasive surgery to reduce burdens. This has been supported by new surgical instruments, new knowledge of surgical anatomy, and new surgical procedures. This lecture explains the shifts and the current surgical treatment of colorectal cancer.

No.	Day of Lecture	Person Responsible & Affiliation	Lecture Title	Lecture Overview
2022-7	Monday, December 19, 2022 17:00-19:30	Inflammatory Bowel Disease Surgery Professor Michio Itabashi	Advances in the Diagnosis and Treatment of Inflammatory Bowel Disease (Ulcerative Colitis/Crohn')	Inflammatory bowel disease (ulcerative colitis and Crohn's disease) often affects young people and its cause is unknown, however, recent advances in technology have improved quality of life due to more accurate endoscopic diagnosis, the development of biologic agents, and the introduction of minimally invasive surgery. The latest treatments and findings as well as problems faced by patients with inflammatory bowel disease will be discussed.
2022-8	January 17, 2023 (Tuesday) 17:00-19:30	Urology Professor Toshio Takagi	Frontiers of Renal Cancer Treatment	Many urological oncologists in Japan offer both surgical and drug treatments. The challenge is exploring prognostic factors related to treatment efficacy to avoid unnecessary side effects, but there are still no definitive factors. Recent findings on kidney cancer surgery and drug treatment are introduced.
2022-9	February 21, 2023 (Tuesday) 17:00-19:30	Oral and Maxillofacial Surgery Professor Toshihiro Okamoto	Diagnostic Methods and Treatment of Oral Mucosal Diseases, Including Oral Cancer, Using Devices	Developing diagnostic methods with high diagnostic accuracy is critical for diseases of the oral mucosa including oral cancer. Today's diagnostic technology includes a device for observing mucosal abnormalities (VELscope) and a special light-observing endoscope system. In addition, we will introduce an image diagnosis analysis method based on artificial intelligence technology using an oral dermoscope developed in our department and explain the actual treatment.
2022-10	March 14, 2023 (Tuesday) 17:00-19:30	Oral and Maxillofacial Surgery Professor Yoko Koga	How Can You Wear the Hat of Both a Clinician and a Researcher?	Everyone in academia wants to be a clinician with a research mindset. The professor introduces her experiences of immersing herself in regenerative medical research during her graduate school years, giving a presentation to obtain a post-doctoral position overseas while still a student, and then moving to the US. She is currently working on dental pulp stem cell research with the aim of using it in clinical applications.

Practical Training

Locations: Morphology Major

Yayoi Education Building 5F, Yayoi Memorial Auditorium, Large Practical Training Lab 1 □

Functional Sciences Major

Yayoi Education Memorial Building 4F, Integrated Research Building 2F, Large Practical Training Lab 2F

Social Medicine Major

Yayoi Education Memorial Building B1F Practical Laboratory & 3F Lecture Room, Tomoe Research and Education Building 1F Forensic Examination Room & AiCT Room, TBD

Advanced Biomedical Science Major

TWIns Advanced Biomedical Sciences Laboratory 2F Innovation Promotion Office, Yayoi Memorial Auditorium Large Practical Training Lab 3, Outpatient Center B2F ME Equipment Management Room

No.	Name of Practicum	Person Responsible	Practical Name	Practicum Outline
2022-11	2022.7.25 (Mon) – 2022.7.29 (Fri)	Social Medicine Major 1) Associate Professor Haruka Sakamoto 2) Professor Michiko Nohara 3) Professor Masato Matsuoka 4) Professor Kazuhiko Kibayashi	1) International Health and Tropical Research 2) Implementation of Medical Statistics 3) Cytotoxicity of Environmental Pollutants 4) Clinical Forensics	1) To compare microscopic diagnostic methods of malaria using field specimens and genetic diagnostic methods using nested PCR. 2) Analyze trends in deaths by cause of death in Japan and quantitatively analyze the burden that various diseases are placing on the health care system in Japan. Through this analysis, students will learn how to analyze mortality data and consider its significance from a public health perspective. 3) Students will conduct basic experiments on the cytotoxicity of environmental pollutants (e.g., heavy metals) using cell culture systems. They will also learn about the experimental overview using model organisms for environmental medicine research. 4) Students will work on forensic issues in clinical practice and learn to appropriately respond to unusual deaths, criminal damage, acute poisoning, etc. Students will receive practical training on ① forensic toxicology, ② forensic serology, and ③ diagnostic imaging at time of death.
2022-12	2022.8.22 (Mon) – 2022.8.26 (Fri)	Functional Sciences Major Professor Shohei Mitani Professor Yoshiro Maru Professor Mariko Miyata Professor Fumio Nakamura	Basic Practical Training in Analyzing Cell Structure and Function Using Genetic Recombination	Cells adapt to various environments and physiological stimuli through gene expression and protein modification from genomic DNA. Methods for visualizing the signal transduction used in cells at that time are useful for understanding biological functions. If Ca sensor genes created by modifying fluorescent protein genes are introduced into a cell and expressed, it is possible to observe intracellular Ca dynamics under a microscope during cell function expression. In this practicum, students will experience a series of principles and specific procedures to create recombinant Ca sensor genes that can be expressed in cells using genetic recombination technology. Since numerous sensor molecules other than Ca are now available, this technique can be applied to many studies.
2022-13	2022.7.25 (Mon) – 2022.7.29 (Fri)	Advanced Biomedical Science Major Professor Masayuki Yamato Professor Tatsuya Shimizu Professor Yoshihiro Muragaki Professor Toshiyuki Yamamoto	1) Tissue engineering experimental methods that form the basis of regenerative medicine 2) Fundamentals and practical training of 3D diagnostic imaging 3) Genetic information collection methods for genomic medicine 4) Drug delivery systems	1) Students will learn basic methods of tissue engineering. They will prepare bioabsorbable supports and cell sheets that serve as the framework for cells and reconstruct three-dimensional tissues using them, and evaluate the regenerated tissues. 2) Students will learn the basics and clinical practice of 3D imaging using MRI equipment. 3) Students will learn to search information via the Internet using genetic information databases. 4) Learn about the water-solubility and characterization of poorly water-soluble drugs using polymeric nanoparticles and hydrogel-type encapsulation technology using natural polymers.
2022-14	2022.8.1 (Mon) – 2022.8.5 (Fri)	Morphology Major Professor Hiroki Fujieda Professor Ayako Nakamura-Ishizu Professor, Department of Pathological	Assessment of retina in animal models of retinal injury using morphological, molecular biological and biochemical techniques	Students will learn basic operations by analyzing changes in the amount of target proteins in injured tissues by immunohistochemical staining and Western blotting, and changes in gene expression levels through RT-PCR.

Practical Training

Social Medicine Major

In-charge: International Environmental and Tropical Medicine 1)
Public Health 2)
Environmental and Occupational Medicine 3)
Forensic Medicine 4)

Specific Objectives:

International Environmental and Tropical Medicine

Understanding the genetic research about the plasmodium falciparum malaria, an important infectious disease in Africa and Asia.

Public Health

We will analyze trends in deaths by cause of death in Japan and quantitatively analyze the burden that various diseases are placing on the health care system in Japan. Through this analysis, students will learn how to analyze mortality data and consider its significance from a public health perspective.

Environmental and Occupational Medicine

Students will analyze cytotoxicity due to exposure to heavy metal compounds, understand the current state of environmental problems, and understand the relationship between various toxic factors in the living and working environment and diseases and disorders.

Forensic Medicine

Students will learn how to solve forensic problems in clinical practice by conducting drug and toxicological instrument analysis, performing physical examinations, and postmortem diagnostic imaging.

Number of Students Accepted: Up to 6

	Morning 9:00-12:00	Afternoon 13:00-16:00
Day 1 7/25 (Mon)	Department In-Charge: Department of International Environmental and Tropical Medicine Classroom Contents: Practical training on Tropical Infectious Diseases (Malaria) Place: Yayoi Memorial Education Building, B1F Practical Training Room In-Charge: Associate Professor Sakamoto, Lecturer Honma, Associate Lecturer Iwashita Assistant Professor Nagi, Assistant Professor Masuda	Department In-Charge: Department of International Environmental and Tropical Medicine Classroom Contents: Practical training on Tropical Infectious Diseases (Malaria) Place: Yayoi Memorial Education Building, B1F Practical Training Room In-Charge: Associate Professor Sakamoto, Lecturer Honma, Associate Lecturer Iwashita Assistant Professor Nagi, Assistant Professor Masuda
Day 2 7/26 (Tue)	Department In-Charge: Department of International Environmental and Tropical Medicine Classroom Contents: Practical training on Tropical Infectious Diseases (Malaria) Place: Yayoi Memorial Education Building, B1F Practical Training Room In-Charge: Associate Professor Sakamoto, Lecturer Honma, Associate Lecturer Iwashita Assistant Professor Nagi, Assistant Professor Masuda	Department In-Charge: Department of Hygiene and Public Health (Public Health) Contents: Epidemiological analysis of mortality data (Life table method) Explanation of the practical training assignments Location: Yayoi Memorial Education Building 3F Lecture Room In-Charge: Professor Nohara, Part-time Lecturer Sato, Associate Professor Sakuraya Assistant Professor Miki
Day 3 7/27 (Wed)	Department In-Charge: Department of Hygiene and Public Health (Public Health) Contents: Epidemiological Analysis of Mortality Data (Kaplan-Meier method, Cox regression analysis) Location: Yayoi Memorial Education Building 3F Lecture Room In-Charge: Professor Nohara, Part-time Lecturer Sato, Associate Professor Sakuraya Assistant Professor Miki	Department In-Charge: Department of Hygiene and Public Health (Environmental and Occupational Medicine) Contents: Molecular Cytotoxicology Practical Training Place: Yayoi Memorial Education Building, B1F Practical Training Room In-Charge: Professor Matsuoka, Associate Professor Komoike, Lecturer Hirota, Assistant Professor Fujiki Assistant Professor Miyayama
Day 4 7/28 (Thu)	Department In-Charge: Department of Hygiene and Public Health (Environmental and Occupational Medicine) Contents: Molecular Cytotoxicology Practical Training Place: Yayoi Memorial Education Building, B1F Practical Training Room In-Charge: Professor Matsuoka, Associate Professor Komoike, Lecturer Hirota, Assistant Professor Fujiki Assistant Professor Miyayama	Department In-Charge: Department of Hygiene and Public Health (Environmental and Occupational Medicine) Contents: Molecular Cytotoxicology Practical Training Place: Yayoi Memorial Education Building, B1F Practical Training Room In-Charge: Professor Matsuoka, Associate Professor Komoike, Lecturer Hirota, Assistant Professor Fujiki Assistant Professor Miyayama
Day 5 7/29 (Fri)	Department In-Charge: Forensic Medicine Department Contents: Forensic Toxicology Practicum (Acute Poisoning and Instrumental Analysis of Medicinal Toxicants) Location: Tomoe Research and Education Building 1F Forensic Examination Room In-Charge: Professor Matsuoka, Associate Professor Shimada, Lecturer Hirota, Assistant Professor Taki Associate Lecturer Nakao, Assistant Professor Machida, Assistant Professor Tatara	Department In-Charge: Forensic Medicine Department Contents: Forensic serology practicum (object examination), postmortem diagnostic imaging Location: Tomoe Research and Education Building 1F Forensic Examination Room, AiCT Room In-Charge: Professor Matsuoka, Associate Professor Shimada, Lecturer Hirota, Assistant Professor Taki Associate Lecturer Nakao, Assistant Professor Machida, Assistant Professor Tatara

In-charge: Physiology (Molecular and Cellular Physiology) Chair:
 Professor Shohei Mitani,
 Lecturer Sawako Moizumi,
 Lecturer Yuji Suehiro,
 Assistant Professor Katfumi Dejima,
 Assistant Professor Keita Yoshida,
 Assistant Professor Luna Izuhara,
 Assistant Professor Naoko Ohno
 Pharmacology : Professor Yoshiro Maru
 Physiology (Neurophysiology) Chair: Professor Mariko Miyata
 Biochemistry : Professor Fumio Nakamura

Practical Training Contents: Basic practical training in analyzing cell structure and function using genetic recombination

Cells adapt to various environments and physiological stimuli through gene expression and protein modification from genomic DNA. Methods for visualizing the signal transduction used in cells at that time are useful for understanding biological functions. If Ca sensor genes created by modifying fluorescent protein genes are introduced into a cell and expressed, it is possible to observe intracellular Ca dynamics under a microscope during cell function expression. In this practicum, students will experience a series of principles and specific procedures to create recombinant Ca sensor genes that can be expressed in cells using genetic recombination technology. Since numerous sensor molecules other than Ca are now available, this technique can be applied to many studies.

Practicum Location: Yayoi Education Memorial Building 4F, Large Practical Training Lab 2, Integrated Research Building 2F Physiology (Department of Molecular and Cellular Physiology) Rental Lab

	Morning 09:00 - 12:00		Afternoon 13:00 - 16:00	
Day 1 August 22 (Monday)	[Lecture] Video of Genetic Recombination Experiments [Lecture] Explanation of Practical Training [Practical training] Amplification of DNA strand by PCR Method	Professor Mitani, Professor Miyata, Professor Maru Professor Nakamura, Lecturer Moizumi	[Lecture] Explanation of Practical Training [Practical] Electrophoresis and purification of PCR products, coiling of linear plasmid DNA and transformation into E. coli	Lecturer Moizumi, Lecturer Suehiro, Assistant Professor Dejima Assistant Professor Yoshida, Assistant Professor Izuhara, Assistant Professor Ohno
Day 2 August 23 (Tuesday)	[Lecture] Explanation of Practical Training [Practical] Colony Selection and Culture	Lecturer Moizumi, Lecturer Suehiro, Assistant Professor Dejima Assistant Professor Yoshida, Assistant Professor Izuhara, Assistant Professor Ohno	[Lecture] Explanation of Practical Training [Practical] Confirmation of inserts by PCR and start of E. coli culture	Lecturer Moizumi, Lecturer Suehiro, Assistant Professor Dejima Assistant Professor Yoshida, Assistant Professor Izuhara, Assistant Professor Ohno
Day 3 August 24 (Wednesday)	[Lecture] Explanation of Practical Training [Practical] Purification and concentration measurement of plasmid DNA	Lecturer Moizumi, Lecturer Suehiro, Assistant Professor Dejima Assistant Professor Yoshida, Assistant Professor Izuhara, Assistant Professor Ohno	[Lecture] Explanation of Practical Training [Practical] Sequencing reaction, introduction of plasmids into cells	Lecturer Moizumi, Lecturer Suehiro, Assistant Professor Dejima Assistant Professor Yoshida, Assistant Professor Izuhara, Assistant Professor Ohno
Day 4 August 25 (Thursday)	[Lecture] Explanation of Practical Training [Practical] Acquisition of Imaging	Lecturer Moizumi, Lecturer Suehiro, Assistant Professor Dejima Assistant Professor Yoshida, Assistant Professor Izuhara, Assistant Professor Ohno	[Lecture] Explanation of Practical Training [Lecture] Analyzing imaging, confirmation of sequencing	Lecturer Moizumi, Lecturer Suehiro, Assistant Professor Dejima Assistant Professor Yoshida, Assistant Professor Izuhara, Assistant Professor Ohno
Day 5 August 28 (Friday)	[Practical] Report Writing	Lecturer Moizumi, Lecturer Suehiro, Assistant Professor Dejima Assistant Professor Yoshida, Assistant Professor Izuhara, Assistant Professor Ohno	[Discussion] Conclusion and Summary	Professor Miyata, Professor Maru, Professor Mitani Professor Nakamura, Lecturer Moizumi, Lecturer Suehiro Assistant Professor Dejima, Assistant Professor Yoshida, Assistant Professor Izuhara, Assistant Professor Ohno

Practical Training

Advanced Biomedical Science Major

Number of Students Accepted: Up to 8

	Morning (Lectures and Practical Training)9:00-12:00	Faculty in Charge	Afternoon (Practical Training) 13:00-16:00	Faculty in Charge	Location
Day 1 7/25 (Monday)	Regenerative Medicine Practicum Tissue Engineering for 3D Tissue Regeneration Learn the basics of tissue engineering through the fabrication of scaffolds made from biodegradable polymers.	Professor Shimizu Lecturer Kobayashi Lecturer Takahashi	Regenerative Medicine Practicum Tissue Engineering for 3D Tissue Regeneration Learn about cell sheet engineering through cell culture and the fabrication of cell sheets using temperature-responsive culture dishes.	Lecturer Akiyama Assistant Professor Aoki Assistant Professor Takagi	TWIns Advanced Biomedical Science Scientific Research Laboratory Second Floor Innovation Promotion Office
Day 2 7/26 (Tuesday)	Regenerative Medicine Practicum Drug Delivery Systems Learn about the water-solubility and characterization of poorly water-soluble drugs using polymeric nanoparticles and hydrogel-type encapsulation technology using natural polymers.	Lecturer Nakayama	Regenerative Medicine Practicum Design and Prototyping of Culture Chambers using 3D-CAD and 3D Printers Learn how to design and prototype a chamber for perfusion culture of cells and tissues using 3D-CAD and a 3D printer.	Assistant Professor Kikuchi Assistant Professor Sekiya	TWIns Advanced Biomedical Science Scientific Research Laboratory Second Floor Innovation Promotion Office
Day 3 7/27 (Tuesday)	Genome Data Analysis Practicum Learn how to use a database to interpret the results of genome copy number analysis.	Professor Toshiyuki Yamamoto	Genome Data Analysis Practicum Learn how to use databases to interpret the results of next-generation sequences.	Professor Toshiyuki Yamamoto	Yayoi Memorial Education Building Basement First Floor PC Room 1
Day 4 7/28 (Thursday)	Regenerative Medicine Practicum Manipulation and Assessment of Regeneration Tissue Observing the morphology of regenerative tissue produced using cell sheets and scaffolds and learning how to evaluate regenerated tissue via biochemical analysis.	Professor Yamato Associate Professor Haraguchi Lecturer Sekine	Regenerative Medicine Practicum Cell Sheet Stacking Learn tissue engineering techniques and understand the basic properties of cultured tissues through the preparation of stacked tissues using cell sheets.	Associate Professor Matsuura Assistant Professor Honma Specially Appointed Assistant Professor Sasaki	TWIns Advanced Biomedical Science Scientific Research Laboratory Second Floor Innovation Promotion Office
Day 5 7/29 (Friday)	Introduction to Advanced Engineering Surgery 3D Imaging Diagnostics	Professor Muragaki Professor Masamune	Fundamentals of 3D Imaging Diagnostics and Clinical MRI Practice Learn about 3D diagnostic imaging using images obtained from MRIs and other sources as examples in the field of neurosurgery. Learn about surgical support robots, their concepts, applications, technologies, and clinical usefulness.	Professor Muragaki Professor Masamune Associate Professor Tamura Associate Professor Kitahara Specially Appointed Lecturer Taichi Saito Specially Appointed Lecturer Yoshimitsu Specially Appointed Assistant Professor Kusuda Specially Appointed Assistant Professor Yamaguchi	TWIns Advanced Biomedical Science Scientific Research Laboratory Second Floor Innovation Promotion Office

Practical Training

Morphology Major

In-charge: Neuromolecular Morphology and Microanatomy
Morphology and Pathological Neuroscience

Morphology Practicum

Subject: Assessment of Retinal Morphology, Molecular Biology and Biochemistry in
Animal Modes of Retinal Injury

Number of Students Accepted: Up to 6

	Morning 9:00 -12:00	Afternoon 13:00 -16:00
8/1 (Monday)	Lectures and Practical Training "Staining of Rat Retinal Tissue" (Large Practical Training Lab 1) Professor Fujieda, Assistant Professor Saito, Assistant Professor Komoike	
8/2 (Tuesday)	Lectures and Practical Training "Staining of Rat Retinal Tissue" (Large Practical Training Lab 1) Professor Fujieda, Assistant Professor Saito, Assistant Professor Komoike	
8/3 (Tuesday)	Lectures and Practical Training "Molecular Biology and Biochemical Analysis of Injured Rat Retina" (Large Practical Training Lab 1) Professor Fujieda, Assistant Professor Saito, Assistant Professor Komoike	
8/4 (Thursday)	Lectures and Practical Training "Molecular Biology and Biochemical Analysis of Injured Rat Retina" (Large Practical Training Lab 1) Professor Fujieda, Assistant Professor Saito, Assistant Professor Komoike	
8/5 11/4 (Friday)	Practical Training, Summary "Summary and Presentation of Lab Results" (Large Practical Training Lab 1) Professor Fujieda, Assistant Professor Saito, Assistant Professor Komoike	

2022 Common Clinical Medicine Lectures

(For internal medicine and surgery majors)

Select 1 credit (1.5 hours per item x 10 items) from the following items.

Lecture Title	Contents	Department in Charge	Faculty Name	R4 Schedule
Introduction to Cell Therapy	A historical review of general treatments using cultured cells including regenerative medicine, cancer immunotherapy, gene therapy, etc., from the latest basic research to cases of commercialized products that have received regulatory approval	Advanced Biomedical Sciences	Professor Yamato	6/1 (Tuesday) 14:00–15:30
Techniques to Improve Heart Transplant Outcomes	Knowledge of transplant cardiac physiology, rejection, infection, and transplant cardiac coronary artery lesions necessary to improve the outcomes of heart transplantation	Study of Critical Heart Failure Control	Professor Nunoda	6/3 (Friday) 14:00–15:30
Fundamentals and Clinical Diabetes	Facts, diagnosis, and treatment of diabetes	Diabetes and Metabolic Medicine	Professor Nakagami	6/8 (Tuesday) 14:00–15:30
Advances in the Diagnosis and Treatment of Systemic Scleroderma	The pathophysiology, diagnosis, evaluation, and treatment of systemic scleroderma	Institute of Rheumatology	Clinical Professor Kawaguchi	6/9 (Thursday) 13:00 – 14:30
Introduction to Behavioral Medicine	Cognitive and behavioral characteristics of children with developmental disabilities and their clinical psychological responses	Pediatrics	Professor Nagata, Children's Psychological Counselor Sakakibara	6/15 (Tuesday) 13:00 – 14:30
Rehabilitation Nutrition	Rehabilitation nutrition, sarcopenia, and frailty	Rehabilitation Sciences	Professor Wakabayashi	6/15 (Tuesday) 14:30–16:00
(Introduction to Sleep Studies) Basics of Insomnia Treatment	(Physiology of sleep, types of sleep disorders, health hazards, treatment) Pathophysiology of insomnia, pharmacotherapy, non-pharmacotherapy	Psychiatry	Lecturer Oshibuchi	6/20 (Monday) 15:00–16:30
General Anesthesia, Consciousness, and Pain	Neither sleep nor death: Anesthesia is a mysterious thing. Let us examine the academic support for the anesthesia that we use on a daily basis.	Anesthesiology	Professor Nagasaka	6/22 (Tuesday) 14:00–15:30
Introduction to Diagnostic Pathology	The purpose, significance, and changes in pathological diagnosis (histology, cytology, and pathological autopsy); immunohistochemistry for differential diagnosis, disease markers, and therapeutic target detection, and its application to cancer panel testing using formalin-fixed paraffin-embedded specimens	Diagnostic Pathology	Professor Nagashima	7/6 (Tuesday)
Introduction to Biomaterials and Drug Delivery Systems	An artificial material coming into contact with a living organism gives rise to various reactions and proceeds to an immunological reaction. This lecture summarizes the techniques to avoid such a reaction. The characteristics of antithrombotic materials, biocompatible materials, and DDS are explained on this basis.	Advanced Biomedical Sciences	Lecturer Nakayama	7/6 (Tuesday) 14:00–15:30
Artificial Organ Transplant (1) Artificial heart	Artificial hearts are used for end-stage severe heart failure that is beyond the scope of medical treatment. They have been used in recent years both as a bridge to transplantation and as a tool for final treatment.	Cardiovascular Surgery	Visiting Professor Nishinaka	7/8 (Friday) 15:00–17:00
Liason Psychiatry	Diagnosis and management of psychiatric disorders complicated by physical disorders Management	Psychiatry	Professor Nishimura	7/13 (Tuesday) 15:00–16:30
Latest Findings in the Diagnosis and Treatment of Endocrine Disorders	An overview of the latest diagnosis and treatments of endocrine disorders and case studies	Endocrinology	Professor Otsuki	7/27 (Tuesday) 14:00–15:30
Treatment Strategies for Hematopoietic Malignant Diseases	Chemotherapy and hematopoietic cell transplantation for leukemia and other hematologic malignant diseases	Hematology	Professor Tanaka	9/7 (Wednesday) 14:00–15:30
Pregnancy and Cancer	Commentary on the diagnosis, treatment, and prognosis of gynecological malignancies complicated by pregnancy	Obstetrics and Gynecology	Professor Tabata	9/14 (Wednesday) 14:00–15:30
The Latest Developments in Clinical Endocrine Surgery	Cutting-edge knowledge and technology of endocrine surgery	Endocrinology	Professor Okamoto	9/21 (Tuesday)
Latest Surgical Treatments for Inflammatory Bowel Diseases	Overview of advances in surgical treatment for inflammatory bowel diseases such as ulcerative colitis and Crohn's disease	Inflammatory Bowel Disease Surgery	Professor Itabashi	September
Latest Surgical Treatments in Functional Surgery	Overview of advances in surgical treatment for achalasia and obesity	Upper Gastrointestinal Surgery	Lecturer Narumiya	September
Colorectal Cancer Surgical Treatment	Changes in colorectal cancer surgical treatments and the practice of minimally invasive surgery	Lower Gastroenterological Surgery	Professor Yamaguchi	10/11 (Tuesday) 14:00–15:30
Artificial Organ Transplant (2) Heart Transplantation	The development of superior immunosuppressive agents and other factors have greatly improved the results of heart transplantation. However, the worldwide shortage of donors has become a major problem.	Cardiovascular Surgery	Associate Professor Saito	11/4 (Friday) 14:00–15:00
Radiation Oncology (Medical Physics)	Radiation therapy techniques, radiotherapy physical quality control	Radiation Oncology (Medical Physics)	Lecturer Toramatsu	11/24 (Thursday) 14:00–15:30

Lecture Title	Contents	Department in Charge	Faculty Name	R4 Schedule
Current Status of Drug-Induced Liver Damage	Current status and future prospects of drug-induced liver damage	Gastroenterology	Professor Tokushige	12/21 (Wednesday) or 1/11 (Wednesday)
Newest Major Vascular Surgery	Aortic aneurysms are fatal; artificial blood vessel replacement surgery is conducted to treat them. Recent years have seen rapid developments in endovascular treatment using stent grafts.	Cardiovascular Surgery	Lecturer Domoto	1/17 (Tuesday) 15:00-16:30 If at least ten seats are filled
Diagnosis and Treatment of Esophageal and Gastric Varicose Veins	An overview of the current state of treatments and procedures focusing on endoscopic diagnosis and treatment for esophageal and gastric varicose veins	Gastroenterology	Professor Nakamura	1/18 (Wednesday)
Radiation Oncology (Detailed Discussion of Radiation Therapy)	Indications for radiation therapy, points to note when ordering, management during radiation therapy, health applications of particle beam therapy, etc.	Radiation Oncology	Professor Karasawa	1/27 (Friday) or 1/13 (Friday)
Introduction to Oral and Maxillofacial Surgery	A discussion of jaw deformities, trauma, jawbone tumors, and dental implant surgery	Oral and Maxillofacial Surgery	Professor Koga	2/15 (Wednesday) 14:00-15:30
Vascular Grafting with Biodegradable Polymers for Regenerative Medicine	Autologous cells are biodeposited into the skeletal scaffold, forming regenerative blood vessels similar to autologous tissue.	Cardiovascular Surgery	Associate Professor Matsumura	Mondays and Thursdays in the first and fourth weeks of the month, Friday in the third and fourth weeks of the month Upon consultation
Current Status of Ligament Injury Treatment and Prospects for the Development of Substitute Biomaterials	Current status of ligament reconstruction surgery by autologous tendon transplantation and research on decellularized heterogeneous biomaterials	Orthopedic Surgery	Assistant Professor Ito	Second semester: After 15:00 except Tuesdays
Advanced Image Processing and Computer-Aided Diagnostics	Advanced image processing and computer-aided diagnostics for respiratory and mediastinal diseases	Diagnostic Imaging and Nuclear Medicine	Professor Sakai	To be determined
Optimization of Renal Cancer Treatment	Surgical and drug treatment for renal cancer	Urology	Professor Takagi	To be determined
To Be Determined	To be determined	Cardiovascular Medicine	Planned for the successor professor	To be determined

Location: Clinical Lecture Hall, TWIns2F Conference, Yayoi Memorial Auditorium, etc.

Dates: As a general rule, Wednesdays from 14:00 to 15:30 from June to February, except from 7/20 to 8/31 and 1/22 to 1/27

2022 Common Lectures for Clinical Medicine

(For internal medicine majors and surgery majors)

Select 1 credit (1.5 hours per item x 10 items) from the following items.

Heading	Content	Department in Charge	Faculty Name	Location	Number of Accepted Students	2022 Schedule	Special Notes, Contact Information
Diagnostic Imaging 1	CT, MRI, nuclear medicine diagnostics in the cardiovascular area	Diagnostic Imaging and Nuclear Medicine	Associate Professor Nagao	General Outpatient Center B1F 2nd Radiographic Interpretation Room	7	Starting in May (Tue) – (Fri) Afternoons	Associate Professor Nagao PHS28256
Diagnostic Imaging 2	3D diagnostic imaging	Ophthalmology	Professor Iida Lecturer	General Outpatient Center 3F Ophthalmology Outpatient	2	From May (Tue) – (Fri) Afternoons	Professor Iida's Office 37550
Diagnostic Imaging 3	Identification of cervical masses	Otorhinolaryngology	Specially Appointed Professor Nakamizo	General Outpatient Center 4F Otorhinolaryngology	1	(Mon) Afternoon	Doctor's Office 28531
Surgical Treatment 1	Liver cancer surgery	Gastroenterological Surgery	Professor Honda	Central Operating Room	2	(Tue)– (Fri) 10:00 – 15:00	Professor Honda PHS28587
Surgical Treatment 2	Pancreatic cancer surgery	Gastroenterological Surgery	Professor Honda	Central Operating Room	2	(Tue) – (Fri) 10:00 – 15:00	Professor Honda PHS28587
Surgical Treatment 3	Esophageal cancer surgery	Gastroenterological Surgery	Lecturer Narumiya	Central Operating Room	2	(Mon) (Thu) 10:00 – 15:00	Doctor's Office 33411
Surgical Treatment 4	Liver transplant surgery	Gastroenterological Surgery	Associate Professor Kodera	Central Operating Room	2	(Tue) 9:00 – 17:00 Indefinite	Associate Professor Kodera PHS28564
Surgical Treatment 5	Surgical observation and explanation	Neurosurgery	Professor Kawamata, Associate Professor Taira	Central Operating Room 14–17, 19 West Ward 2F Operating Room 23	5	Professor Kawamata: Weekly (Tue) Weekly (Wed) Associate Professor Taira: Weekly (Thu) Morning	Doctor's Office 33411
Surgical Treatment 6	Surgical observation and explanation	Neurosurgery	Professor Kawamata, Associate Professor Aihara	Central Operating Room 14–17, 19	5	Professor Kawamata: Weekly (Tue) Weekly (Wed) Morning Associate Professor Aihara: (Mon) Afternoon	Doctor's Office 33411
Surgical Treatment 7	Esophageal reconstruction by free intestinal tube	Plastic Surgery	Professor Sakurai	West Ward B Operating Room	2	Weekly (Tue) Weekly (Wed) Morning	Doctor's Office 37111
Surgical Treatment 8	Cataract operation	Ophthalmology	Professor Iida Assistant Professor Hasegawa	West Ward Operating Room	2	(Mon), (Thu) Morning As needed during surgery	Professor Iida's Office 37550
Surgical Treatment 9	Vitreous surgery	Ophthalmology	Professor Iida Lecturer	West Ward Operating Room	2	(Wed) Morning As needed during surgery	Professor Iida's Office 37550
Surgical Treatment 10	Observation of dental implant surgery	Craniofacial Surgery	Professor Okamoto	Outpatient Dental & Oral Surgery, 4F, General Outpatient Center	4	(Mon) – (Fri) 9:00 – 16:00 As needed	Professor Okamoto PHS28361
Surgical Treatment 11	Jaw deformity surgery	Oral and Maxillofacial Surgery	Professor Koga	Central Operating Room	2	(Thu) 9:00 – 15:00 Indefinite	Professor Koga PHS28334
Conducting research assignments	Conducting research on an issue and writing a research paper	Upper Gastrointestinal Surgery	Lecturer Narumiya	West Ward A2F Conference Room, Central Operating Room, etc.	2	As needed	Doctor's Office 33411
Transplantation and Artificial Organ Medicine 1	Artificial heart	Cardiovascular Surgery	Visiting Professor Nishinaka	West Ward B Operating Room	5	9/2 (Fri) 15:00 – 17:00	Visiting Professor Nishinaka PHS28451
Transplantation and Artificial Organ Medicine 2	Heart transplant	Cardiovascular Surgery	Associate Professor Saito	West Ward B Operating Room	5	6/9 (Thu) 14:00 – 15:30	Associate Professor Saito PHS28474
Transplantation and Artificial Organ Medicine 3	Renal transplant	Urology	Professor Takagi, Professor Ishida, Lecturer Kamisawa	Central Operating Room	4	To be determined	Professor Ishida PHS28732
Endovascular Treatment 1	Renal artery balloon dilatation	Urology	Professor Takagi	Central Ward 1F Angio Room	5	To be determined	Professor Ishida PHS28732
Endovascular Treatment 2	Internal shunt balloon dilatation	Urology	Professor Takagi	Central Ward 1F Angio Room	5	To be determined	Professor Ishida PHS28732
Regenerative Medicine 1	Histological analysis	Cardiovascular Surgery	Associate Professor Matsumura	West Ward B Immunology	2	Mondays and Thursdays in the first and fourth weeks of the month, Friday in the third and fourth weeks of the month Upon consultation	Associate Professor Matsumura PHS28438
Laparoscopic Surgery 2	Robot-assisted laparoscopic partial nephrectomy Robot-assisted laparoscopic prostatectomy	Urology	Professor Takagi, Lecturer Yoshida	Central Operating Room	4	To be determined	Associate Professor Takagi Extension 33331–3
Laparoscopic Surgery 3	Trans-retroperitoneoscopic donor nephrectomy	Urology	Professor Takagi, Professor Ishida	Central Operating Room	4	To be determined	Professor Ishida PHS28732

Heading	Content	Department in Charge	Faculty Name	Location	Number of Accepted Students	2022 Schedule	Special Notes, Contact Information
Medical Electrotherapy 1	Catheter ablation	Cardiovascular Medicine	Specially Appointed Professor Shoda	West Ward B 2F Catheter Room 5	4	6/3 (Fri) After 15:00	Office of Succeeding Professor 23102
Medical Electrotherapy 2	Laser treatment of pigmented skin lesions	Plastic Surgery	Professor Sakurai	General Outpatient Center 3F Laser Room	2	(Mon) – (Fri) Upon consultation	Doctor's Office 37111
Diagnostic Ultrasound 1	Transrectal prostate echocardiography	Urology	Professor Takagi, Associate Professor Iizuka	General Outpatient Center Urology Outpatient	2	To be determined	Associate Professor Iizuka Extension 33511-3
Diagnostic Ultrasound 2	Renal transplant Doppler echocardiography	Urology	Professor Takagi, Professor Ishida	General Outpatient Center Urology Outpatient	2	To be determined	Professor Ishida PHS28732
Diagnostic Ultrasound 3	Renal Doppler (power Doppler) echocardiography	Urology	Professor Takagi	General Outpatient Center Urology Outpatient	6	To be determined	Professor Ishida PHS28732
Diagnostic Ultrasound 4	Renal-urologic echocardiography	Urology	Professor Takagi	General Outpatient Center Urology Outpatient	2	To be determined	Professor Ishida PHS28732
Diagnostic Ultrasound 5	Ultrasound diagnosis and treatment of gastrointestinal disorders	Gastroenterology	Professor Tokushige Lecturer Takayama	General Outpatient Center 2F Ultrasound Room	3	Consult for schedule	Office of Professor Tokushige, Professor of Gastroenterology 25212
Endoscopy 1	Nasal sinus surgery with endoscopic microdebrider	Otorhinolaryngology	Professor Nonaka	Central Operating Room	1	(Wed) or (Thurs)	Doctor's Office 28531
Endoscopy 2	Observation and practice of the techniques of laser therapy and stenting for airway opening as bronchoscopic treatment for endotracheal tumors	Respiratory Surgery	Professor Kanazaki Lecturer Isaka	Central Operating Room or Central Angiography Room	2	(Mon) (Tue) (Fri) 9:00 – 17:00 As needed	Contact and confirm with the professor's office at 37546 and with Professor Kanazaki at 28899 at least 2 weeks in advance
Endoscopy 3	Transurethral resection of the prostate	Urology	Professor Takagi, Associate Professor Iizuka	Central Operating Room	4	To be determined	Associate Professor Iizuka Extension 33511-3
Endoscopy 4	Percutaneous lithotripsy	Urology	Professor Takagi, Lecturer Yoshida	General Outpatient Center B3F Lithotripsy Room	4	To be determined	Associate Professor Takagi Extension 33511-3
Endoscopy 5	Endoscopic treatment of bile and pancreatic disorders	Gastroenterology	Professor Tokushige Lecturer Takayama Associate Lecturer Tahara	General Outpatient Center 2F Endoscopy Room	2	Consult for schedule	Office of Professor Tokushige, Professor of Gastroenterology 25212
Endoscopy 6	Diagnosis and treatment of colorectal neuropathy	Gastroenterology	Professor Nakamura Professor Nonaka Lecturer Omori Assistant Professor Yonezawa	General Outpatient Center 2F Endoscopy Room	2-3	Consult for schedule	Office of Professor Tokushige, Professor of Gastroenterology 25212
Endoscopy 1	Endoscopic diagnosis and treatment of early stage gastrointestinal tract cancer	Gastroenterology	Professor Nakamura Professor Nonaka Lecturer Kishino	General Outpatient Center 2F Endoscopy Room	2	Consult for schedule	Office of Professor Tokushige, Professor of Gastroenterology 25212
Endoscopy 2	Bronchoscopy	Respiratory Internal Medicine	Lecturer Arimura	General Outpatient Center 2F Bronchoscopy Room	2	(Wed) (Thu) Afternoon	Lecturer Arimura PHS28193
Endoscopy 3	Diagnosis and treatment of middle ear lesions	Otorhinolaryngology	Professor Nonaka	General Outpatient Center 4F Otorhinolaryngology	1	(Fri) Morning	Doctor's Office 28531
Endoscopy 4	Endoscopic diagnosis of laryngeal lesions	Otorhinolaryngology	Specially Appointed Professor Nakamizo	General Outpatient Center 4F Otorhinolaryngology	1	(Thu) Morning	Doctor's Office 28531
Endoscopy 5	Bronchoscopic diagnosis	Respiratory Internal Medicine	Lecturer Arimura	General Outpatient Center 2F Laboratory	2	(Wed) (Thu) Afternoon	Lecturer Arimura PHS28193
Endoscopy 6	Diagnosis of small intestinal diseases (capsule endoscopy, balloon)	Gastroenterology	Professor Nakamura Lecturer Omori	General Outpatient Center 2F Endoscopy Room	2-3	Consult for schedule	Office of Professor Tokushige, Professor of Gastroenterology 25212
Emergency Medicine 1	Multidisciplinary treatment for multiple organ failure	Emergency Medicine	Professor Yaguchi	Emergency and Critical Care Center ICU	2	October to the end of March	Extension 36085
Emergency Medicine 3	Emergency cardio and major vascular surgery	Cardiovascular Surgery	Lecturer Kikuchi	West Ward B Operating Room	2	Day, time as per consultation	Lecturer Kikuchi PHS28448
Gastric Cancer Surgery	Gastric cancer surgery (laparoscopic)	Gastroenterological Surgery	Lecturer Taniguchi	Central Operating Room	2	(Mon) (Thu) 10:00 – 3:00	Doctor's Office 33411
Colon Cancer Surgery	Laparoscopic colectomy	Gastroenterological Surgery	Professor Yamaguchi	Central Operating Room	2	(Tue) (Thu) 10:00 – 3:00	Doctor's Office 25214
Rectal Cancer Surgery	Laparoscopic resection	Gastroenterological Surgery	Professor Yamaguchi	Central Operating Room	2	(Tue) (Thu) 10:00 – 3:00	Doctor's Office 25214

Heading	Content	Department in Charge	Faculty Name	Location	Number of Accepted Students	2022 Schedule	Special Notes, Contact Information
Otorhinolaryngology Diagnosis	Diagnosis and treatment of hearing loss	Otorhinolaryngology	Associate Professor Yamamura	General Outpatient Center 4F	1	(Fri) Morning	Doctor's Office 28531
Laparoscopic Diagnosis	Diagnosis of mass lesions in the chest requires biopsy of the lesion by mediastinoscopy and thoracoscopy, and the students will observe and practice the surgical technique.	Respiratory Surgery	Professor Kanazaki Lecturer Isaka Associate Lecturer Aoshima	Central Operating Room	2	(Mon) (Tue) (Fri) 9:00 – 17:00 As needed	Contact and confirm with the professor's office at 37546 and with Professor Kanazaki at 28899 at least 2 weeks in advance
Thoracoscopic Surgery Using 3D Imaging	There are differences in individual cases of pulmonary, arteriovenous, and bronchial branches. Here, students will confirm the preoperative anatomy of the thoracic cavity based on 3D images from preoperative CT images, become virtual surgeons, and observe and practice simulated thoracoscopic surgery.	Respiratory Surgery	Professor Kanazaki Lecturer Isaka Assistant Professor Mitsuboshi	Central Operating Room	2	(Mon) (Tue) (Fri) 9:00 – 17:00 As needed	Contact and confirm with the professor's office at 37546 and with Professor Kanazaki at 28899 at least 2 weeks in advance
Actual Pulmonary Air Leakage Closure in Respiratory Surgery	Respiratory surgery can, unlike other surgical procedures, face a unique situation called "pulmonary air leak" in which air leaks from the lungs during surgery. In the past, air leaks were closed by direct suturing of the site and the surrounding tissue. Now, air leaks are closed by using fibrin glue or, due to their development, a combination of fibrin glue and artificial materials. Here students will receive lectures and observation practice on the current status and methods of pulmonary air leak closure.	Respiratory Surgery	Professor Kanazaki Lecturer Isaka Assistant Professor Hagiwara	Central Operating Room	2	(Mon) (Tue) (Fri) 9:00 – 17:00 As needed	Contact and confirm with the professor's office at 37546 and with Professor Kanazaki at 28899 at least 2 weeks in advance
Robot-assisted thoracoscopic surgery	Although we are in a golden age for thoracoscopic surgery, robots have been introduced as a new surgical support device for thoracoscopy, enabling minimally invasive and detailed surgical operations. Here, students attend lectures and observe surgery through 3D imaging.	Respiratory Surgery	Professor Kanazaki Lecturer Isaka	Central Operating Room	2	(Mon) (Tue) (Fri) 9:00 – 17:00 As needed	Contact and confirm with the professor's office at 37546 and with Professor Kanazaki at 28899 at least 2 weeks in advance
Diagnostic Pathology Practicum	Observe pathological tissue specimens (mainly surgical specimens) and prepare a written diagnosis. Aim to appropriately change the subject organ unit 15 times and be familiar with the organ pathology of all organs by the end of the course.	Department of Diagnostic Pathology	Professor Nagashima	Office of the Professor of Pathology (West Ward A 2F)	1	Every Saturday 9 – 11 (Schedule to be arranged with the student)	Professor Nagashima nagashima.yoji@twmu.ac.jp PHS 29611 Extension-25226
Blood Purification Therapy	Lymphocyte antibody removal methods	Urology	Professor Takagi, Professor Ishida	Ward 1 2F Dialysis Room	5	To be determined	Professor Ishida PHS28732
Immunotherapy	Immunosuppression for renal transplant	Urology	Professor Takagi, Professor Ishida, Lecturer Kamisawa	General Outpatient Center Urology Outpatient	5	To be determined	Professor Ishida PHS28732
Endocrine Surgery	The practicalities of surgical treatment in endocrinology and surgery	Endocrinology and Pediatric Surgery	Professor Okamoto, Associate Professor Hiroichi, Lecturer Omi	Operating Room	2	(Mon) (Wed) 10:00 – 15:00	Professor Okamoto's office (37554)
Assisted Circulation	Methods of assisted circulation and its management	Cardiovascular Surgery	Visiting Professor Nishinaka	West Ward B Operating Room	5	10/7 (Fri) 15:00 – 17:00	Visiting Professor Nishinaka PHS28451
Surgical Treatment of Inflammatory Bowel Disease	Basics of surgical treatment for inflammatory bowel disease	Inflammatory Bowel Disease Surgery	Professor Itabashi	West Ward A2F Conference Room, Central Operating Room, etc.	2	As needed	Gastroenterological Surgery Office
Coronary Contrast Radiography	Interpreting radiographs	Cardiovascular Medicine	Specially Appointed Professor Yamaguchi	West Ward B 2F Catheter Room	5	5/12 (Thu) 15:00 – 17:00	Office of Succeeding Professor 23102
Coronary Angioplasty	Procedures and methods	Cardiovascular Medicine	Specially Appointed Professor Yamaguchi	West Ward B 2F Catheter Room	5	5/26 (Thu) 15:00 – 17:00	Office of Succeeding Professor 23102

Heading	Content	Department in Charge	Faculty Name	Location	Number of Accepted Students	2022 Schedule	Special Notes, Contact Information
Radiation Oncology 1	On radiation therapy, from planning to conducting radiation therapy	Radiation Oncology	Associate Professor Hashimoto Assistant Professor Kawanishi	B1F General Outpatient Center Radiation Therapy Room	1-2	(Wed) Afternoon (9:30 - 12:00) or (Thur) Afternoon (13:30 - 17:00) As needed	Doctor's Office 37411-2 Associate Professor Hashimoto PHS 28265 hashimoto.yaichiro@twmu.ac.jp
Radiation Oncology 2	Radiation therapy planning in practice	Radiation Oncology	Assistant Professor Lee Associate Lecturer Kuribayashi	B3F General Outpatient Center Radiation Therapy Room	1-2	(Mon) 13:30 - 17:00 As needed	Doctor's Office 37411-2 Associate Lecturer Kuribayashi PHS 27614 kuribayashi.shigehiko@twmu.ac.jp
Liason Psychiatry	Introduction and practice of mental healthcare for cancer patients	Psychiatry	Associate Professor Akaho	West Ward A 5F	1	Upon consultation	Office of the Professor of Psychiatry 33201
Psychiatric Diagnosis	Assessment of psychiatric symptoms	Psychiatry	Professor Nishimura	West Ward A 5F	1	Upon consultation	Office of the Professor of Psychiatry 33201
Management of Ischemic Heart Disease	Management of unstable angina, acute myocardial infarction, etc. Treatment policy, etc.	Cardiovascular Medicine	Specially Appointed Professor Yamaguchi	West Ward B 2F Catheter Room	5	6/2 (Thu) 15:00 - 17:00	Office of Succeeding Professor 23102
Catheterization for Valvular Disease	Techniques and methods	Cardiovascular Medicine	Specially Appointed Professor Yamaguchi	West Ward B 2F Catheter Room	5	6/16 (Thu) 15:00 - 17:00	Office of Succeeding Professor 23102
Anesthesiology	Conducting research in accordance with the theme of general anesthesiology	Anesthesiology	Professor Nagasaka, Professor Kurokawa, Associate Professor Sasagawa, Lecturer Iwade, Associate Lecturer Nakazawa, Assistant Professor Doi	Zoom (Consultation)	Several	Available at any time/on consultation	Professor Nagasaka's Room 29465
Neurological Disease Diagnosis and Practice	Students learn about the forefront of diagnosis and treatment of various neurological diseases	Neurology	Professor Kitagawa Lecturer Yoshizawa	Ward 1 3F Conference Room	2	Each Tuesday	Lecturer Yoshizawa PHS28616
Hematopoietic Stem Cell Transplantation	Hematopoietic stem cell transplantation	Hematology	Professor Tanaka	Hematology Office	5	(Wed) Afternoon Upon consultation	Professor Tanaka's Office 37544
Diagnostics of Hematological Diseases	Morphological diagnosis of hematopoietic tissues	Hematology	Associate Professor Shiseki	Hematology Office	5	(Wed) Afternoon Upon consultation	Associate Professor Shiseki PHS28024
Diagnostic Methods in Skin Symptoms of Collagen Diseases	Skin symptoms and histopathological images of collagen diseases, dermoscopy findings in nail bed area	Dermatology	Professor Ishiguro	Ward 1 3F Conference Room 5 (tentative)	4	10/11 (Tuesday) 10:00 - 12:00	Professor's Office 37534
Practical Skin Biopsy	What symptoms of skin diseases can be diagnosed by biopsy? Through observation, students learn the indications for biopsy, when to perform them, and the practicalities of the procedure.	Dermatology	Lecturer Fukuya	Dermatology Outpatient	2	October (Thu) 13:15 - 15:15	28178
Physiological Function Diagnosis	Respiratory function test	Respiratory Internal Medicine	Professor Katsura	General Outpatient Center 2F Respiratory Function Lab	2	(Mon) Afternoon	Professor Katsura PHS28875
Diabetic Nephropathy	Diagnosis and treatment of diabetic nephropathy	Diabetes and Metabolic Medicine	Professor Babazano	South Building 3F Center for Diabetes Medical Office	2	(Mon) 14:00 - 17:00 On consultation	Center for Diabetes Professor's Office 27110
Diabetic Macroangiopathy	Diagnosis and treatment of diabetic macroangiopathy	Diabetes and Metabolic Medicine	Professor Nakagami	South Building 3F Center for Diabetes Medical Office	2	(Wed) 14:00 - 17:00 On consultation	Center for Diabetes Medical Office 27114
Diagnosis and Treatment of Diabetes	Blood glucose self-monitoring and continuous glucose concentration monitoring measurement/Device-based insulin therapy, etc.	Diabetes and Metabolic Medicine	Associate Professor Miura	South Building 3F Center for Diabetes Medical Office	2	(Wed) 14:00 - 17:00 On consultation	Center for Diabetes Medical Office 27114
In-Depth Look at Renal Diseases	Renal disease as seen in renal biopsy	Nephrology	Associate Professor Moriama Lecturer Karasawa	Pathology Laboratory 4F East Ward, Microscope Room 1F Tomoe Research and Education Building	3	(Wed) 13:00-16:00 On consultation	Kidney Center 33511
Pathological Diagnosis of Liver Disease	Pathological diagnosis of liver biopsy	Gastroenterology	Professor Tokushige Associate Professor Tanai Lecturer Kogiso	West Ward A 2F Pathological Diagnosis Division	3	Consult for schedule	Office of Professor Tokushige, Professor of Gastroenterology 25212
Psychiatry	Modified electroconvulsive therapy	Psychiatry	Lecturer Oshibuchi	West Ward B 2F Operating Room	1	Upon consultation	Office of the Professor of Psychiatry 33201
Diagnostic Imaging 1	Basics and clinical application of brain function imaging using MRI	Diagnostic Imaging and Nuclear Medicine	Lecturer Abe	Conference Room, Education and Research Building	5	Every day except Thursday	Lecturer Abe PHS 28274

Heading	Content	Department in Charge	Faculty Name	Location	Number of Accepted Students	2022 Schedule	Special Notes, Contact Information
Diagnostic Imaging 2	Fundamentals and clinical application of nuclear medicine functional imaging using PET/CT	Diagnostic Imaging and Nuclear Medicine	Lecturer Kaneko	Conference Room, Education and Research Building	5	Mornings except Thursday	Lecturer Kaneko PHS28255
CT Imaging and IVR in Abdominal Region (Treatment under Imaging)	Fundamentals of CT imaging and IVR in the abdominal region (treatment under imaging)	Diagnostic Imaging and Nuclear Medicine	Lecturer Morita	Conference Room, Education and Research Building	3-4	2/7 (Tue) 14:00 - 15:00	Lecturer Morita PHS28602
Diagnostic Imaging Techniques for the Cranium	Techniques and theories of CT and MRI diagnostic imaging for the cranium	Diagnostic Imaging and Nuclear Medicine	Lecturer Suzuki	Conference Room, Education and Research Building	5	May onward, except Wednesdays	Lecturer Suzuki PHS28270
Topics in Neurology	Frontiers of neurological treatment	Neurology	Professor Kitagawa Lecturer Yoshizawa	Ward 1 3F Conference Room	2	Every Tuesday (contact in advance to confirm)	Lecturer Yoshizawa PHS28616
Learning Neurological Symptoms	Neurological symptoms observed in various neurological diseases	Neurology	Professor Kitagawa Lecturer Yoshizawa	Ward 1 3F Conference Room	2	Each Tuesday	Lecturer Yoshizawa PHS28616
Treatment of Neurological Diseases	The latest evidence for treatment of various neurological diseases	Neurology	Professor Kitagawa Lecturer Yoshizawa	Ward 1 3F Conference Room	2	Every Tuesday (contact in advance to confirm)	Lecturer Yoshizawa PHS28616
Practical Treatment of Rheumatoid Arthritis and Collagen Disease	The actual diagnosis and treatment of collagen diseases through cases observed in hospital rounds	Collagen Disease & Rheumatology Internal Medicine	Professor Harigai Lecturer Katsumata	Former Collagen Disease and Rheumatology Gout Center 3F	2	(Thu) 9:00 - 11:30	Lecturer Katsumata PHS29821
Genome and Chromosome Analysis	Genome and chromosomal analysis in practice	Integrated Medical Science	Associate Professor Akagawa	Institute for Integrated Medical Sciences	5	To be determined	To be determined
Robot-Assisted Knee Replacement Surgery	Intraoperative measurement of patient-specific knee joint geometry for optimal prosthesis placement	Orthopedic Surgery	Professor Okazaki	Central Operating Room	2	Wed, (Thu) 9:00 - 16:00	Professor Okazaki PHS29402 (Professor Secretary Ichikawa 29397)

**Syllabus and Possible Research Topics
in Each Field**

Syllabus and Possible Research Topics in Each Field

Minimum Credits to be Acquired (18 Credits)

Main Fields of Study ······ 15 credits

Elective Fields ······ 3 credits

Items and possible research topics marked with an asterisk (*) in each field are intended for medical license holders.

***Research guidance should include guidance from someone in the position of lecturer or above in each field.**

Human Pathology & Pathological Neuroscience

I Educational Policy

We would like to fulfill three chief missions at TWUM. 1) Medical education: Students are required to be actively involved in learning morphological as well as functional changes of each diseased organ. 2) Research activities: Our attitudes are to unveil the molecular pathology of human diseases with the combination of in vitro, in vivo and in silico approaches, which will lead to novel therapeutic strategies. 3) Medical practices: Traditional autopsy approach is still fundamental in grasping the pathophysiology of the patient as a whole. We also make it a rule to render a timely and accurate diagnosis to provide the best medical care to the patient.

II Goals

- (1) Minimum level: To carry out research activities via communicating efficiently with colleagues and conforming to research ethics.
- (2) Ordinary level: To formulate a qualitative research design and prove it with the supervisors through an appropriate reference searching and an untenable hypothesis building
- (3) Advanced level: To voluntarily compile research findings into full-fledged English papers and publish them in peer-reviewed academic journals

III Supervisor*Research theme (* = for doctor's license holders)

Name and position	Research theme
Prof. Kurata	(1) Elucidation of the nature of atherosclerosis Atherosclerotic arterial occlusion, which leads to myocardial infarction and cerebral infarction, is the leading cause of death in developed countries, comparable to cancer in general. Plaque instability, the main cause of such arterial occlusion, is characterized by an increased lipid core and thinning of the fibrous capsule, but it is not known why this occurs. Smooth muscle, the main component of the fibrous capsule, has been thought to be uniformly dedifferentiated, but we have found that the degree of differentiation of smooth muscle varies, and that it is more dedifferentiated when plaques become unstable. In the future, we would like to elucidate whether this smooth muscle dedifferentiation is the cause of plaque destabilization or whether it interacts with the lipid core, and contribute to the prevention, diagnosis, and treatment of plaque destabilization.
Prof. Kurata	(2) Induction of differentiation of pluripotent stem cell-derived immature teratomas The goal of inducing differentiation of pluripotent stem cells such as ES cells and iPS cells to form transplantable tissues and organs currently remains a cellular-level result. On the other hand, immature teratomas formed by transplanting pluripotent stem cells into immunodeficient mice are malignant tumors and have not received much attention for transplantation. We have found that these immature teratomas transform into differentiated mature teratomas after intraperitoneal administration of anticancer agents to the teratoma-bearing host. In the future, we would like to refine this technique and explore ways to induce differentiation into desired tissues and organs.
Associate Prof. Masui	(3) Cancer metabolism in malignant brain tumor Cancer cells depend on metabolic reprogramming to drive nucleotide, lipid, and protein synthesis needed for survival. Of interest, recent molecular genetic studies revealed discrete links between oncogenotypes and the resultant metabolic phenotypes. Further, more comprehensive approaches are applied to unravel the dynamic spatio-temporal regulatory map of metabolites that enable cancer cells to adapt to their microenvironment to maximize tumor growth. Our approach for the elucidation of cancer biology is to leverage "OMICS" approaches to link cancer cell genotype, epigenotype and phenotype through metabolic reprogramming for improving the management of patients with malignant brain tumor, glioblastoma.
Visiting Prof. Watabe Assistant Prof. Kato	(4) Abnormal protein aggregates of in neurodegeneration Most neurodegenerative diseases are characterized by deposition of abnormal protein aggregates with amyloid-like structures, but the link between toxic protein aggregates and neuronal cell death remains unclear. Abnormalities in signaling cascades of programmed cell death, such as apoptosis, necroptosis, pyroptosis, ferroptosis, and autophagic cell death as well as unprogrammed necrosis can be observed in the pathogenesis of various neurological diseases. We would like to clarify how abnormal protein accumulation would induce cell death by virally introducing disease-related genes into cultured neuron and glia, which will lead to novel therapeutics against neurodegenerative disorders.

Associate Prof. Yamamoto	(5) Fukutin and human diseases Fukutin, a product of the causative gene of Fukuyama congenital muscular dystrophy (FCMD), is known to be responsible for basement membrane formation. Patients with FCMD exhibit not only muscular dystrophy but also central nervous system abnormalities, including polymicrogyria and neurofibrillary tangles (NFTs) in the cerebral cortex. We have so far clarified novel roles of fukutin in the proliferation, differentiation and degeneration of neurons and glia. Our research aim is to further unravel other proposed functions of fukutin that have not been fully understood yet.
Assistant Prof. Kato	(6) Metastatic capacity of thyroid cancer cells Among thyroid cancers, papillary carcinoma tends to metastasize via lymphatics whereas follicular carcinoma prefers hematogenous routes. It has not been clarified yet what makes their difference in metastatic capacity. Our research focus is to morphologically and quantitatively analyze the mechanism underlying the metastatic difference between papillary and follicular carcinoma cells with the use of thyroid cancer cell lines and human surgical specimens.

IV Syllabus

(* = for doctor's license holders)

Title	Instructor	Credit	Theme
Outline of Pathology	Prof. Kurata	1	History of pathology: Past, present and future
General Pathology	Associate Prof. Masui	1	Cytopathology and tumor pathology
Special Pathology	Associate Prof. Masui Assistant Prof. Kato	1	Cerebrovascular diseases, neurodegeneration, cancer genetics and metabolism
Diagnostic Pathology (General)	Associate Prof. Yamamoto Associate Prof. Masui	1	Tumor diagnostics (histology, cytology, electron microscopy, immunohistochemistry, in situ hybridization)
Diagnostic Pathology (Special)	Associate Prof. Masui	1	Brain tumor pathology
Practical training (practice of field research, presentation of results, discussion)	Prof. Kurata Associate Prof. Yamamoto Associate Prof. Masui Assistant Prof. Kato	10	Research activities and academic writing
Total credits		15	

Human Pathology & Pathological Neuroscience Syllabus (1)

Syllabus Title	Outline of Pathology		
Instructor	Kurata		
Credit	1		
Type of Class	Lectuer and Practice		
Theme	History of pathology: Past, present and future		
Schedule	Thursday 14:00–15:10, 15:20–16:30		
Course Objective	<p>(1) Minimum level: To carry out research activities via communicating efficiently with colleagues and conforming to research ethics.</p> <p>(2) Ordinary level: To formulate a qualitative research design and prove it with the supervisors through an appropriate reference searching and an untenable hypothesis building</p> <p>(3) Advanced level: To voluntarily compile research findings into full-fledged English papers and publish them in peer-reviewed academic journals</p>		
Evaluation Methods	Attendance (50%), report on seminar (30%), conference presentation (10%), academic writing (5%), examination (5%)		
Grading Scale	The five categories are S (90 points or more to 100 points), A (80 points or more to less than 90 points), B (70 points or more to less than 80 points), C (60 points or more to less than 70 points), and D (less than 60 points). S, A, B, and C are acceptable, and D is not acceptable.		
Textbooks/References	病理学の歴史 (エズモンドR.ロング著、西村書店)、症状を知り、病気を探る (市原真著、照林社)		
Independent Study Outside of Class	Textbook reading and reference searching		
Room	Yayoi Memorial Education Building, 4th Floor, Department of Pathology		
Special Note	For those who cannot participate in the above time, the time schedule will be decided after consultation. Questions will be accepted at any time. Feedback will be given at the final session.		
Course Plan	Number	Instructor	Contents
	1	Kurata	History of pathology
	2	Kurata	Status quo of pathology
	3	Kurata	Human pathology
	4	Kurata	Experimental pathology

Human Pathology & Pathological Neuroscience Syllabus (2)

Syllabus Title	General Pathology		
Instructor	Masui		
Credit	1		
Type of Class	Lectuer and Practice		
Theme	Cytopatholgy and tumor pathology		
Schedule	Thursday10:00-11:10		
Course Objective	(1) Minimum level: To carry out research activities via communicating efficiently with colleagues and conforming to research ethics. (2) Ordinary level: To formulate a qualitative research design and prove it with the supervisors through an appropriate reference searching and an untenable hypothesis building (3) Advanced level: To voluntarily compile research findings into full-fledged English papers and publish them in peer-reviewed academic journals		
Evaluation Methods	Attendance (50%), report on seminar (30%), conference presentation (10%), academic writing (5%), examination (5%)		
Grading Scale	The five categories are S (90 points or more to 100 points), A (80 points or more to less than 90 points), B (70 points or more to less than 80 points), C (60 points or more to less than 70 points), and D (less than 60 points). S, A, B, and C are acceptable, and D is not acceptable.		
Textbooks/References	Robbins and Cotran Pathologic Basis of Disease(Saunders)、Newエッセンシャル病理学 第6版(医歯薬出版)、がんの生物学 第2版(南江堂)		
Independent Study Outside of Class	Textbook reading and reference searching		
Room	Yayoi Memorial Education Building, 4th Floor, Department of Pathology		
Special Note	For those who cannot participate in the above time, the time schedule will be decided after consultation. Questions will be accepted at any time. Feedback will be given at the final session.		
Course Plan	Number	Instructor	Contents
	1	Masui	Cellular adaptation and degeneration
	2	Masui	Molecular mechanism of cell death
	3	Masui	Overview of cell cycle
	4	Masui	Aberrant cell cycle and diseases
	5	Masui	Morphological features of tumor cells
	6	Masui	Functional features of tumor cells
	7	Masui	Carcinogenic agents
	8	Masui	Cancer genetics

Human Pathology & Pathological Neuroscience Syllabus (3)

Syllabus Title	Special Pathology		
Instructor	Masui, Kato		
Credit	1		
Type of Class	Lectuer and Practice		
Theme	Cerebrovascular diseases, neurodegeneration, cancer genetics and metabolism		
Schedule	Thursday10:00-11:10		
Course Objective	<p>(1) Minimum level: To carry out research activities via communicating efficiently with colleagues and conforming to research ethics.</p> <p>(2) Ordinary level: To formulate a qualitative research design and prove it with the supervisors through an appropriate reference searching and an untenable hypothesis building</p> <p>(3) Advanced level: To voluntarily compile research findings into full-fledged English papers and publish them in peer-reviewed academic journals</p>		
Evaluation Methods	Attendance (50%), report on seminar (30%), conference presentation (10%), academic writing (5%), examination (5%)		
Grading Scale	The five categories are S (90 points or more to 100 points), A (80 points or more to less than 90 points), B (70 points or more to less than 80 points), C (60 points or more to less than 70 points), and D (less than 60 points). S, A, B, and C are acceptable, and D is not acceptable.		
Textbooks/References	Robbins and Cotran Pathologic Basis of Disease(Saunders)、Greenfield's Neuropathology(Arhold)、グレイ解剖学(Elsevier)、The Biology of Cancer,Second Edition(Garland Science)、ワトソン遺伝子の分子生物学 第7版(東京電機大学出版局)		
Independent Study Outside of Class	Textbook reading and reference searching		
Room	Yayoi Memorial Education Building, 4th Floor, Department of Pathology		
Special Note	For those who cannot participate in the above time, the time schedule will be decided after consultation. Questions will be accepted at any time. Feedback will be given at the final session.		
Course Plan	Number	Instructor	Contents
	1	Masui	Biology of cerebral ischemia
	2	Kato	Pathology of cerebral ischemia
	3	Masui	Therapeutics on cerebral ischemia
	4	Masui	A β proteinopathy and α -synucleinopathy
	5	Masui	TDP-43 proteinopathy
	6	Masui	Oxidative stress, inflammation, glutamate toxicity
	7	Masui	Cancer genetics
	8	Masui	Cancer metabolism

Human Pathology & Pathological Neuroscience Syllabus (4)

Syllabus Title	Diagnostic Pathology (General)		
Instructor	Yamamoto, Masui		
Credit	1		
Type of Class	Lectuer and Practice		
Theme	Tumor diagnostics (histology, cytology, elecron microscopy, immunohistochemistry, in situ hybridization)		
Schedule	Thursday 14:00-15:10, 15:20-16:30		
Course Objective	<p>(1) Minimum level: To carry out research activities via communicating efficiently with colleagues and conforming to research ethics.</p> <p>(2) Ordinary level: To formulate a qualitative research design and prove it with the supervisors through an appropriate reference searching and an untenable hypothesis building</p> <p>(3) Advanced level: To voluntarily compile research findings into full-fledged English papers and publish them in peer-reviewed academic journals</p>		
Evaluation Methods	Attendance (50%), report on seminar (30%), conference presentation (10%), academic writing (5%), examination (5%)		
Grading Scale	The five categories are S (90 points or more to 100 points), A (80 points or more to less than 90 points), B (70 points or more to less than 80 points), C (60 points or more to less than 70 points), and D (less than 60 points). S, A, B, and C are acceptable, and D is not acceptable.		
Textbooks/References	細胞診を学ぶ人のために 第6版(医学書院)、外科病理学 第5版(文光堂)		
Independent Study Outside of Class	Textbook reading and reference searching		
Room	Yayoi Memorial Education Building, 4th Floor, Department of Pathology		
Special Note	For those who cannot participate in the above time, the time schedule will be decided after consultation. Questions will be accepted at any time. Feedback will be given at the final session.		
Course Plan	Number	Instructor	Contents
	1	Masui	Histological diagnosis
	2	Masui	Cytological diagnosis
	3	Masui	Application of electron microscopy
	4	Yamamoto, Masui	Immunohistochemistry and in situ hybridization

Human Pathology & Pathological Neuroscience Syllabus (5)

Syllabus Title	Diagnostic Pathology (Special)		
Instructor	Masui		
Credit	1		
Type of Class	Lectuer and Practice		
Theme	Brain tumor pathology		
Schedule	Wednesday 14:00-15:10, 15:20-16:30		
Course Objective	<p>(1) Minimum level: To carry out research activities via communicating efficiently with colleagues and conforming to research ethics.</p> <p>(2) Ordinary level: To formulate a qualitative research design and prove it with the supervisors through an appropriate reference searching and an untenable hypothesis building</p> <p>(3) Advanced level: To voluntarily compile research findings into full-fledged English papers and publish them in peer-reviewed academic journals</p>		
Evaluation Methods	Attendance (50%), report on seminar (30%), conference presentation (10%), academic writing (5%), examination (5%)		
Grading Scale	The five categories are S (90 points or more to 100 points), A (80 points or more to less than 90 points), B (70 points or more to less than 80 points), C (60 points or more to less than 70 points), and D (less than 60 points). S, A, B, and C are acceptable, and D is not acceptable.		
Textbooks/References	脳腫瘍臨床病理カラーアトラス 第4版(医学書院)		
Independent Study Outside of Class	Textbook reading and reference searching		
Room	Yayoi Memorial Education Building, 4th Floor, Department of Pathology		
Special Note	For those who cannot participate in the above time, the time schedule will be decided after consultation. Questions will be accepted at any time. Feedback will be given at the final session.		
Course Plan	Number	Instructor	Contents
	1	Masui	Brain tumor pathology (1)
	2	Masui	Brain tumor pathology (2)
	3	Masui	Cytopathology of brain tumors
	4	Masui	Genotypic classification of brain tumors

Human Pathology & Pathological Neuroscience Syllabus (6)

Syllabus Title	Practical research activities		
Instructor	All staffs		
Credit	10		
Type of Class	Field study and Laboratory work		
Theme	Research implementation and development of the academic paper		
Schedule	Mon, Wed- Fri 13:00-17:00		
Course Objective	(1) Minimum level: To carry out research activities via communicating efficiently with colleagues and conforming to research ethics. (2) Ordinary level: To formulate a qualitative research design and prove it with the supervisors through an appropriate reference searching and an untenable hypothesis building (3) Advanced level: To voluntarily compile research findings into full-fledged English papers and publish them in peer-reviewed academic journals		
Evaluation Methods	Research notes and reports (60%), Preparation of figures and tables (10%), Research presentation and discussion (10%), Preparation of paper (20%)		
Grading Scale	The five categories are S (90 points or more to 100 points), A (80 points or more to less than 90 points), B (70 points or more to less than 80 points), C (60 points or more to less than 70 points), and D (less than 60 points). S, A, B, and C are acceptable, and D is not acceptable.		
Textbooks/References	蛍光抗体法(ソフトサイエンス社)、酵素抗体法(学際企画)、In situハイブリダイゼーション手法(学際企画)、PCR実験マニュアル(HBJ出版)、タンパク質実験ノート(羊土社)		
Independent Study Outside of Class	Textbook reading and reference searching		
Room	Yayoi Memorial Education Building, 4th Floor, Department of Pathology		
Special Note	For those who cannot participate in the above time, the time schedule will be decided after consultation. Questions will be accepted at any time. Feedback will be given at the final session.		
Course Plan	Number	Instructor	Lecture Title
	1	All staffs	Tissue preparation and microscopic examination: Adaptation, metabolic disorders, degeneration Tumor pathology: Macroscopic and microscopic examination, immunohistochemistry, in situ hybridization
	~		
	25		
	26	All staffs	Macro/microscopic and immunohistochemical examination of brain infarcts; Morphological examination of carotid and intracerebral vasculatures; Autopsy; IHC of neurodegenerative diseases; Histological/genetic/biochemical analyses on tumors
	~		
	50		
	51	All staffs	Histological/cytological/EM examination of tumors; Molecular pathology; Histopathology of neuroepithelial and other brain tumors; IHC of brain tumors
~			
75			

Neurophysiology

I Educational Policy

At neurophysiology group, we are interested in neural circuit, which underlies higher brain functions. Neural circuit formation is affected by numbers of factors, such as development of the animal, inputs from outer environments, and nerve injuries. To understand the mechanism of neural circuit formation at such diverse conditions, we focus onto developmental maturations and adoptive plastic changes of the neural circuits. The techniques to address these issues range from functional analysis such as optogenetics, imaging and electrophysiology, to molecular analysis as transcriptome analysis, immunostaining, ISH and behavior analysis. We are expecting that our research will clarify the mechanisms underly adoptive neural plasticity, which then leads to elucidate and cure the mental disorders and neuropathic pain caused by malfunctions of the neural circuit plasticity.

II Goals

- Understand the brain structures and the synaptic functions
- Follow and understand the up-to-date scientific articles.
- Acquire the IT literacy to access necessary information.
- Understand and perform brain science experiment in a multiple levels.
- Set the goal, plan the project, and perform the experiment to address the theme.
- Acquire the skill to perform the precise and reproducible experiment.
- Choose and run the appropriate statistical analysis against the acquired data.
- Design comprehensive figures from the acquired data to convince audience.
- Write the academic articles.
- Write the grant applications.
- Understand the research ethics
- Discuss topics related to brain science not only in the specialized field but also with wider scope.

III Supervisor • Research theme

(* = for doctor's license holders)

Name and position	Research theme
Prof. Miyata, Assistant Profs. Midorikawa, Ueta, Nakayama (Kawamura), Kodama	(1)Remodeling of the CNS neural circuit induced by peripheral nerve injury The aim is to solve the mechanism underlie phantom limb sensation/pain induced by an amputation or spinal cord injury. To address this issue, we investigate how neural circuit remodeling at the brain interfere the somatotopy and pain sensation. We use somatosensory thalamus as a model circuit and clarify the functional, anatomical, and molecular mechanisms.
Prof. Miyata, Assistant Profs. Midorikawa, Kanaya (Yasuda), Nakayama (Kawamura), Maruyama, Kodama	(2)Synaptic elimination during developmental critical period and maintenance after the maturation. At the central nervous system, redundant synapse is formed in the early postnatal stage. In the adolescent critical period, survival of the necessary synapse and elimination of unnecessary synapse proceed to complete the mature neural circuit formation. Understanding this process is crucial since it is proposed that mental disorders such as autism and schizophrenia is caused by malfunction of this process. We address this issue by combining diverse experimental techniques.
Prof. Miyata, Assistant Profs. Kanaya (Yasuda), Nakayama (Kawamura)	(3)Brain function analysis under social discrimination or trans gender surgery. The aim of this project is to clarify the pathological basis by analyzing behavior, brain function and molecular. We will describe the causal relationship between the gene mutation and the synaptic malfunction.
Prof. Miyata, Assistant Profs. Kanaya (Yasuda), Maruyama, Kodama	(4)Relationship between somatosensory/pain and the animal behavior. The goal is to understand how somatosensory, and pain are coded at the cerebral cortex? And how these sensations affect the animal behaviors and decisions.

IV

Syllabus

(* = for doctor's license holders)

Title	Instructor	Credit	Theme
Neuroscience	Prof. Miyata, Assistant Profs. Midorikawa,Ueta, Kanaya (Yasuda), Nakayama (Kawamura), Maruyama, Kodama	1	Learn the overview of neuroscience and neuroanatomy including ongoing research
Neurotechnology	Prof. Miyata, Assistant Profs. Midorikawa,Ueta, Kanaya (Yasuda), Nakayama (Kawamura), Maruyama, Kodama	2	Learn techniques and knowledges to perform experiment by lectures and trainings
Research Progress Seminar	Prof. Miyata, Assistant Profs. Midorikawa,Ueta, Kanaya (Yasuda), Nakayama (Kawamura), Maruyama, Kodama	2	Learn how to perform comprehensive academic presentation and constructive discussion
Experiment/Practice (Research for thesis)	Prof. Miyata, Assistant Profs. Midorikawa,Ueta, Kanaya (Yasuda), Nakayama (Kawamura), Maruyama, Kodama	10	Design and perform experiments for the theme and write up the academic article based on the acquired data
Total credits		15	

(Neurophysiology) Syllabus (1)

Syllabus Title	Neuroscience		
Instructor	Prof. Miyata, Assistant Profs. Midorikawa, Ueta, Kanaya (Yasuda), Nakayama (Kawamura), Maruyama, Kodama		
Credit	1		
Type of Class	Lecture/Practicum		
Theme	Learn and understand the General Neurophysiology and the Neuromorphology		
Schedule	On Mon, 9:30–10:40		
Course Objective	<ul style="list-style-type: none"> • Understand the brain structures and the synaptic functions • Follow and understand the up-to-date scientific articles. • Understand and perform brain science experiment in a multiple levels. • Acquire knowledge of analysis methods in the brain science experiments. 		
Evaluation Methods	<ul style="list-style-type: none"> • Class attendance (50%) • Oral exam (50%) 		
Grading Scale	Passing grade: S (90–100 points), A (80–89), B (70–79), or C (60–69); rejected: D (< 60)		
Textbooks/References	Fundamental Neuroscience (Academic Press) Principles of Neural Science (English Edition) or カンデル神経科学(メディカルサイエンスインターナショナル) (in Japanese), and other related books		
Independent Study Outside of Class	Read the above reference books and related literature.		
Room	Div. Neurophysiol., Dept. Physiol. (4th, 5th, or 7th floor, Yayoi build.)		
Special Note	For those who cannot participate in the class on schedule, the time schedule will be decided after consulting. If you have any questions about the class, please feel free to contact us.		
Course Plan	Number	Instructor	Contents
	1	Mariko Miyata	General Neuroscience
	2	Mariko Miyata	Introduction to Neurophysiology I
	3	Mariko Miyata	Introduction to Neurophysiology II
	4	Mariko Miyata	Introduction to Neuroanatomy I
	5	Mariko Miyata	Introduction to Neuroanatomy II
	6	Mariko Miyata	Neuroimaging
	7	Mariko Miyata	Optogenetics and its Applications in Neuroscience Research
	8	Mariko Miyata	Application of Genetically Modified Mice in Neuroscience
	9	Mariko Miyata	Nociception
	10	Mariko Miyata	Synaptology
	11	Mariko Miyata	Sensory Physiology
	12	Mariko Miyata	Exercise Physiology
	13	Mariko Miyata	Animal Models and Pathophysiology of Neuropsychiatric Disorders
	14	Mariko Miyata	Animal Behavior Analysis
15	Mariko Miyata	Summary	

(Neurophysiology) Syllabus (2)

Syllabus Title	Neurotecnology		
Instructor	Prof. Miyata, Assistant Profs. Midorikawa, Ueta, Kanaya (Yasuda), Nakayama (Kawamura), Maruyama, Kodama		
Credit	2		
Type of Class	Lecture/Practice		
Theme	Understand the principle about the research techniques and analysis methods and acquire the skills through the lectures and the practices		
Schedule	On Fri. 10:40–11:50		
Course Objective	<ul style="list-style-type: none"> •Set the goal, plan the project, and perform the experiment to solve the issue. •Acquire the skill to perform the precise and reproducible experiment. •Choose and run the appropriate statistical analysis against the data acquired from the living animals. •Design comprehensive figures from the acquired data to convince audience. •Write the academic articles. 		
Evaluation Methods	Attendance (50%) Evaluation of presentation and discussion (50%)		
Grading Scale	Passing grade: S (90–100 points), A (80–89), B (70–79), or C (60–69); rejected: D (< 60)		
Textbooks/References	Fundamental Neuroscience (Academic Press), Principles of Neural Science (Kandel), and other related papers.		
Independent Study Outside of Class	Read the textbooks above and related references. Acquire a broad knowledge about the interdisciplinary field with an interest in the research topics of other researchers.		
Room	Div. Neurophysiol., Dept. Physiol. (4th, 5th, or 7th floor, Yayoi build.)		
Special Note	For those who cannot participate in the class on schedule, the time schedule will be decided after consulting. If you have any questions about the class, please feel free to contact us.		
Course Plan	Number	Instructor	Contents
	1	Mariko Miyata, Takashi Kodama	Lectures and practices on the fundamental techniques of neuroscience
	2	Mariko Miyata, Mitsuharu Midorikawa	Lectures and practices on the fundamental techniques of neuroscience
	3	Mariko Miyata, Yoshifumi Ueta	Lectures and practices on the fundamental techniques of neuroscience
	4	Mariko Miyata, Takuma Maruyama	Lectures and practices on the fundamental techniques of neuroscience
	5	Mariko Miyata, Kanaya (Yasuda) Moe	Lectures and practices on the fundamental techniques of neuroscience
	6	Mariko Miyata, Nakayama (Kawamura) H	Lectures and practices on the fundamental techniques of neuroscience
	7	Mariko Miyata, Takashi Kodama	Lectures and practices on the fundamental techniques of neuroscience
	8	Mariko Miyata, Mitsuharu Midorikawa	Lectures and practices on the fundamental techniques of neuroscience
	9	Mariko Miyata, Yoshifumi Ueta	Lectures and practices on the fundamental techniques of neuroscience
	10	Mariko Miyata, Takuma Maruyama	Lectures and practices on the fundamental techniques of neuroscience
	11	Mariko Miyata, Kanaya (Yasuda) Moe	Lectures and practices on the fundamental techniques of neuroscience
	12	Mariko Miyata, Nakayama (Kawamura) H	Lectures and practices on the fundamental techniques of neuroscience
	13	Mariko Miyata, Yoshifumi Ueta	Lectures and practices on the fundamental techniques of neuroscience
	14	Mariko Miyata, Mitsuharu Midorikawa	Lectures and practices on the fundamental techniques of neuroscience
	15	Mariko Miyata, Yoshifumi Ueta	Lectures and practices on the fundamental techniques of neuroscience
16	Mariko Miyata, Mitsuharu Midorikawa	Lectures and practices on the fundamental techniques of neuroscience	

(Neurophysiology) Syllabus (3)

Syllabus Title	Research Progress Seminar		
Instructor	Prof. Miyata, Assistant Profs. Midorikawa, Ueta, Kanaya (Yasuda), Nakayama (Kawamura), Maruyama, Kodama		
Credit	2		
Type of Class	Lecture/Exercise		
Theme	Reading, presentation, and discussion of research paper related to neuroscience		
Schedule	On Fri, 9:30 AM – 10:25 AM		
Course Objective	<ul style="list-style-type: none"> •Set the goal, plan the project, and experiment to solve the issue. •Acquire the skill to perform precise and reproducible experiments. •Design comprehensive figures from the acquired data to convince an audience. •Write the academic articles. •Acquire the IT literacy to access the required information. 		
Evaluation Methods	The final grade will be calculated based on the following: Attendance (25%), Submission of presentation abstract (25%), the Quality of Presentation (40%), and Attitude in class (10%).		
Grading Scale	Passing grade: S (90–100 points), A (80–89), B (70–79), or C (60–69); rejected: D (< 60)		
Textbooks/References	Related previous research literature and research information resource on the internet		
Independent Study Outside of Class	Prepare presentation materials under the mentoring of instructors.		
Room	Div. Neurophysiol., Dept. Physiol. (4th, 5th, or 7th floor, Yayoi build.)		
Special Note	For those who cannot participate in the class on schedule, the time schedule will be decided after consulting. If you have any questions about the class, please feel free to contact us.		
Course Plan	Number	Instructor	Contents
	1	Miyata, Kodama	Presentation and discussion of research paper related to neuroscience
	2	Miyata, Midorikawa	Presentation and discussion of research paper related to neuroscience
	3	Miyata, Ueta	Presentation and discussion of research paper related to neuroscience
	4	Miyata, Maruyama	Presentation and discussion of research paper related to neuroscience
	5	Miyata, Kanaya–Yasuda	Presentation and discussion of research paper related to neuroscience
	6	Miyata, Nakayama–Kawamura	Presentation and discussion of research paper related to neuroscience
	7	Miyata, Kodama	Presentation and discussion of research paper related to neuroscience
	8	Miyata, Midorikawa	Presentation and discussion of research paper related to neuroscience
	9	Miyata, Ueta	Presentation and discussion of research paper related to neuroscience
	10	Miyata, Maruyama	Presentation and discussion of research paper related to neuroscience
	11	Miyata, Kanaya–Yasuda	Presentation and discussion of research paper related to neuroscience
	12	Miyata, Nakayama–Kawamura	Presentation and discussion of research paper related to neuroscience
	13	Miyata, Ueta	Presentation and discussion of research paper related to neuroscience
	14	Miyata, Midorikawa	Presentation and discussion of research paper related to neuroscience
	15	Miyata, Ueta	Presentation and discussion of research paper related to neuroscience
16	Miyata, Midorikawa	Presentation and discussion of research paper related to neuroscience	

(Neurophysiology) Syllabus (4)

Syllabus Title	Experiment/Practice (Research for thesis)	
Instructor	Prof. Miyata, Assistant Profs. Midorikawa, Ueta, Kanaya (Yasuda), Nakayama (Kawamura), Maruyama, Kodama	
Credit	10	
Type of Class	Experiment/Practice (Research for thesis)	
Theme	Conduct research and write the scientific articles	
Schedule	On Mon.–Fri., start at 9:00 AM and continue until the end of experiments (except class hours on Mon. or Thu.); and on Sat, 9:00 AM–13:00 PM	
Course Objective	<ul style="list-style-type: none"> • Understand the brain structures and the synaptic functions • Follow and understand the up-to-date scientific articles. • Acquire the IT literacy to access required information. • Understand and perform brain science experiment in a multiple levels. • Set the goal, plan the project, and perform the experiment to solve the issue. • Acquire the skill to perform the precise and reproducible experiment. • Choose and run the appropriate statistical analysis against the acquired data. • Design comprehensive figures from the acquired data to convince audience. • Write the academic articles. • Write the grant applications. • Understand the research ethics • Discuss topics related to brain science not only in the specialized field but also with wider scope. 	
Evaluation Methods	<ul style="list-style-type: none"> • Use a lab notebook for scientific documentation, search related papers, summarize the results, and prepare research report (55%) • Interpret results and prepare figures (10%) • Present and discuss results (10%) • Write the scientific articles (25%) 	
Grading Scale	Passing grade: S (90–100 points), A (80–89), B (70–79), or C (60–69); rejected: D (< 60)	
Textbooks/References	理系なら知っておきたいラボノートの書き方(羊土社) (in Japanese), Reviews and articles in related areas	
Independent Study Outside of Class	Gain knowledge by reading scientific papers and by communicate with colleagues. Actively attending, participating in, and presenting at the academic conferences or seminars.	
Room	Div. Neurophysiol., Dept. Physiol. (4th, 5th, or 7th floor, Yayoi build.)	
Special Note	If you have any questions about research or wish for a research guidance, please feel free to contact us at any time.	
Course Plan	Number	Contents
	1	<ul style="list-style-type: none"> • Acquire an extensive and up-to-date knowledge from scientific papers through understanding brain structures and the synaptic functions.
	~	<ul style="list-style-type: none"> • Acquire the IT literacy to access required information from various sources. • Understand and perform brain science experiment in a multiple levels (molecular, cellular, synapses, neural circuits, and animal behaviors).
	90	<ul style="list-style-type: none"> • Set the goal, plan the project, and perform the experiment to solve the issue. For these purposes, use and maintain a lab notebook.
	91	<ul style="list-style-type: none"> • Train to acquire the following expertise and skills. • How to choose and run the appropriate statistical analysis against the acquired data.
	~	<ul style="list-style-type: none"> • How to design comprehensive figures from the acquired data to convince audience. • How to write the academic articles.
	120	<ul style="list-style-type: none"> • Understand the research ethics. • Develop skills for discussing topics related to brain science not only in the specialized field but also with wider scope.
	121	<ul style="list-style-type: none"> • Write a scientific paper based on the results. Specify experiments or analyses required to support the conclusions. If you realize further data are required, conduct additional experiments or analyses. During this period, accomplish the following goals.
	~	<ul style="list-style-type: none"> • Write, submit, and publish the academic article(s). • Understand the research ethics.
150	<ul style="list-style-type: none"> • Discuss topics related to brain science not only in the specialized field but also with wider scope. 	

Biochemistry

I Educational Policy

We are investigating the molecular mechanism of neural circuit formation and maturation. We found that PTP δ , one of receptor-type protein tyrosine phosphatases, is involved in cortical dendritic growth regulated by Semaphorin 3A (Sema3A), an axon guidance molecule. We will study Sema3A-PTP δ relationship with physiological functions and pathological conditions. We are currently examining identified a dephosphorylated substrate for PTP δ . We will also examine how these identified molecules are involved in higher brain functions such as memory and neurological disorders.

PTP δ is also involved in human metabolic disorders such as diabetes. As PTP δ is expressed in the hypothalamus and liver, which are the centers of metabolism, we speculate that PTP δ may participate in metabolic regulation through neuronal and non-neuronal mechanism. We will clarify the role of PTP δ in metabolism using the PTP δ mutant mice as well as human specimens.

In addition, we are investigating the mechanism of infection of Plasmodium malaria to erythrocytes, the molecular mechanism involved in the formation and maturation of mast cell secretory granules, the asymmetric distribution of the lipid bilayer, and the elongation of neurites. All of these important research topics form the basis for elucidating various diseases and for developing new therapeutic drugs.

Graduate school students will work on one of themes following (1) to (5). The students will learn the process of research conception, gathering information, experimental planning, experimental techniques, evaluation of the obtained data with statistical analysis, conference reports, presentations, and dissertation writing. We will also encourage the students to find his/her own research theme through the graduate school course.

II Goals

- Set research themes in biochemistry, molecular biology, neuroscience and related fields, formulate experimental plans, and carry out the research.
- Acquire knowledges, research methods, and experimental techniques above indicated fields.
- Promote research by actively incorporating methods from other fields including electrophysiology, pharmacology, and pathology.
- Visualize the experimental results with statistical evaluation.
- Make the research results into a dissertation paper.
- Discuss with other scientists to gain a wide range of ideas and knowledges.

III Supervisor•Research theme

(* = for doctor's license holders)

Name and position	Research theme
Nakamura F Jitsuki-Takahashi A Takizawa K	(1) Elucidation of the molecular mechanism of dendrites and synaptogenesis by tyrosine phosphatase PTP δ PTP δ is involved in the formation of dendrites and synapses in various regions such as cerebral cortex and cerebellum. Preliminary experiments suggests that PTP δ may interact with different molecules in different regions. Using various mutant mice, we will find region-specific interacting molecules and dephosphorylation substrates. We will elucidate the role of the identified molecule and PTP δ in dendrite / synaptogenesis and higher-order functions.
Nakamura F Jitsuki-Takahashi A Arashiki N Takizawa K	(2) Evaluation of the function of PTP δ in metabolic regulation The involvement of PTP δ in human metabolic diseases such as diabetes has been suggested. As PTP δ is expressed in the hypothalamus and liver, we speculates that PTP δ may be involved in metabolic regulation in neuronal as well as non-neuronal manner. We will identify the extracellular ligand of PTP δ in metabolism using generated mutant mice. We will also investigate the possibility of PTP δ as a new biomarker using mouse and human specimens.
Koshino I Nakamura F	(3) Elucidation of erythrocyte invasion mechanism of Plasmodium malaria We are analyzing molecular events caused in erythrocytes when Plasmodium invades erythrocytes, with a particular focus on phosphorylation of erythrocyte membrane proteins and the resulting changes in protein and membrane function. We have recently found that Sema7A is involved in this process. Elucidate the role of Sema7A in malaria infection using knockout mice and recombinant proteins of Sema7A.

Tanaka S Nakamura F	(4) Elucidation of secretory granule formation and secretory mechanism of mast cells We are investigating secretory granules, which are a reservoir of allergens for mast cells. So far, we have developed a method for separating secreted granules specifically for localized molecules and proceeded with proteome analysis. Currently, we are searching for proteins essential for the formation and functional expression of secretory granules using gene knockdown technology. We are also trying to elucidate the molecular mechanism of tissue flexibility formation using cell nodules (spheroids).
Arsashiki N Nakamura F	(5) Elucidation of the mechanism and role of maintaining the lipid asymmetric distribution in the membrane lipid bilayer We are analyzing the active transport mechanism of aminophospholipids by flippase of lipid transport protein to the inner layer and the scrambling mechanism by scramblase. We also investigate the role in interaction with membrane skeletal protein and maintenance of membrane function. In addition, the role of these lipid transport mechanisms in neurite formation will be elucidated using techniques such as live imaging.

IV Syllabus

(* = for doctor's license holders)

Title	Instructor	Credit	Theme
New findings in biochemistry, molecular biology and Neuroscience□	Nakamura F., Koshino I., Tanaka S., Arashiki N., Jitsuki-Takahashi A., Takizawa K.□	2	New findings in biochemistry, molecular biology and Neuroscience
Progress reports and original article readings	Nakamura F., Koshino I., Tanaka S., Arashiki N., Jitsuki-Takahashi A., Takizawa K.□	3	Progress reports and original article readings
Preparation for meeting presentation	Nakamura F., Koshino I., Tanaka S., Arashiki N., Jitsuki-Takahashi A., Takizawa K.□	1	Preparation for meeting presentation
Practice, experiments, writing dissertation (Project Research)	Nakamura F., Koshino I., Tanaka S., Arashiki N., Jitsuki-Takahashi A., Takizawa K.□	9	Practice, experiments, writing dissertation (Project Research)
Total credits		15	

(Biochemistry) Syllabus (1)

Syllabus Title	New findings in biochemistry, molecular biology and Neuroscience		
Instructor	Nakamura F., Koshino I., Tanaka S., Arashiki N., Jitsuki-Takahashi A., Takizawa K.		
Credit	2		
Type of Class	Lecture, Seminar		
Theme	New findings in biochemistry, molecular biology and Neuroscience□		
Schedule	Tuesday 18:00..19:30		
Course Objective	<ul style="list-style-type: none"> • Lecturers will introduce each field of biochemistry, molecular biology, and neuroscience. • Graduate students will explain original papers including review articles in a seminar format. • The training will aim knowledge aggregation, research planning, and adaptation to the researcher's own research subject. 		
Evaluation Methods	Attendance (30%), Presentation and/or reports (60%), discussion (10%)		
Grading Scale	S (90..100), A (80..89), B(70..79), C(60..69), Passed; D (less than 60), Failed		
Textbooks/References	Molecular Biology of THE CELL 6th Ed; Lehninger Principles of Biochemistry 6th Ed; Principles of Neural Science 5th Ed. Recent review articles.		
Independent Study Outside of Class			
Room	Yayoi Bld 5F, Biochemistry		
Special Note	Resceduling of lecture time will be considered.		
Course Plan	Number	Instructor	Contents
	1	Nakamura F	Introduction
	2	FN, IK, NA, ST, AJ, KT	Biochemistry, overview of metabolism
	3	FN, IK, NA, ST, AJ, KT	Biochemisry, new findings in sugar metabolism
	4	FN, IK, NA, ST, AJ, KT	Biochemistry, new findings in lipids metabolism
	5	FN, IK, NA, ST, AJ, KT	Biochemistry, new findings in pathological metabolism
	6	FN, IK, NA, ST, AJ, KT	Molecular Biology, overview of signal transduction
	7	FN, IK, NA, ST, AJ, KT	Molecular Biology, new findings in signal transduction
	8	FN, IK, NA, ST, AJ, KT	Overview of molecular biology (DNA duplication, RNA transcription, Translation, etc)
	9	FN, IK, NA, ST, AJ, KT	New finding in molecular biology (DNA duplication, RNA transcription, Translation, etc) (1)
	10	FN, IK, NA, ST, AJ, KT	New finding in molecular biology (DNA duplication, RNA transcription, Translation, etc) (2)
	11	FN, IK, NA, ST, AJ, KT	Neuroscience, overview
	12	FN, IK, NA, ST, AJ, KT	New findings in synaptic transmission
	13	FN, IK, NA, ST, AJ, KT	New findings in developmental neuroscience
	14	FN, IK, NA, ST, AJ, KT	New findings in Neurological disorders
15	Nakamura F	Concluding Remarks	

(Biochemistry) Syllabus (2)

Syllabus Title	Progress reports and original article readings□		
Instructor	Nakamura F., Koshino I., Tanaka S., Arashiki N., Jitsuki-Takahashi A., Takizawa K.		
Credit	3		
Type of Class	Lecture, Seminar□		
Theme	Progress reports and original article readings		
Schedule	Tuesday 16:30..18:00□		
Course Objective	<ul style="list-style-type: none"> • Progress report: Each member reports recent progress of one's own experimental project with rigorous assessment. • Article readings: Each member should find interesting articles relating to one's project and report the paper with critical readings and evaluation. 		
Evaluation Methods	Attendance (30%), Presentation and/or reports (60%), discussion (10%)		
Grading Scale	S (90..100), A (80..89), B(70..79), C(60..69), Passed; D (less than 60), Failed		
Textbooks/References	Original articles recently published (within 2 years). Textbook: Molecular Biology of THE CELL 6th Ed; Lehninger Principles of Biochemistry 6th Ed; Principles of Neural Science 5th Ed. Recent review articles.		
Independent Study Outside of Class			
Room	Yayoi Bld 5F, Biochemistry		
Special Note	Rescheduling of lecture time will be considered.		
Course Plan	Number	Instructor	Contents
	1	FN, IK, NA, ST, AJ, KT	Progress report
	2	FN, IK, NA, ST, AJ, KT	Original article recently published
	3	FN, IK, NA, ST, AJ, KT	Progress report
	4	FN, IK, NA, ST, AJ, KT	Original article recently published
	5	FN, IK, NA, ST, AJ, KT	Progress report
	6	FN, IK, NA, ST, AJ, KT	Original article recently published
	7	FN, IK, NA, ST, AJ, KT	Progress report
	8	FN, IK, NA, ST, AJ, KT	Original article recently published
	9	FN, IK, NA, ST, AJ, KT	Progress report
	10	FN, IK, NA, ST, AJ, KT	Original article recently published
	11	FN, IK, NA, ST, AJ, KT	Progress report
	12	FN, IK, NA, ST, AJ, KT	Original article recently published
	13	FN, IK, NA, ST, AJ, KT	Progress report
	14	FN, IK, NA, ST, AJ, KT	Original article recently published
	15	FN, IK, NA, ST, AJ, KT	Progress report
	16	FN, IK, NA, ST, AJ, KT	Original article recently published
	17	FN, IK, NA, ST, AJ, KT	Progress report
	18	FN, IK, NA, ST, AJ, KT	Original article recently published
	19	FN, IK, NA, ST, AJ, KT	Progress report
	20	FN, IK, NA, ST, AJ, KT	Original article recently published
	21	FN, IK, NA, ST, AJ, KT	Progress report
	22	FN, IK, NA, ST, AJ, KT	Original article recently published
	23	FN, IK, NA, ST, AJ, KT	Progress report
	24	FN, IK, NA, ST, AJ, KT	Original article recently published
	25	FN, IK, NA, ST, AJ, KT	Progress report
	26	FN, IK, NA, ST, AJ, KT	Original article recently published
	27	FN, IK, NA, ST, AJ, KT	Progress report
	28	FN, IK, NA, ST, AJ, KT	Original article recently published
	29	FN, IK, NA, ST, AJ, KT	Progress report
30	FN, IK, NA, ST, AJ, KT	Original article recently published	

(Biochemistry) Syllabus (3)

Syllabus Title	Preparation for meeting presentation		
Instructor	Nakamura F., Koshino I., Tanaka S., Arashiki N., Jitsuki-Takahashi A., Takizawa K.		
Credit	1		
Type of Class	practice		
Theme	Preparation for meeting presentation		
Schedule	2 times/year, Saturday before any meetings 9:00-12:00, 13:00-18:00		
Course Objective	<ul style="list-style-type: none"> • Preparation for meeting presentation (poster, oral) • Rehearsal for presentation. 		
Evaluation Methods	Attendance (25%), Writing Abstract (25%), Preparation and rehearsal for presentation (40%), Comments for other presentations (10%)		
Grading Scale	S (90..100), A (80..89), B(70..79), C(60..69), Passed; D (less than 60), Failed□		
Textbooks/References			
Independent Study Outside of Class	Writing abstracts and preparing presentation poster and/or slides, discussing with Lab members.		
Room	Yayoi Bld 5F, Biochemistry□		
Special Note	Rescheduling will be considered.□		
Course Plan	Number	Instructor	Contents
	1	FN, IK, NA, ST, AJ, KT	Any meetings in Biochemistry, Molecular Biology, or Neuroscience
	2	FN, IK, NA, ST, AJ, KT	Any meetings in Biochemistry, Molecular Biology, or Neuroscience

(Biochemistry) Syllabus (4)

Syllabus Title	Practice, experiments, writing dissertation (Project Research)		
Instructor	Nakamura F., Koshino I., Tanaka S., Arashiki N., Jitsuki-Takahashi A., Takizawa K.		
Credit	10		
Type of Class	Practice		
Theme	Practice, experiments, writing dissertation (Project Research)		
Schedule	Monday to Friday 9:00–12:00, 13:00–17:00		
Course Objective	<ol style="list-style-type: none"> 1. Acquire the necessary experimental techniques and execute planned research. 2. Record experimental contents and data correctly. 3. Summarize and visualize experimental results in appropriate manner. 4. Present the research progress at external academic societies and study groups. 5. Make a dissertation of the research content and submit to academic journal. Appropriately respond to the comments of the reviewers and achieve the publication of the paper. 		
Evaluation Methods	Labnotebook record, research report (50%), Figure preparation (10%), Presentation, discussion (10%), Writing paper (30%)		
Grading Scale	S (90..100), A (80..89), B(70..79), C(60..69), Passed; D (less than 60), Failed□		
Textbooks/References	Original articles and review articles relating to the research project Handbook for Academic writing Textbook for Statistical analysis		
Independent Study Outside of Class	Attend academic meetings to present and discuss one's own research.		
Room	Yayoi Bld 5F, Biochemistry□		
Special Note	Rescheduling will be considered.□		
Course Plan	Number	Instructor	Contents
	1~90	FN, IK, NA, ST, AJ, KT	Aim 1 and 2
	91~120	FN, IK, NA, ST, AJ, KT	Aim 3 and 4
	121~150	Nakamura F	Aim 5

Microbiology and Immunology

I Educational Policy

Lifestyle and dietary habits influence the gut microbiota, which has a significant impact not only on the intestinal environment but also on the homeostasis of extraintestinal organs. Many of the gut microorganisms play important roles in the digestion of food components, supply of vitamins, as well as development and regulation of the immune system. In this field, host-bacteria interactions associated with inflammatory pathologies in lifestyle-related and autoimmune diseases will be studied. The mechanisms will be explored on how abnormal immune responses induced by bacteria shape the pathogenesis in immune dysfunction and metabolic diseases .

II Goals

- 1) To plan clinically relevant research projects that may contribute to the prevention of diseases.
- 2) To gain experimental techniques in bacteriology and immunology, and implement research methods based on both scientific justification and ethical regulations.
- 3) To be able to publish scientific significances in academic journals.
- 4) To construct a research network in and beyond the project team.

III Supervisor•Research theme

(* = for doctor's license holders)

Name and position	Research theme
Professor Yanagisawa Associate Professor Osaka	(1) Molecular mechanisms in host-microbial interaction. Bacterial surface structures utilized by microorganisms to persist in host tissues, immunogenic bioactivators, and factors involved in immune evasion of microorganisms will be explored.
Professor Yanagisawa Associate Professor Osaka	(2) Association of microbiota with disease pathogenesis. Comprehensive analysis of bacterial flora in experimental mice models mimicing various inflammatory diseases, as well as patient-derived specimens, will be performed to evaluate the clinical relevance of microbiota in diseases. Cellular composition of the intestinal lymphoid tissues and other mucosa will be analysed to investigate on the relationship with disease progeression. Pathogenesis of diseases with unknown causes (e.g. Kawasaki disease) will be of interest.
Professor Yanagisawa Associate Professor Osaka Assistant Professor Ueshiba Assistant Professor Iizuka	(3) Pathogenic roles of microbial composition in autoimmune diseases. Mechanisms by which autoimmune diseases are developed will be elucidated using disease-specific mice models. Antigen responsiveness of the immunocompetent cells in autoimmune diseases will be determined in dysbiotic animal experiments.
Professor Yanagisawa Associate Lecturer Kato	(4) Immune regulation in Toxic Shock Syndrome. Infection caused by methicillin-resistant <i>Staphylococcus aureus</i> and <i>Streptococcus fulminans</i> induce production of bacterial toxins. Regulatory mechanisms and inhibitors of bacterial toxin-induced shock will be explored.
Professor Yanagisawa Assistant Professor Iizuka	(5) Immunocompetency in metabolic diseases. The relationship between immune cells and the pathogenesis of metabolic disorders caused by type 2 diabetes and obesity will be analyzed using mice and cell lines. This research will use therapeutic agents and food ingredients to explore methods of treatment and prevention of lifestyle-related diseases targeting immune cells.
Professor Yanagisawa Assistant Professor Ueshiba	(6) Analysis of pathogenicity and pathogenesis of new pathogens in laboratory animals. For newly classified bacteria that may cause infectious diseases in laboratory animals, analysis of pathogenic factors will be analyzed. Its pathology will be characterized, including comparison with known-pulmonary infection isolates, and will be proposed as a new pathogenic bacteria.

IV Syllabus

(* = for doctor's license holders)

Title	Instructor	Credit	Theme
Self-recognition of the immune system	Professor Yanagisawa, Associate Professor Osaka, Associate Lecturer Kato, Assistant Professor Ueshiba, Assistant Professor Iizuka	2	Pathogenesis of autoimmune diseases and its clinical applications.
Indigenous microbiota in inflammatory diseases	Professor Yanagisawa, Associate Professor Osaka, Associate Lecturer Kato, Assistant Professor Ueshiba, Assistant Professor Iizuka	2	Analysis of indigenous microbiota using disease-specific mouse models and clinical specimens.
Immunity and metabolic disorders	Professor Yanagisawa, Associate Professor Osaka, Associate Lecturer Kato, Assistant Professor Ueshiba, Assistant Professor Iizuka	1	Immune pathogenesis in metabolic diseases.
Practical training in microbiology and immunology experiments	Professor Yanagisawa, Associate Professor Osaka, Associate Lecturer Kato, Assistant Professor Ueshiba, Assistant Professor Iizuka	10	Research planning and scientific writing.
Total credits		15	

Microbiology and Immunology Syllabus (1)

Syllabus Title	Self-recognition of the immune system		
Instructor	Professor Yanagisawa, Associate Professor Osaka, Associate Lecturer Kato, Assistant Professor Ueshiba, Assistant Professor Iizuka		
Credit	2		
Type of Class	Lectures and Exercises		
Theme	<p>Pathogenesis of autoimmune diseases and its clinical applications. Lifestyle and dietary habits influence gut microbiota, which has a significant impact not only on the intestinal environment but also on the homeostasis of extraintestinal organs. Many of the gut microorganisms play important roles in the digestion of food components, supply of vitamins, as well as development and regulation of the immune system. In this field, host-bacteria interactions associated with inflammatory pathologies in autoimmune diseases will be studied. The mechanisms will be explored on how abnormal immune responses induced by bacteria shape the pathogenesis in immune dysfunction.</p>		
Schedule	Monday 10:20-11:30		
Course Objective	<ol style="list-style-type: none"> 1. To understand the mechanism on self-recognition by the immune system and the breakdown of self-tolerance. 2. To acquire techniques to analyze immune cells and antibodies to conduct basic research. 3. To appropriately record and store experimental data, and to demonstrate the results in figures and tables. 4. To be able to present and to discuss the research content at academic conferences and research meetings. 		
Evaluation Methods	Submission of reports on lecture content (50%), presentation and discussion (50%)		
Grading Scale	Five categories include S (90 to 100 points), A (80 to 90 points), B (70 to 80 points), C (60 to 70 points), and D (60 points), with S, A, B, and C as passed and D as failed.		
Textbooks/References	Fundamental Immunology (LWW), Janeway's Immunobiology (Garland Science)		
Independent Study Outside of Class	Read the above text book. Update literatures on the topics of current interest.		
Room	Conference Room 403, Practice Room 1		
Special Note	Those who are unable to attend at the above timetable will be rescheduled. A feedback will be given at the final session.		
Course Plan	Number	Instructor	Contents
	1	Professor Yanagisawa	General immunology
	2	Associate Professor Osaka	Innate and mucosal immunity
	3	Associate Professor Osaka	Mechanisms of acquired immunity
	4	Associate Lecture Kato	Introduction to methods in analysis of the immune system
	5	Professor Yanagisawa	Immunoregulatory mechanisms and self-tolerance
	6	Professor Yanagisawa	Breakdown of self-tolerance and autoimmunity
	7	Professor Yanagisawa	Introduction to autoimmune diseases
	8	Associate Lecture Kato	Introduction to methods in analysis of autoimmune diseases
	9	Assistant Professor Ueshiba	Mouse autoimmune disease model - Sjogren's syndrome
	10	Assistant Professor Ueshiba	Mouse autoimmune disease model-primary biliary cholangitis
	11	Assistant Professor Ueshiba	Mouse autoimmune disease model-autoimmune pancreatitis
	12	Assistant Professor Iizuka	Immune tolerance and environmental factors
	13	Assistant Professor Iizuka	Immune tolerance and nutrition
	14	Professor Yanagisawa	Methods for the search of pathogenic factors in autoimmune diseases
	15	Professor Yanagisawa	Clinical applications of mouse models of autoimmune disease
16	Professor Yanagisawa	Prospects and problems in research on autoimmune diseases	

Microbiology and Immunology Syllabus (2)

Syllabus Title	Indigenous microbiota in inflammatory diseases		
Instructor	Professor Yanagisawa, Associate Professor Osaka, Associate Lecturer Kato, Assistant Professor Ueshiba, Assistant Professor Iizuka		
Credit	2		
Type of Class	Lectures and Exercises		
Theme	<p>Analysis of indigenous microbiota in inflammatory diseases. Lifestyle and dietary habits influence gut microbiota, which has a significant impact not only on the intestinal environment but also on the homeostasis of many other organs. Dysbiosis of the intestinal flora has been linked to immune dysfunction and metabolic diseases. Recent attention has been attracted to unculturable bacteria which are known to make up a large percentage of the gut microbiome. In this study, specialized techniques will be used to analyze for microbiotic compositions in experimental–mouse models and clinical specimens.</p>		
Schedule			
Course Objective	<ol style="list-style-type: none"> 1. To acquire methods and techniques to screen for commensal microbiota using experimental–mouse models and clinical specimens. 2. To acquire analytical approaches for unculturable bacteria. 3. To understand, present, and discuss the contents of practical training. 		
Evaluation Methods	Submission of reports on lecture content (50%), presentation and discussion of academic research (50%)		
Grading Scale	Five categories includes S (90 to 100 points), A (80 to 90 points), B (70 to 80 points), C (60 to 70 points), and D (60 points), with S, A, B, and C as passed and D as failed.		
Textbooks/References	Intestinal and Oral Bacteria and Systemic Diseases (CMC Publishing Co.)		
Independent Study Outside of Class	Update original and review papers in the research field.		
Room	Conference Room 403, Practice Room 1		
Special Note	Those who are unable to attend at the above time table will be re-scheduled. A feedback will be given at the final session.		
Course Plan	Number	Instructor	Contents
	1	Professor Yanagisawa	Overview of endemic microbiology, mastery of classical bacterial search methods (culture methods, Gram staining, etc.)
	2	Associate Professor Osaka	Research approach to difficult-to-culture bacteria, molecular ecological analysis technique (1) (FISH method)
	3	Associate Professor Osaka	Overview of gastrointestinal diseases and commensal bacteria, molecular ecological analysis techniques (DNA extraction, PCR)
	4	Associate Professor Osaka	Introduction to skin diseases and commensal bacteria, molecular ecological analysis technique (3) (meta-16S analysis)
	5	Associate Lecturer Kato	Molecular ecological analysis technique (4) (data analysis), presentation, discussion
	6	Assistant Professor Ueshiba	Overview of animal models for inflammatory bowel disease, construction of model mice for inflammatory bowel disease
	7	Associate Professor Osaka	Immunological analysis of mouse models of inflammatory bowel disease (analysis of cells in the colon mucosa-specific layer)
	8	Associate Professor Osaka	Intestinal microbiota analysis of model mice with inflammatory bowel disease (1) (DNA extraction, PCR)
	9	Associate Professor Osaka	Intestinal microbiota analysis of mouse models of inflammatory bowel disease (2) (meta-16S analysis)
10	Assistant Professor Iizuka	Data analysis, presentation, discussion, summary	

Microbiology and Immunology Syllabus (3)

Syllabus Title	Immunity and metabolic disorders		
Instructor	Professor Yanagisawa, Associate Professor Osaka, Associate Lecturer Kato, Assistant Professor Ueshiba, Assistant Professor Iizuka		
Credit	1		
Type of Class	Lectures and exercises		
Theme	<p>Analysis of immunocompetent cells in metabolic disorders caused by type 2 diabetes and obesity. Lifestyle and dietary habits influence gut microbiota, which has a significant impact not only on the intestinal environment but also on the homeostasis of many other organs in the body. Intestinal bacteria play important roles in the digestion of food components, supply of vitamins, as well as development and regulation of the immune system.</p> <p>In this field, the link between metabolic diseases such as obesity and type 2 diabetes, and cells responsible for immunity, will be analyzed using mice or cell lines. This research will use therapeutic agents and food ingredients to explore methods of treatment and prevention of lifestyle-related diseases targeting immune-competent cells.</p>		
Schedule	Monday 9:00-10:10		
Course Objective	<ol style="list-style-type: none"> 1. To acquire techniques to analyze the pathogenesis of immune cells in metabolic diseases. 2. To learn ethical handling as well as experimental techniques used for laboratory animals. 3. To appropriately record and store experimental data, and to be able to discuss the contents of the study. 		
Evaluation Methods	Submission of reports on lectures (50%), presentation and discussion of academic research (50%)		
Grading Scale	Five categories include S (90 to 100 points), A (80 to 90 points), B (70 to 80 points), C (60 to 70 points), and D (60 points), with S, A, B, and C as passed and D as failed.		
Textbooks/References	Fundamental Immunology (LWW), Janeway's Immunobiology (Garland Science)		
Independent Study Outside of Class	Read the above reference books. Conduct a literature search to investigate the latest articles in the research content..		
Room	Conference Room 403, Practice Room 1		
Special Note	Those who are unable to attend at the above time table will be re-scheduled. A feedback will be given at the final session.		
Course Plan	Number	Instructor	Contents
	1	Assistant Professor Iizuka	Lipid-metabolism analysis using the cell culture system
	2	Assistant Professor Iizuka	Analysis of glucose metabolism using the cell culture system
	3	Associate Professor Osaka	Gut microbiota and metabolic syndrome
	4	Associate Professor Osaka	Analysis of the innate immune system in metabolic syndrome
	5	Associate Lecturer Kato	Analysis of immune responses in inflammatory diseases
	6	Assistant Professor Ueshiba	Animal models of metabolic syndrome
	7	Assistant Professor Iizuka	Methods to regulate glucose and lipid metabolism in animal models
8	Professor Yanagisawa	Immune system and associated metabolic disorders	

Microbiology and Immunology Syllabus (4)

Syllabus Title	Practical training in microbiology and immunology experiments		
Instructor	Professor Yanagisawa, Associate Professor Osaka, Associate Lecturer Kato, Assistant Professor Ueshiba, Assistant Professor Iizuka		
Credit	10		
Type of Class	Experiments and practical training (project-directed issues)		
Theme	Completing thesis.		
Schedule	Monday 15:00-17:00 Tuesday-Friday 9:00-12:00, 13:00-17:00		
Course Objective	<ol style="list-style-type: none"> 1. To be able to explain the importance and originality of the designed research plan. 2. To acquire experimental techniques and to demonstrate the results in figures and tables. 3. To be able to plan and to run essential and advanced experiments for publication. 4. To present research progresses at academic conferences. 5. To compile and submit a manuscript on the results of the study. 		
Evaluation Methods	Presentation and discussion on the conducted study (15%), Discussion on other students' research presentation (15%), laboratory notebook/experimental results (20%), preparation of figures and tables (20%), preparation of thesis (30%).		
Grading Scale	Five categories include S (90 to 100 points), A (80 to 90 points), B (70 to 80 points), C (60 to 70 points), and D (60 points), with S, A, B, and C as passed and D as failed.		
Textbooks/References	Review articles and original papers related to the research project.		
Independent Study Outside of Class	Attend to and present at relevant conferences or seminars, and communicate with scientists in the field of interest. Recommended to acquire ability for future teaching in medical science.		
Room	Conference Room 403, Practice Room 1		
Special Note			
Course Plan	Number	Instructor	Contents
	1 to 90	Associate Lecturer Kato Assistant Professor Iizuka	Achievement of Objectives 1 through 2
	91 to 120	Associate Professor Osaka Assistant Professor Ueshiba	Achievement of Objectives 3-4
121 to 150	Professor Yanagisawa Associate Professor Osaka	Achievement of Objectives 5	

Environmental and Occupational Medicine

I Educational Policy

Physical and chemical factors present in both general and occupational environments affect our health. Much attention has been paid in recent times to environmental exposure to toxic metals, dioxins, persistent organic pollutants, volatile organic compounds and fine particulate matter, as well as to the effects of global environmental issues on public health. Workplace exposure to organic solvents and metal compounds remains a key factor that causes harmful clinical or subclinical intoxication. The primary objective of research in our laboratory is to clarify the molecular mechanisms of toxic chemical-induced cell dysfunction and cell death using the techniques of molecular and cellular biology. In addition to in vitro studies, zebrafish and the nematode *C. elegans* are utilized as model organisms. In addition to the above areas of laboratory investigation, studies on healthcare administration, occupational health, and female workers health are ongoing projects. Using cultured cells and model organisms, graduate students will carry out molecular toxicological experiments on the regulatory mechanism of cellular response and adaptation following exposure to toxic agents.

II Goals

The goals of this course are to

1. be able to explain current worldwide status and problem of environmental/occupational factors and their health effects.
2. be able to explain mechanism of toxicity development induced by hazardous chemical agents and their health effects.
3. be able to explain cellular response/adaptation mechanisms responsible for cell survival/death in response to environmental stress.
4. be able to conduct research with experimental techniques required for molecular and cellular toxicology research.
5. be able to conduct research related to environmental and occupational medicine with planning the experimental protocol, interpret and discuss the results, and prepare the research paper in English.

III Supervisor* Research theme

(* = for doctor's license holders)

Name and position	Research theme
Masato Matsuoka (Professor and Head)	(1) Effects of toxic metal compounds exposure on MAP kinase signaling pathway Mitogen-activated protein kinases (MAPKs), a family of Ser/Thr protein kinases, are activated by various cellular stresses, and known to participate in a diverse array of cellular functions such as cell proliferation, differentiation, and cell death. Examination on the early intracellular signaling pathway will contribute to the evaluation and prevention of the adverse health effects caused by toxic chemical agents. In this research project, toxicological significance of environmental pollution metal compounds on MAP kinase signaling pathway and target genes expression will be investigated.
Masato Matsuoka (Professor and Head)	(2) Mechanism of p53 protein phosphorylation and its toxicological significance following exposure to toxic chemical agents The tumor suppressor p53 protein plays an important role in DNA damage response, cell cycle arrest, and apoptosis induction. Phosphorylation of p53 is known to be responsible for the function of p53. Exposure to cadmium or asbestos increases the level of p53 protein and induces the phosphorylation of p53 at Ser15 in the transactivation domain of p53 protein. In this research project, mechanisms and toxicological relevance of carcinogenic metal compounds and other toxic chemical agents exposure on p53 phosphorylation will be investigated primarily using cultured human cells.
Masato Matsuoka (Professor and Head)	(3) Toxic chemical-induced cell death and the role of ER stress The endoplasmic reticulum (ER) is responsible for the synthesis, post-translational modification and delivery of biologically active proteins to their proper target sites within the cell and the extracellular milieu. Environmental stresses such as ischemia, hypoxia, and heat shock induce the ER stress by accumulating the unfolded proteins in the lumen of the ER. Exposure to toxic chemical agents also can induce the ER stress. In this research project, role of ER stress in the toxic cell death induced by heavy metals exposure will be investigated.

<p>Masato Matsuoka (Professor and Head)</p>	<p>(4) Molecular toxicological studies on the suspended particulate matters The suspended particulate matter (SPM) stays in the atmosphere for a long time and causes pulmonary adverse effects by depositing in bronchi and lungs. In this research project, to explore the mechanisms of cytotoxicity and cellular dysfunction induced by the diesel exhaust particulate (DEP), the major element of SPM, gene and protein profiling will be investigated by using toxicogenomics and toxicoproteomics approaches. In addition, the molecular mechanisms of cellular injury induced by nanoparticles exposure will be investigated by focusing on autophagy.</p>
<p>Masato Matsuoka (Professor and Head), Yuta Komoike (Associate Professor)</p>	<p>(5) Stress response studies using zebrafish as a model organism Zebrafish is a useful model organism in the bioscience field, because whole genome sequence analysis of zebrafish has been completed. In this research project, molecular biology-based environmental toxicological studies using zebrafish will be conducted at individual level of stress response caused by environmental pollutants. Finally, zebrafish model will be used to biomonitoring of the environmental pollutants.</p>

IV Syllabus

(* = for doctor's license holders)

Title	Instructor	Credit	Theme
Occupational Medicine and Health *	Masato Matsuoka (Professor and Head), Tatsuko Kato (Associate Professor), Norihiro Nakajima (Assistant Professor)	2	Lectures on occupational medicine and health, and their related research
Environmental Medicine and Toxicology	Masato Matsuoka (Professor and Head), Yuta Komoike (Associate Professor), Keiko Hirota (Assistant Professor), Kota Fujiki (Assistant Professor), Takamitsu Miyayama (Assistant Professor)	2	Lectures on environmental medicine and toxicology, and their related research
Molecular and Cellular Toxicology	Masato Matsuoka (Professor and Head), Tatsuko Kato (Associate Professor), Yuta Komoike (Associate Professor), Norihiro Nakajima (Assistant Professor), Keiko Hirota (Assistant Professor), Kota Fujiki (Assistant Professor), Takamitsu Miyayama (Assistant Professor)	1	Seminar and discussion about environmental and occupational medicine, with focusing mainly on molecular and cellular toxicology
Experiments and practical training (themed research)	Masato Matsuoka (Professor and Head), Tatsuko Kato (Associate Professor), Yuta Komoike (Associate Professor), Norihiro Nakajima (Assistant Professor), Keiko Hirota (Assistant Professor), Kota Fujiki (Assistant Professor), Takamitsu Miyayama (Assistant Professor)	10	Themed research and preparation of research paper
Total credits		15	

Environmental and Occupational Medicine Syllabus (1)

(* = for doctor's license holders)

Syllabus Title	Occupational Medicine and Health *		
Instructor	Masato Matsuoka (Professor and Head), Tatsuko Kato (Associate Professor), Norihiro Nakajima (Assistant Professor)		
Credit	2		
Type of Class	Lectures and Seminars		
Theme	Lectures on occupational medicine and health, and their related research.		
Schedule	Tuesday 16:35~17:45		
Course Objective	<p>By the end of the course, students should be able to do the following:</p> <ol style="list-style-type: none"> 1. Explain the role and significance of occupational medicine and health. 2. Explain the current worldwide status of occupational medicine and health. 3. Read the research articles about occupational medicine and health, and explain their contents. 4. Consider the resolution of issues of occupational medicine and health. 		
Evaluation Methods	Class attendance (50%), Submission of report submission (50%).		
Grading Scale	Grade S (90~100% of score), Grade A (80~89% of score), Grade B (70~79% of score), Grade C (60~69% of score), Grade D (less than 59% of score): A grade of S, A, B, or C is Pass. A grade of D is Failure.		
Textbooks/References	Hunter's Diseases of Occupations (Hodder Arnold), Roudou eisei no shiori (Japan Industrial Safety and Health Association), Sangyoui no shokumu Q&A (The Occupational Health Promotion Foundation), and others		
Independent Study Outside of Class	Reading of the above textbooks and related references.		
Room	Yayoi memorial building for medical and nursing education 4F conference room or professor's room.		
Special Note	The schedule can be changed depending on the situation. Questions will be accepted at any time. Feedback will be provided on the last time. The instructor may be changed without notice.		
Course Plan	Number	Instructor	Contents
	1	Masato Matsuoka, Tatsuko Kato	Orientation, Occupational health physician system
	2	Masato Matsuoka	Current state of work-related injury or death, Occupational health administration
	3	Masato Matsuoka, Norihiro Nakajima	Labour laws of Japan, Occupational health organization
	4	Masato Matsuoka	Work practice management, Work environment management
	5	Masato Matsuoka	Occupational mental health, Measures against overwork
	6	Masato Matsuoka	Occupational diseases caused by chemical agents: metals, organic solvents
	7	Masato Matsuoka	Occupational diseases caused by chemical agents: particles, gases
	8	Masato Matsuoka	Occupational diseases caused by chemical agents: nanomaterials, new chemical substances
	9	Masato Matsuoka	Occupational disease caused by physical agents: noise, vibration
	10	Masato Matsuoka	Occupational disease caused by physical agents: heat, ambient pressure
	11	Masato Matsuoka	Work-related disease, Occupational cancer
	12	Masato Matsuoka	Special medical examination
	13	Masato Matsuoka, Norihiro Nakajima	Work style reform and occupational health
	14	Masato Matsuoka, Tatsuko Kato	Inspection tour in the workplace, Support for returning to work
15	Masato Matsuoka	Summary	

Environmental and Occupational Medicine Syllabus (2)

Syllabus Title	Environmental Medicine and Toxicology		
Instructor	Masato Matsuoka (Professor and Head), Yuta Komoike (Associate Professor), Keiko Hirota (Assistant Professor), Kota Fujiki (Assistant Professor), Takamitsu Miyayama (Assistant Professor)		
Credit	2		
Type of Class	Lectures and Seminars		
Theme	Lectures on environmental medicine and toxicology, and their related research.		
Schedule	Thursday 14:00~15:10		
Course Objective	<p>By the end of the course, students should be able to do the following:</p> <ol style="list-style-type: none"> 1. Explain the current worldwide status of environmental factors and their health effect. 2. Read the research articles about environmental medicine and toxicology, and explain their contents. 3. Explain the mechanism of toxicity development induced by hazardous chemical agents. 4. Explain the environmental stress responses and signaling pathways responsible for cell survival/death. 5. Explain the methods required for environmental toxicology research. 		
Evaluation Methods	Class attendance (50%), Submission of report submission (50%).		
Grading Scale	Grade S (90~100% of score), Grade A (80~89% of score), Grade B (70~79% of score), Grade C (60~69% of score), Grade D (less than 59% of score): A grade of S, A, B, or C is Pass. A grade of D is Failure.		
Textbooks/References	Casarett and Doull's Toxicology The Basic Science of Poisons (McGraw-Hill Education), Kokumin eisei no doukou (Health, Labour and Welfare Statistics Association), and others.		
Independent Study Outside of Class	Reading of the above textbooks and related references.		
Room	Yayoi memorial building for medical and nursing education 4F conference room or professor's room.		
Special Note	The schedule can be changed depending on the situation. Questions will be accepted at any time. Feedback will be provided on the last time. The instructor may be changed without notice.		
Course Plan	Number	Instructor	Contents
	1	Masato Matsuoka	Orientation, Current status of environmental issues
	2	Masato Matsuoka	Environmental toxicology, Pharmacokinetics of chemical agents
	3	Masato Matsuoka	Evaluation and collecting information of chemical agents toxicity
	4	Takamitsu Miyayama	Genotoxicity and carcinogenesis
	5	Yuta Komoike	Reproductive and immunological toxicity
	6	Masato Matsuoka	Neuro and behavioral toxicity
	7	Masato Matsuoka	Toxicity in the liver, kidney, and lung
	8	Masato Matsuoka	Environmental pollution, Food poisoning (Yusho)
	9	Masato Matsuoka	Cell proliferation and toxicity assays
	10	Masato Matsuoka	Molecular mechanisms of toxic cell death
	11	Masato Matsuoka	Cell fate determination mechanism against environmental stress
	12	Kota Fujiki	Stress response signaling mechanism of toxicity development (1)
	13	Keiko Hirota	Stress response signaling mechanism of toxicity development (2)
	14	Yuta Komoike	Toxicological study using zebrafish
15	Masato Matsuoka	Summary	

Environmental and Occupational Medicine Syllabus (3)

Syllabus Title	Molecular and Cellular Toxicology		
Instructor	Masato Matsuoka (Professor and Head), Tatsuko Kato (Associate Professor), Yuta Komoike (Associate Professor), Norihiro Nakajima (Assistant Professor), Keiko Hirota (Assistant Professor), Kota Fujiki (Assistant Professor), Takamitsu Miyayama (Assistant Professor)		
Credit	1		
Type of Class	Lectures and Seminars		
Theme	Seminar and discussion about environmental and occupational medicine, with focusing mainly on molecular and cellular toxicology.		
Schedule	Tuesday 13:45~14:45		
Course Objective	By the end of the course, students should be able to do the following: 1. Explain the current knowledge about environmental and occupational medicine. 2. Read the latest research articles about molecular and cellular toxicology, and explain their contents. 3. Summarize your experimental results, and present them. 4. Plan your additional required experiments. 5. Have interests in other investigator's research, and discuss on them.		
Evaluation Methods	Class attendance (50%), Submission of report submission (25%), Presentation and discussion (25%).		
Grading Scale	Grade S (90~100% of score), Grade A (80~89% of score), Grade B (70~79% of score), Grade C (60~69% of score), Grade D (less than 59% of score): A grade of S, A, B, or C is Pass. A grade of D is Failure.		
Textbooks/References	Review and original research papers related to environmental and occupational medicine, with focusing mainly on molecular and cellular toxicology.		
Independent Study Outside of Class	Reading of the above related references. Acquirement of interest in other investigator's research and extensive knowledge about fusion area.		
Room	Yayoi memorial building for medical and nursing education 4F conference room or professor's room.		
Special Note	The schedule can be changed depending on the situation. Questions will be accepted at any time. Feedback will be provided on the last time.		
Course Plan	Number	Instructor	Contents
	1	Masato Matsuoka and faculty members	Seminar on research and journal 1
	2	Masato Matsuoka and faculty members	Seminar on research and journal 2
	3	Masato Matsuoka and faculty members	Seminar on research and journal 3
	4	Masato Matsuoka and faculty members	Seminar on research and journal 4
	5	Masato Matsuoka and faculty members	Seminar on research and journal 5
	6	Masato Matsuoka and faculty members	Seminar on research and journal 6
	7	Masato Matsuoka and faculty members	Seminar on research and journal 7
	8	Masato Matsuoka and faculty members	Seminar on research and journal 8
	9	Masato Matsuoka and faculty members	Seminar on research and journal 9
	10	Masato Matsuoka and faculty members	Seminar on research and journal 10
	11	Masato Matsuoka and faculty members	Seminar on research and journal 11
	12	Masato Matsuoka and faculty members	Seminar on research and journal 12
	13	Masato Matsuoka and faculty members	Seminar on research and journal 13
	14	Masato Matsuoka and faculty members	Seminar on research and journal 14
	15	Masato Matsuoka and faculty members	Seminar on research and journal 15
	16	Masato Matsuoka and faculty members	Seminar on research and journal 16
	17	Masato Matsuoka and faculty members	Seminar on research and journal 17
	18	Masato Matsuoka and faculty members	Seminar on research and journal 18
	19	Masato Matsuoka and faculty members	Seminar on research and journal 19
	20	Masato Matsuoka and faculty members	Seminar on research and journal 20
	21	Masato Matsuoka and faculty members	Seminar on research and journal 21
	22	Masato Matsuoka and faculty members	Seminar on research and journal 22
	23	Masato Matsuoka and faculty members	Seminar on research and journal 23
	24	Masato Matsuoka and faculty members	Seminar on research and journal 24
	25	Masato Matsuoka and faculty members	Seminar on research and journal 25
	26	Masato Matsuoka and faculty members	Seminar on research and journal 26
	27	Masato Matsuoka and faculty members	Seminar on research and journal 27
	28	Masato Matsuoka and faculty members	Seminar on research and journal 28
	29	Masato Matsuoka and faculty members	Seminar on research and journal 29
	30	Masato Matsuoka and faculty members	Seminar on research and journal 30

Environmental and Occupational Medicine Syllabus (4)

Syllabus Title	Experiments and practical training (themed research)		
Instructor	Masato Matsuoka (Professor and Head), Tatsuko Kato (Associate Professor), Yuta Komoike (Associate Professor), Norihiro Nakajima (Assistant Professor), Keiko Hirota (Assistant Professor), Kota Fujiki (Assistant Professor), Takamitsu Miyayama (Assistant Professor)		
Credit	10		
Type of Class	Experiments and practical training (themed research)		
Theme	Themed research and preparation of research paper		
Schedule	Monday, Wednesday, Thursday, and Friday 9:00–12:00, 13:00–17:00; Tuesday 15:00–17:00		
Course Objective	<p>By the end of the course, students should be able to do the following:</p> <ol style="list-style-type: none"> 1. Conduct research with planning the experimental protocol, reading the related references, and obtaining experimental techniques. 2. Record and save the experimental results properly, and present them at seminar classes. 3. Show the experimental results properly in figure/table and abstract. 4. Present the experimental results at the conferences and discuss with other investigators. 5. Prepare the research paper and submit it to the international journal as the first author. 6. Respond to the reviewer's comments properly for the publication of research paper. 		
Evaluation Methods	Lab note and experimental reports (60%), Reporting of figures and tables (10%), Presentation and discussion (10%), Preparation of research paper (20%)		
Grading Scale	Grade S (90~100% of score), Grade A (80~89% of score), Grade B (70~79% of score), Grade C (60~69% of score), Grade D (less than 59% of score): A grade of S, A, B, or C is Pass. A grade of D is Failure.		
Textbooks/References	Review and original research papers related to themed research project.		
Independent Study Outside of Class	Conference attendance, presentation, information collection, and discussion with other researchers.		
Room	Yayoi memorial building for medical and nursing education 4F laboratory of Division of Environmental and Occupational Medicine		
Special Note	The schedule can be changed after consultation. Questions will be accepted at any time.		
Course Plan	Number	Instructor	Contents
	1	Masato Matsuoka and faculty members	Achievement of course objectives 1 and 2
	~		
	90		
	91	Masato Matsuoka and faculty members	Achievement of course objectives 3 and 4
	~		
	120		
	121	Masato Matsuoka and faculty members	Achievement of course objectives 5 and 6
~			
150			

Public Health

I Educational Policy

The Department of Hygiene and Public Health was founded in 1934 by Professor Hiroto Yoshioka, the son of Dr. Yayoi Yoshioka, the founder of Tokyo Women's Medical University. We contribute to research and education covering a wide range of health issues in society. The achievements of public health are applied in community health, maternal and child health, mental health, and elderly health at health centers, as well as school health, occupational health, environmental health, and international health. In public health, research on a wide range of fields is conducted mainly using epidemiological approaches. We aim to nurture medical professionals who can play an active role in such fields. We also conduct research and education on women's health and working women in order to contribute to "the empowerment of women", which is the purpose of establishing Tokyo Women's Medical University.

II Goals

1. Students will be able to develop a research plan based on their research questions.
2. Students will be able to conduct research in accordance with their research plan.
3. Students will be able to perform data analysis using appropriate statistical methods.
4. Students will be able to present their research results at domestic and international academic conferences, and to discuss the results with other experts.
5. Students will be able to summarize their research results, write a dissertation, and publish it in academic journals.

III Supervisor* Research theme

(* = for doctor's license holders)

Name and position	Research theme
<p style="text-align: center;">Michiko Nohara (Professor)</p> <p style="text-align: center;">Asuka Sakuraya (Assistant Professor)</p>	<p>(1) Study among working women's health As the employment rate of women is increasing and women are expected to play more active roles, it is extremely important to improve the work environment for women to maintain and improve their health throughout their lives. In our laboratory, we have been conducting research on the health effects caused by occupation (working conditions) and the health issues across women's life cycles. In this program, students will decide on a theme, develop a research plan, and conduct a survey. Then they will perform statistical analysis and study about the health effects of work environment and life cycles.</p>
<p style="text-align: center;">Michiko Nohara (Professor)</p> <p style="text-align: center;">Asuka Sakuraya (Assistant Professor)</p>	<p>(2) Study on improving working conditions in medical institutions We have been conducting research focusing on the balance between clinical and nonclinical duties among physicians, given that the Japanese government is promoting work style reform for physicians as a priority issue. In this program, students will decide on a theme, develop a research plan, and conduct a survey. Then they will perform statistical analysis and study about the appropriate work style and environment for physicians.</p>
<p style="text-align: center;">Yasuto Sato (Part-Time Assistant Professor)</p> <p style="text-align: center;">Asuka Sakuraya (Assistant Professor)</p>	<p>(3) Epidemiological study on environmental factors and health Along with technological innovations, various physical and chemical factors are closely related to our daily lives. Safety evaluation and risk assessment of those factors are essential for realizing a safe and secure society. In this program, students will learn how to develop a plan for epidemiological research, conduct a survey, perform statistical analysis, and summarize their research results.</p>

IV Syllabus

(* = for doctor's license holders)

Title	Instructor	Credit	Theme
Discussion in Science of Labour	Michiko Nohara Asuka Sakuraya	1	Presentation and Discussion on Science of Labour
Women's Health	Michiko Nohara Asuka Sakuraya	2	Lecture and Practice on Women's Health
Epidemiology and Medical Statistics	Yasuto Sato Asuka Sakuraya	2	Lecture and Practice on Epidemiology and Medical Statistics
Individual research project (planning, data collection, analysis/interpretation of data, discussion and presentation of individual projects)	Michiko Nohara Yasuto Sato Asuka Sakuraya	10	Conduct individual research and complete a dissertation
Total credits		15	

Public Health Syllabus (1)

Syllabus Title	Discussion in Science of Labour		
Instructor	Michiko Nohara, Asuka Sakuraya		
Credit	1		
Type of Class	Lecture and Discussion		
Theme	Presentation and Discussion on Science of Labour		
Schedule	Every 3rd Friday or every 3rd Saturday		
Course Objective	<ul style="list-style-type: none"> • Students will be able to present their research progress and engage in discussions with other lab members. • Students will be able to attend research seminars on science of labour and engage in discussions with other lab members. 		
Evaluation Methods	Attendance (50%), Content of discussion (30%), Content of presentation materials (20%)		
Grading Scale	Grades are divided into five levels; S (100-90%), A (89-80%), B (79-70%), C (69-60%), and D (59-0%). S, A, B, and C are pass, and D is fail.		
Textbooks/References	Not applicable		
Independent Study Outside of Class	Students are expected to prepare presentation materials according to the progress of their research in consultation with their supervisor.		
Room	Laboratory of Public Health on the 4th floor of Yayoi Memorial Building for Medical and Nursing Education, or online		
Special Note	For those who cannot attend the above time, another time schedule will be decided after consultation. Questions will be accepted at any time. Feedback will be given as needed.		
Course Plan	Number	Instructor	Contents
	1	Michiko Nohara Asuka Sakuraya	Presentation and Discussion
	2	Michiko Nohara Asuka Sakuraya	Discussion at September seminar
	3	Michiko Nohara Asuka Sakuraya	Discussion at October seminar
	4	Michiko Nohara Asuka Sakuraya	Discussion at November seminar
	5	Michiko Nohara Asuka Sakuraya	Discussion at December seminar
	6	Michiko Nohara Asuka Sakuraya	Discussion at January seminar
	7	Michiko Nohara Asuka Sakuraya	Discussion at February seminar
	8	Michiko Nohara Asuka Sakuraya	Presentation and Discussion

Public Health Syllabus (2)

Syllabus Title	Women's Health		
Instructor	Michiko Nohara, Asuka Sakuraya		
Credit	2		
Type of Class	Lecture and Discussion		
Theme	Lecture and Discussion on Women's Health		
Schedule	Every Thursday 14:30-16:00		
Course Objective	<ul style="list-style-type: none"> •Students will be able to understand and explain women's health. •Students will be able to review the research papers on women's health critically. •Students will be able to develop a research plan on women's health. 		
Evaluation Methods	Attendance (50%), Discussion (50%)		
Grading Scale	Grades are divided into five levels; S (100-90%), A (89-80%), B (79-70%), C (69-60%), and D (59-0%). S, A, B, and C are pass, and D is fail.		
Textbooks/References	Women and Health 2nd Edition (Academic Press) (12/31/2012)		
Independent Study Outside of Class	Students are expected to read the reference book listed above and the publications related to women's health.		
Room	Laboratory of Public Health on the 4th floor of Yayoi Memorial Building for Medical and Nursing Education, or online		
Special Note	For those who cannot attend the above time, another time schedule will be decided after consultation. Questions will be accepted at any time. Feedback will be given as needed.		
Course Plan	Number	Instructor	Contents
	1	Michiko Nohara Asuka Sakuraya	Course outline and Overview of Women and Health 2nd Edition
	2	Michiko Nohara Asuka Sakuraya	Women's Health in the 21st Century
	3	Michiko Nohara Asuka Sakuraya	The Mutability of Women's Health with Age
	4	Michiko Nohara Asuka Sakuraya	Current Approaches to Women's Health Care
	5	Michiko Nohara Asuka Sakuraya	Understanding Research Design
	6	Michiko Nohara Asuka Sakuraya	Progress in Women's Health
	7	Michiko Nohara Asuka Sakuraya	Life Course Approach to Research in Women's Health
	8	Michiko Nohara Asuka Sakuraya	Presentation of class papers and Discussion
	9	Michiko Nohara Asuka Sakuraya	Working Women the United State: A Statistical Profile
	10	Michiko Nohara Asuka Sakuraya	International Perspectives: Women's Occupational Health
	11	Michiko Nohara Asuka Sakuraya	Multiple Roles and Complex Exposures
	12	Michiko Nohara Asuka Sakuraya	Socioeconomic Determinants of Women's Health
	13	Michiko Nohara Asuka Sakuraya	Do Social Policies Influence the Health of Women and their Children
	14	Michiko Nohara Asuka Sakuraya	The Impact of the Built Environment on Health
15	Michiko Nohara Asuka Sakuraya	Presentation of class papers and Discussion	

Public Health Syllabus (3)

Syllabus Title	Epidemiology and Medical Statistics		
Instructor	Yasuto Sato, Asuka Sakuraya		
Credit	2		
Type of Class	Lecture and Practice		
Theme	Lecture on Epidemiology and Medical Statistics required for epidemiological studies		
Schedule	Every Tuesday 10:30-12:00		
Course Objective	<ul style="list-style-type: none"> • Students will be able to understand and gain extensive knowledge of epidemiological methods required for survey research. • Students will be able to understand and gain extensive knowledge of medical statistics required for data analysis. 		
Evaluation Methods	Attendance (50%), Discussion (50%)		
Grading Scale	Grades are divided into five levels; S (100-90%), A (89-80%), B (79-70%), C (69-60%), and D (59-0%). S, A, B, and C are pass, and D is fail.		
Textbooks/References	Epidemiology Foundations: The Science of Public Health (Public Health/Epidemiology and Biostatistics) 1st Edition (12/21/2010)		
Independent Study Outside of Class	Students are expected to read the related publications.		
Room	Laboratory of Public Health on the 4th floor of Yayoi Memorial Building for Medical and Nursing Education, or online		
Special Note	For those who cannot attend the above time, another time schedule will be decided after consultation. Questions will be accepted at any time. Feedback will be given as needed.		
Course Plan	Number	Instructor	Contents
	1	Yasuto Sato	Epidemiological indicators
	2	Yasuto Sato Asuka Sakuraya	Epidemiological study designs (descriptive epidemiology)
	3	Yasuto Sato Asuka Sakuraya	Epidemiological study designs (cross-sectional studies, ecological studies)
	4	Yasuto Sato Asuka Sakuraya	Epidemiological study designs (case-control studies)
	5	Yasuto Sato Asuka Sakuraya	Epidemiological study designs (cohort studies)
	6	Yasuto Sato Asuka Sakuraya	Epidemiological study designs (intervention)
	7	Yasuto Sato Asuka Sakuraya	Bias and confounding
	8	Yasuto Sato Asuka Sakuraya	Causation
	9	Yasuto Sato Asuka Sakuraya	JMP Programming basics
	10	Yasuto Sato Asuka Sakuraya	Data handling
	11	Yasuto Sato Asuka Sakuraya	Data summary
	12	Yasuto Sato Asuka Sakuraya	Mean comparison, Bivariate analysis
	13	Yasuto Sato Asuka Sakuraya	Multivariate analysis (multiple regression analysis)
	14	Yasuto Sato Asuka Sakuraya	Multivariate analysis (logistic regression analysis)
15	Yasuto Sato Asuka Sakuraya	Multivariate analysis (cox regression analysis)	

Public Health Syllabus (4)

Syllabus Title	Individual research project (planning, data collection, analysis/interpretation of data, discussion and presentation of individual projects)		
Instructor	Michiko Nohara, Yasuto Sato, Asuka Sakuraya		
Credit	10		
Type of Class	Individual research project		
Theme	Research implementation and development of dissertation		
Schedule	Every Tuesday to Friday 9:00-12:00, 13:00-17:00		
Course Objective	<ol style="list-style-type: none"> 1. Students will be able to develop a research plan based on their research questions. 2. Students will be able to conduct research in accordance with their research plan. 3. Students will be able to store data appropriately using computer systems. 4. Students will be able to perform data analysis using statistical methods and summarize it in tables and figures. 5. Students will be able to present their research results at domestic and international academic conferences, and to discuss the results with other experts. 6. Students will be able to summarize their research results, write a dissertation, and publish it in academic journals. 		
Evaluation Methods	Research reports (60%), Preparation of figures and tables (10%), Research presentation and discussion (10%), Preparation of dissertation (20%)		
Grading Scale	Grades are divided into five levels; S (100-90%), A (89-80%), B (79-70%), C (69-60%), and D (59-0%). S, A, B, and C are pass, and D is fail.		
Textbooks/References	Not applicable		
Independent Study Outside of Class	Students are encouraged to present their research, engage in discussions, and gather information at the related academic conferences.		
Room	Laboratory of Public Health on the 4th floor of Yayoi Memorial Building for Medical and Nursing Education, or online		
Special Note	For those who cannot attend the above time, another time schedule will be decided after consultation. Questions will be accepted at any time. Feedback will be given as needed.		
Course Plan	Number	Instructor	Contents
	1	Michiko Nohara	Achievement 1-2
	~	Yasuto Sato	
	90	Asuka Sakuraya	
	91	Michiko Nohara	Achievement 3-4
	~	Yasuto Sato	
	120	Asuka Sakuraya	
121	Michiko Nohara	Achievement 5-6	
~	Yasuto Sato		
150	Asuka Sakuraya		

Forensic Medicine

I Educational Policy

In forensic medicine, the main research focuses on the human disorders caused by external factors.

1. Diagnosis and pathophysiological analysis of traumatic brain injury

Forensic medicine investigates the mechanism of traumatic brain injury and the causal relationship between injury and the death. We have been conducting research on the mechanism of brain injury due to head trauma. We have found important issues in forensic practice and are conducting research by using basic experimental techniques and verifying them with animal experiments. Our educational policy is to acquire the ability to find research issues from the practice of medicine and medical care.

2. Diagnosis and prevention of accidents

Accidents caused by falls, abnormal environments, acute poisoning, and traffic accidents are major causes of death, and research on their diagnosis and prevention is necessary for the safety and security of society. In our laboratory, we are analyzing accidents in infants and the elderly, investigating the relationship between existing and latent diseases and accidents, and investigating complications caused by accidents. We are also conducting histomorphological and molecular biological analyses of pathological conditions caused by abnormal environments and lesions that need to be differentiated from injuries, in order to find findings that are useful for diagnosis and to study the causes and pathophysiology. Furthermore, the relationship between the death and drug intake is studied from the aspects of toxicology and jurisprudence. Another educational policy is to cultivate the ability to contribute to society by understanding the role of forensic medicine.

II Goals

1. Understanding the types and pathology of human disorders caused by external factors

2. Statistical analysis of human disorders caused by external factors

3. Acquisition of basic techniques of instrumental analysis and animal experiments

4. Planning of research and logical design of experiments

5. Publication of research results at scientific meetings and in scientific journals

III Supervisor・Research theme

(* = for doctor's license holders)

Name and position	Research theme
Kazuhiko Kibayashi, Professor and Head Ryo Shimada, Associate Professor Takashi Taki, Assistant Professor Ken-ichiro Nakao, Assistant Professor Mitsuyo Machida, Assistant Professor Yuki Tatara, Assistant Professor	(1) Brain injury due to head trauma To clarify the exacerbation mechanism of traumatic brain injury, basic research will be conducted on brain injury caused by head trauma using laboratory animals. Using a brain injury generator, we will create animal models of traumatic brain injury and conduct behavioral analysis, MRI image analysis, histomorphometric analysis, and protein and gene expression analysis to clarify the exacerbation mechanism and devise methods to reduce traumatic brain injury.
Kazuhiko Kibayashi, Professor and Head Ryo Shimada, Associate Professor Takashi Taki, Assistant Professor Ken-ichiro Nakao, Assistant Professor Mitsuyo Machida, Assistant Professor Yuki Tatara, Assistant Professor	(2) Brain pathology caused by drug poisoning Qualitative quantification methods of intoxicants by instrumental analysis of acute drug intoxication will be examined, and basic research using laboratory animals with acute drug intoxication will be conducted to clarify the mechanisms of human disorders caused by medicinal toxicants. For animals administered drugs of abuse and other drugs, we will quantify drugs in blood and tissues, conduct histomorphometric analysis, protein and gene expression analysis, and clarify the mechanisms of drug-induced disorders.

<p>Kazuhiko Kibayashi, Professor and Head Ryo Shimada, Associate Professor Takashi Taki, Assistant Professor Ken-ichiro Nakao, Assistant Professor Mitsuyo Machida, Assistant Professor Yuki Tatara, Assistant Professor</p>	<p>(3) Personal identification by DNA polymorphism analysis Examination of DNA extraction methods for forensic samples such as trace samples, mixed samples, and denatured samples, and devise methods for analysis of short base repeat sequences STRs and short base substitution SNPs. Application of next-generation sequencers for personal identification will be devised, and new methods for DNA identification and paternity testing will be devised.</p>
<p>Kazuhiko Kibayashi, Professor and Head Ryo Shimada, Associate Professor Takashi Taki, Assistant Professor Ken-ichiro Nakao, Assistant Professor Mitsuyo Machida, Assistant Professor Yuki Tatara, Assistant Professor</p>	<p>(4) Forensic pathology and clinical forensic medicine Analysis of factors such as sudden and accidental deaths, and devising methods to prevent injuries and illnesses. Regarding fatal traumatic injuries, analyze factors of various types of accidents such as traffic accidents and industrial accidents, and propose methods to prevent accidents. Regarding sudden unexpected deaths, analysis of lesions and devise methods to prevent sudden death. Application of imaging diagnosis at the time of death (autopsy imaging) to the diagnosis of cause of death will be devised.</p>

IV Syllabus

(* = for doctor's license holders)

Title	Instructor	Credit	Theme
Forensic medicine, forensic pathology, clinical forensic medicine	Kazuhiko Kibayashi, Professor and Head Ryo Shimada, Associate Professor Takashi Taki, Assistant Professor Ken-ichiro Nakao, Assistant Professor Mitsuyo Machida, Assistant Professor Yuki Tatara, Assistant Professor	1	Forensic medicine, examination of living, forensic autopsies and expert testimony, internal cause death, external cause of death, forensic pathology, research methods, autopsy imaging
Forensic toxicology	Kazuhiko Kibayashi, Professor and Head Ryo Shimada, Associate Professor Takashi Taki, Assistant Professor Ken-ichiro Nakao, Assistant Professor Mitsuyo Machida, Assistant Professor Yuki Tatara, Assistant Professor	2	Acute intoxication and poisoning, drug abuse, screening, instrumental analysis
DNA polymorphism	Kazuhiko Kibayashi, Professor and Head Ryo Shimada, Associate Professor Takashi Taki, Assistant Professor Ken-ichiro Nakao, Assistant Professor Mitsuyo Machida, Assistant Professor Yuki Tatara, Assistant Professor	2	Forensic genetics, blood typing, DNA polymorphism, object testing, paternity testing
Experimental study	Kazuhiko Kibayashi, Professor and Head Ryo Shimada, Associate Professor Takashi Taki, Assistant Professor Ken-ichiro Nakao, Assistant Professor Mitsuyo Machida, Assistant Professor Yuki Tatara, Assistant Professor	10	Conducting research on an issue and writing a research paper
Total credits		15	

Forensic Medicine Syllabus (1)

Syllabus Title	Forensic medicine, forensic pathology, clinical forensic medicine		
Instructor	Kazuhiko Kibayashi, Professor and Head Ryo Shimada, Associate Professor Takashi Taki, Assistant Professor Ken-ichiro Nakao, Assistant Professor Mitsuyo Machida, Assistant Professor Yuki Tatara, Assistant Professor		
Credit	1		
Type of Class	Lecture and practice		
Theme	Forensic medicine, examination of living, forensic autopsies and expert testimony, internal cause death, external cause of death, forensic pathology, research methods, autopsy imaging		
Schedule	15:50-17:00, Monday		
Course Objective	<ol style="list-style-type: none"> 1. Research in accordance with the research plan 2. Scientific and logical thinking 3. Statistical processing 4. Expression of results in figures and tables 5. Recording the contents of experiments 		
Evaluation Methods	Attendance (50%), submission of reports on lecture content (50%)		
Grading Scale	S (90 to 100 points), A (80 to 90 points), B (70 to 80 points), C (60 to 70 points), D (60 points) There shall be five types, with S, A, B, and C as passing grades and D as failing grade.		
Textbooks/References	Spits WU (ed). Spits and Fisher's medicolegal investigation of death. Thomas, 1993		
Independent Study Outside of Class	Students are expected to understand the current state of knowledge on the topics of the lesson plan in advance through literature.		
Room	Yayoi Kinen Kyoikuto, 5th floor, Department of Forensic Medicine; Tomoe Kenkyu Kyoikuto, 1st floor, Forensic laboratory		
Special Note	Those unable to attend at the above times will be scheduled by mutual agreement. Questions, etc. will be accepted at any time. Feedback will be given at the final session.		
Course Plan	Number	Instructor	Contents
	1	Kazuhiko Kibayashi	Aim and purpose of forensic medicine
	2	Kazuhiko Kibayashi	Clinical forensic medicine, examination of living
	3	Kazuhiko Kibayashi	Death investigation, forensic autopsy
	4	Kazuhiko Kibayashi	Autopsy imaging, internal and external cause of death
	5	Ryo Shimada	Medical law
	6	Takashi Taki	Research in forensic medicine 1: human identification
	7	Ken-ichiro Nakao	Research in forensic medicine 2: forensic toxicology
	8	Mitsuyo Machida	Research in forensic medicine 3: forensic DNA analyses
9	Yuki Tatara	Research in forensic medicine 4: experimental study	

Forensic Medicine Syllabus (2)

Syllabus Title	Forensic toxicology		
Instructor	Kazuhiko Kibayashi, Professor and Head Ryo Shimada, Associate Professor Takashi Taki, Assistant Professor Ken-ichiro Nakao, Assistant Professor Mitsuyo Machida, Assistant Professor Yuki Tatara, Assistant Professor		
Credit	2		
Type of Class	Lecture and practice		
Theme	Acute intoxication and poisoning, drug abuse, screening, instrumental analysis		
Schedule	15:50-17:00, Tuesday		
Course Objective	<ol style="list-style-type: none"> 1. Research in accordance with the research plan 2. Scientific and logical thinking 3. Statistical processing 4. Expression of results in figures and tables 5. Recording the contents of experiments 		
Evaluation Methods	Attendance (50%), submission of reports on lecture content (50%)		
Grading Scale	S (90 to 100 points), A (80 to 90 points), B (70 to 80 points), C (60 to 70 points), D (60 points) There shall be five types, with S, A, B, and C as passing grades and D as failing grade.		
Textbooks/References	Spits WU (ed). Spits and Fisher's medicolegal investigation of death. Thomas, 1993		
Independent Study Outside of Class	Students are expected to understand the current state of knowledge on the topics of the lesson plan in advance through literature.		
Room	Yayoi Kinen Kyoikuto, 5th floor, Department of Forensic Medicine; Tomoe Kenkyu Kyoikuto, 1st floor, Forensic laboratory		
Special Note	Those unable to attend at the above times will be scheduled by mutual agreement. Questions, etc. will be accepted at any time. Feedback will be given at the final session.		
Course Plan	Number	Instructor	Contents
	1	Kazuhiko Kibayashi	Physical injuries due to acute intoxication and poisoning
	2	Kazuhiko Kibayashi	Physical injuries due to drug abuse
	3	Ryo Shimada	Drug screening: alcohol
	4	Ryo Shimada	Drug screening: evaporative drugs
	5	Takashi Taki	Drug screening: medications, abused drugs
	6	Takashi Taki	Drug screening: poisons
	7	Ken-ichiro Nakao	Drug analysis: spectrophotometer
	8	Ken-ichiro Nakao	Drug analysis: GC
	9	Ken-ichiro Nakao	Drug analysis: GC
	10	Ken-ichiro Nakao	Drug analysis: GC-MS
	11	Ken-ichiro Nakao	Drug analysis: GC-MS
	12	Ken-ichiro Nakao	Drug analysis: LC-MS/MS
	13	Ken-ichiro Nakao	Drug analysis: LC-QTOF-MS
	14	Ken-ichiro Nakao	Case study 1
	15	Mitsuyo Machida	Case study 2
16	Yuki Tatara	Case study 3	

Forensic Medicine Syllabus (3)

Syllabus Title	DNA polymorphism		
Instructor	Kazuhiko Kibayashi, Professor and Head Ryo Shimada, Associate Professor Takashi Taki, Assistant Professor Ken-ichiro Nakao, Assistant Professor Mitsuyo Machida, Assistant Professor Yuki Tatara, Assistant Professor		
Credit	2		
Type of Class	Lecture and practice		
Theme	Forensic genetics, blood typing, DNA polymorphism, object testing, paternity testing		
Schedule	15:50–17:00, Wednesday		
Course Objective	<ol style="list-style-type: none"> 1. Research in accordance with the research plan 2. Scientific and logical thinking 3. Statistical processing 4. Expression of results in figures and tables 5. Recording the contents of experiments 		
Evaluation Methods	Attendance (50%), submission of reports on lecture content (50%)		
Grading Scale	S (90 to 100 points), A (80 to 90 points), B (70 to 80 points), C (60 to 70 points), D (60 points) There shall be five types, with S, A, B, and C as passing grades and D as failing grade.		
Textbooks/References	Spits WU (ed). Spits and Fisher's medicolegal investigation of death. Thomas, 1993		
Independent Study Outside of Class	Students are expected to understand the current state of knowledge on the topics of the lesson plan in advance through literature.		
Room	Yayoi Kinen Kyoikuto, 5th floor, Department of Forensic Medicine; Tomoe Kenkyu Kyoikuto, 1st floor, Forensic laboratory		
Special Note	Those unable to attend at the above times will be scheduled by mutual agreement. Questions, etc. will be accepted at any time. Feedback will be given at the final session.		
Course Plan	Number	Instructor	Contents
	1	Kazuhiko Kibayashi	Forensic genetics and personal identification
	2	Kazuhiko Kibayashi	Paternity test
	3	Ryo Shimada	Blood typing
	4	Ryo Shimada	DNA polymorphism 1: sample preparation
	5	Ryo Shimada	DNA polymorphism 2: trace sample preparation
	6	Ryo Shimada	DNA polymorphism 3: mixed sample preparation
	7	Ryo Shimada	DNA polymorphism 4: degraded sample preparation
	8	Ryo Shimada	DNA polymorphism 5: DNA extraction
	9	Takashi Taki	DNA polymorphism 6: STR typing
	10	Takashi Taki	DNA polymorphism 7: STR typing
	11	Takashi Taki	DNA polymorphism 8: SNP typing
	12	Takashi Taki	DNA polymorphism 9: SNP typing
	13	Mitsuyo Machida	DNA polymorphism 10: next generation sequencing
	14	Mitsuyo Machida	DNA polymorphism 11: next generation sequencing
	15	Yuki Tatara	Case study 1
16	Yuki Tatara	Case study 2	

Forensic Medicine Syllabus (4)

Syllabus Title	Experimental study		
Instructor	Kazuhiko Kibayashi, Professor and Head Ryo Shimada, Associate Professor Takashi Taki, Assistant Professor Ken-ichiro Nakao, Assistant Professor Mitsuyo Machida, Assistant Professor Yuki Tatara, Assistant Professor		
Credit	10		
Type of Class	Practice		
Theme	Conducting research on an issue and writing a research paper		
Schedule	09:00–12:00, 13:00–17:00, Monday – Friday		
Course Objective	<ol style="list-style-type: none"> 1. Acquisition of the basic experimental techniques and conduction of the research in accordance with the research plan 2. Precise recording and storage of the experimental data 3. Expression of the results of experiments in figures and tables 4. Presentations and discussion of the contents of research at external conferences and research meetings 5. Writing research papers and submission for publication. Appropriate response to reviewers' comments. 		
Evaluation Methods	Experiment notes and research reports (60%), preparation of figures and tables (10%), research presentations and discussions (10%), and writing papers (20%)		
Grading Scale	S (90 to 100 points), A (80 to 90 points), B (70 to 80 points), C (60 to 70 points), D (60 points) There shall be five types, with S, A, B, and C as passing grades and D as failing grade.		
Textbooks/References	Textbook of medical writing and medical statistics		
Independent Study Outside of Class	Active participation and presentation at related conferences to gather information and engage in discussion		
Room	Yayoi Kinen Kyoikuto, 5th floor, Department of Forensic Medicine		
Special Note	Those unable to attend at the above times will be scheduled by mutual agreement. Questions, etc. will be accepted at any time. Feedback will be given at the final session.		
Course Plan	Number	Instructor	Contents
	1	Kazuhiko Kibayashi	Achievement of Goals 1–2
	~	Kazuhiko Kibayashi	Achievement of Goals 1–2
	90	Kazuhiko Kibayashi	Achievement of Goals 1–2
	91	Ryo Shimada	Achievement of Goals 3–4
	~	Ryo Shimada	Achievement of Goals 3–4
	120	Ryo Shimada	Achievement of Goals 3–4
	121	Takashi Taki	Achievement of Goal 5
	~	Takashi Taki	Achievement of Goal 5
150	Takashi Taki	Achievement of Goal 5	

Respiratory Medicine

I Educational Policy

Tokyo Women's Medical University Hospital is one of the facilities with the largest number of patients in Japan. In the Department of Respiratory Medicine, the annual number of outpatients is 26,000 and the number of inpatients is more than 560. Our practice covers all areas of respiratory illness, infectious diseases, tumors, allergies, inflammation and immune disorders. We are conducting translational research that connects the results of basic research to clinical practice with the aim of developing new diagnostic and therapeutic methods. The main research subjects of our department are airway and lung inflammation / remodeling, airway mucus secretion, lung aging, lung cancer, pulmonary circulation, and respiratory rehabilitation. Expert doctors educate one-on-one guidance in all fields. Recently, molecular biology research and cell physiology research are often conducted in order to elucidate the pathophysiology, especially at the genetic level.

II Goals

- Understand the pathophysiology of diseases caused by airway inflammation, and be able to explain the relationship with the aggravation and progression of diseases.
- To be able to discuss the usefulness of biomarkers in the diagnosis, management and treatment of diseases in asthma, COPD and interstitial pneumonia.
 - Learn to culture airway epithelial cells and be able to teach others.
- Understand the molecular pathology of hyper mucus secretion and explain the impact on respiratory diseases.

III Supervisor • Research theme

(* = for doctor's license holders)

Name and position	Research theme
Professor and Head Etsuko Tagaya	(1) Elucidation of the pathophysiology of lung disorders using animal models. To elucidate the mechanism of LPS-induced lung injury, we will measure various cytokines in bronchoalveolar lavage fluid. In addition, we will examine the expression of adhesion molecules in lung tissues using the in situ hybridization method. Next, we will examine the effects of various inhibitors of these cytokines, and adhesion molecules on these lung injuries.
Specially Appointed Professor Mitsuko Kondo	(2) The role of mast cell tryptase in chronic allergic pulmonary diseases and interstitial pneumonia. To elucidate how mast cell tryptase affects for chronic eosinophilic pneumonia and idiopathic interstitial pneumonia, we will measure tryptase levels and analyze histological findings using their animal models.
Specially Appointed Professor Mitsuko Kondo	(3) The role of exhaled nitric oxide (NO) in exacerbation of allergic airway inflammation. To elucidate the role of NO in acute exacerbation of airway inflammation, we will examine the gene expression of inducible NO synthase in alveolar macrophages and measure NO concentration released from the macrophages. Next, we will examine the effect of corticosteroids and macrolides on exhaled NO concentration and elucidate the possibility of NO as biomarker for airway inflammation.
Professor and Head Etsuko Tagaya	(4) Study on the regulatory mechanism of airway mucus secretion. To evaluate goblet cell proliferation, mucin (MUC5AC) production, mucin gene expression, guinea pigs were sensitized with ovalbumin (OA) or Th2 cytokine and then antigen challenge is performed. We will study the effects of macrolides on lipopolysaccharide (LPS)-induced airway goblet cell secretion in the guinea pig trachea.
Professor Hideki Katsura	(5) Study on comorbidity of COPD, especially focus on muscle dysfunction. In COPD patients, muscle dysfunction is reported as systemic comorbidity. We assess muscle mass of various muscles by CT scan in COPD patients and examine correlation with various outcomes such as frequency of exacerbation, prognosis, dyspnea, health-related QOL, physical activity. We also examine effects of pulmonary rehabilitation on muscle dysfunction and loss of muscle mass.

IV Syllabus

(* = for doctor's license holders)

Title	Instructor	Credit	Theme
Lung function	Professor Hideki Katsura	1	Pathophysiology on respiration and respiratory regulation
Diagnosis of respirology	Professor and Head Etsuko Tagaya	1	Introduction to clinical diagnosis of respiratory diseases
Obstructive lung disease	Professor Hideki Katsura	1	Diagnosis and pathophysiology of obstructive lung diseases
Allergic Lung Disease	Professor and Head Etsuko Tagaya	1	Pathophysiology and treatment of bronchial asthma
Lung Tumor	Specially Appointed Professor Mitsuko Kondo	1	Diagnosis and Treatment of Lung Cancer
Experiment / Practice (Task Research)	Etsuko Tagaya[Mitsuko Kondo Hideki Katsura	10	Implementation of research projects and preparation of research treatises
Total credits		15	

Respiratory Medicine Syllabus (1)

(* = for doctor's license holders)

Syllabus Title	Lung function		
Instructor	Professor Hideki Katsura		
Credit	1		
Type of Class	Lecture/Practice		
Theme	Pathophysiology on respiration and respiratory regulation		
Schedule	Wednesday • 13:00~14:10		
Course Objective	<ul style="list-style-type: none"> •To perform laboratory test according to laboratory test planning •To understand the laboratory results and record it 		
Evaluation Methods	Attendance (50%) Submission of reports on lectures (50%)		
Grading Scale	S (90 -100 points), A (80 - <90 points), B (70 - <80 points), C (60 - <70 points), D (<60 points). S, A, B, and C are accepted. D is rejected.		
Textbooks/References	West JB. Respiratory Physiology, 10th Ed, Wolters Kluwer, 2016, USA		
Independent Study Outside of Class	Study about literatures sited in Syllabus		
Room	Medical office of Respiratory Medicine/Laboratory, etc.		
Special Note	The person who cannot participate in the above time will decide the timetable after consultation.If you have any questions, we will be available at any time. We will give feedback in the final episode.		
Course Plan	Number	Instructor	Contents
	1	Hideki Katsura	Spirometry and lung volume
	2	Hideki Katsura	Flow-volume curve
	3	Hideki Katsura	Respiratory mechanics
	4	Hideki Katsura	Chest wall and respiratory muscle
	5	Hideki Katsura	Shunt and dead space
	6	Hideki Katsura	Diffusion
	7	Hideki Katsura	Closing volume
	8	Hideki Katsura	Respiratory regulation

Respiratory Medicine Syllabus (2)

(* = for doctor's license holders)

Syllabus Title	Diagnosis of respirology		
Instructor	Professor and Head , Etsuko Tagaya		
Credit	1		
Type of Class	Lectures / practice		
Theme	Introduction to clinical diagnosis of respiratory diseases		
Schedule	Wednesday •13:00~16:30		
Course Objective	Learn how to take physical findings as a diagnostic method necessary for diagnosing respiratory diseases. Students will learn chest X-rays, CT image interpretation, respiratory function tests, and bronchoscopy.		
Evaluation Methods	Attendance (50%) Submission of reports on lectures (50%)		
Grading Scale	S (90 -100 points), A (80 - <90 points), B (70 - <80 points), C (60 - <70 points), D (<60 points). S, A, B, and C are accepted. D is rejected.		
Textbooks/References	Harrison's Principles, Simple Respiratory Medicine, Felson chest x-ray interpretation, Bronchoscope Introductory Manual		
Independent Study Outside of Class	Read the above reference books and related literature.		
Room	Medical office of Respiratory Medicine/Laboratory, etc.		
Special Note	The person who cannot participate in the above time will decide the timetable after consultation.If you have any questions, we will be available at any time. We will give feedback in the final episode.		
Course Plan	Number	Instructor	Contents
	1	Etsuko Tagaya	Pulmonary function test
	2	Etsuko Tagaya	Bronchoscopy
	3	Etsuko Tagaya	Interpretation of radiological images
	4	Etsuko Tagaya	Examination of physical findings

Respiratory Medicine Syllabus (3)

(* = for doctor's license holders)

Syllabus Title	Obstructive lung disease		
Instructor	Professor Hideki Katsura		
Credit	1		
Type of Class	Lecture/Practice		
Theme	To understand diagnosis and pathophysiology of molecular mechanism about obstructive lung diseases and perform different diagnosis		
Schedule	Monday • 13:00~16:30		
Course Objective	<p>To understand classification and pathophysiology of obstructive</p> <p>To create treatment plan of obstructive lung diseases according to disease severity</p> <p>To understand animal model of obstructive lung diseases</p>		
Evaluation Methods	Attendance (50%) Submission of reports on lectures (50%)		
Grading Scale	S (90 -100 points), A (80 - <90 points), B (70 - <80 points), C (60 - <70 points), D (<60 points). S, A, B, and C are accepted. D is rejected.		
Textbooks/References	<p>COPD guideline for diagnosis and treatment 5th ed, Japanese Respiratory Society, 2018.</p> <p>Asthma guideline for prevention and treatment, 2018.</p>		
Independent Study Outside of Class	<p>To study and understand the findings before the lecture according to Syllabus.</p> <p>Study about literatures sited in Syllabus</p>		
Room	Medical office of Respiratory Medicine/Laboratory, etc.		
Special Note	The person who cannot participate in the above time will decide the timetable after consultation.If you have any questions, we will be available at any time. We will give feedback in the final episode.		
Course Plan	Number	Instructor	Contents
	1	Hideki Katsura	Pathophysiology of obstructive disorder
	2	Hideki Katsura	COPD
	3	Hideki Katsura	Diffuse panbronchiolitis
	4	Hideki Katsura	Bronchiolitis obliterance

Respiratory Medicine Syllabus (4)

(* = for doctor's license holders)

Syllabus Title	Allergic Lung Disease		
Instructor	Professor and Head , Etsuko Tagaya		
Credit	1		
Type of Class	Lectures / practice		
Theme	Pathophysiology and treatment of bronchial asthma		
Schedule	Wednesday • 13:00~16:30		
Course Objective	Understand allergic reactions (type I, type II, type III, type IV). Acquire knowledge about the pathophysiology, symptoms, diagnosis, and treatment of bronchial asthma, hypersensitivity pneumonitis, eosinophilic pneumonia, allergic pneumonia, drug-induced pneumonia, and ABPA.		
Evaluation Methods	Attendance (50%) Submission of reports on lectures (50%)		
Grading Scale	S (90 -100 points), A (80 - <90 points), B (70 - <80 points), C (60 - <70 points), D (<60 points). S, A, B, and C are accepted. D is rejected.		
Textbooks/References	Simple respiratory disease, Standard respiratory disease , Asthma prevention and management guideline 2021		
Independent Study Outside of Class	Read the above reference books and related literature.		
Room	Medical office of Respiratory Medicine/Laboratory, etc.		
Special Note	The person who cannot participate in the above time will decide the timetable after consultation.If you have any questions, we will be available at any time. We will give feedback in the final episode.		
Course Plan	Number	Instructor	Contents
	1	Etsuko Tagaya	Bronchial asthma,
	2	Etsuko Tagaya	hypersensitivity pneumonitis
	3	Etsuko Tagaya	eosinophilic pneumonia
	4	Etsuko Tagaya	allergic pneumonia, drug-induced pneumonia, and ABPA.

Respiratory Medicine Syllabus (5)

(* = for doctor's license holders)

Syllabus Title	Lung Tumor Details*		
Instructor	Specially Appointed Professor Mitsuko Kondo		
Credit	1		
Type of Class	Lecture/Practice		
Theme	Diagnosis and Treatment of Lung Cancer		
Schedule	Thursday • 13:00~16:30		
Course Objective	Understand and practice the latest lung cancer algorithms for diagnosis and therapy such as bronchoscopy, pathological diagnosis, genetic testing, and pharmacotherapy.		
Evaluation Methods	Attendance (50%) Submission of reports on lectures (50%)		
Grading Scale	S (90 -100 points), A (80 - <90 points), B (70 - <80 points), C (60 - <70 points), D (<60 points). S, A, B, and C are accepted. D is rejected.		
Textbooks/References	Lung Tumor Handling Regulations 8th Edition, Lung Tumor Clinical Practice Guidelines 2018 Edition, Latest Medical Separate Volume Respiratory Tumor Diagnosis and Treatment ABC		
Independent Study Outside of Class	Radiological interpretation of lung cancer cases, bronchoscopy, and microscopic observation of pathological specimens. Participate in a conference on lung cancer to deepen the knowledge.		
Room	Office and Laboratory room of Department of Respiratory Medicine		
Special Note	Those who cannot participate in the above time will decide the timetable after consultation. Questions etc. are accepted at any time. Give feedback in the final round.		
Course Plan	Number	Instructor	Contents
	1	Mitsuko Kondo	Lung cancer
	2	Mitsuko Kondo	Beneign bronchial and lung tumor
	3	Mitsuko Kondo	Bronchial and lung carcinoid
	4	Mitsuko Kondo	Lymphangitis carcinomatosa and pleuritis carcinomatosa

Respiratory Medicine Syllabus (6)

(* = for doctor's license holders)

Syllabus Title	Experiment / Practice (Task Research)	
Instructor	Etsuko Tagaya, Mitsuko Kondo, Hideki Katsura	
Credit	10	
Type of Class	Experiment / Practice (Task Research)	
Theme	Implementation of research projects and preparation of research treatises	
Schedule	Monday•Tuesday•Wednesday•Friday 9:00-12:00、13:00-17:00 Thursday 15:00-17:00	
Course Objective	<ol style="list-style-type: none"> 1. Acquire technique according to research plan and conduct research. 2. Record and store experimental data correctly. 3. Express experimental results in an appropriate figure and table. 4. Present and discuss research data properly at academic conference and research meetings. 5. Write and submit a research paper. Correspond appropriately the comment of the reviewer , and complete the paper. 	
Evaluation Methods	Creation of experiment note and research report (60%) , Make figures and tables (10%) Research presentation and discussion (10%) Thesis (20%)	
Grading Scale	S (90 -100 points), A (80 - <90 points), B (70 - <80 points), C (60 - <70 points), D (<60 points). S, A, B, and C are accepted. D is rejected.	
Textbooks/References	Reviews and papers related to research issues	
Independent Study Outside of Class	Present and discuss research data properly at academic conference	
Room	Medical office of Respiratory Medicine/Laboratory, etc.	
Special Note	Those who cannot participate in the above time will decide the timetable after consultation. Questions etc. are accepted at any time.	
Course Plan	Number	Contents
	1	Achievement of reach targets 1-2
	~	
	90	
	91	Achievement of reach targets 3-4
	~	
	120	
	121	Achievement of reach targets 5
~		
150		

Endocrinology

I Educational policy

Our clinical and research targets are all endocrinological diseases. Our aim is to groom a medical doctor as a physician scientist who perform clinical and basic research to give the patients the best medical treatment which we think of. Based on our case analysis, clinical and nuclear receptor research (Case analysis 1. “adrenal crisis induced by an absorption delay of hydrocortisone by Exenatide” Diabetes Care, 2013, Proposal for new disease concept 2. “SITSH after surgery for Cushing’s syndrome” J Clin Endocrinol Metab., 2013, 3. “Primary aldosteronism with normal plasma aldosterone” J Hypertens., 2017, Novel diagnostic method and novel significance of endocrine function test 4. “TSH ratio in Cushing’s syndrome” Endocr J., 2018, 5. “Paradoxical GH response to OGTT in Acromegaly” J Clin Endocrinol Metab., 2019, Novel evidence by multi-institutional, cross-sectional study 6. “Diabetes mellitus increases cardio-cerebrovascular risk and renal complications in primary aldosteronism” J Clin Endocrinol Metab., 2020, Nuclear receptor biology 7. “Adipocyte GR Inhibits Healthy Adipose Expansion in Cushing Syndrome” Endocrinology, 2019), we would like to solve the critical clinical issues about endocrinological diseases (especially pituitary and adrenal diseases).

II Goals

1. To get clinical techniques such as laboratory examination, imaging and treatment to make the pathology of endocrine diseases clear in each patient and to distinguish between solved and unsolved points.
2. To make a proper research plan to analyze the unsolved points of endocrine diseases.
3. To judge the results properly in addition to the essential knowledge and technique of both clinical and basic research.
4. To present the research result at a conference and publish it in the academic journal.
5. To present the research result at an international conference and have an international view point by interacting with foreign researcher.
6. To discuss the other member’s research project and teach the younger generation.

III Faculty*Research projects

(* = for doctor’s license holders)

Name	Research projects
Michio Otsuki	<ol style="list-style-type: none"> 1. To investigate the novel clinical parameter to perform the adequate glucocorticoid replacement in secondary adrenal insufficiency 2. To clarify the significance of glucocorticoid induced adiponectin production by adipocyte glucocorticoid receptor in secondary adrenal insufficiency with sick day 3. To investigate the regulatory mechanism for endocrine abnormality in Cushing’s syndrome 4. To develop the novel diagnostic parameter for primary aldosteronism and Cushing’s syndrome 5. To investigate the real situation of adult 21-hydroxylase deficiency in Japan (Research Committee on Disorders of Adrenal Hormones from the Ministry of Health, Labour and Welfare)

IV Syllabus

Content	Faculty	credit	Title
Hypothalamic and pituitary diseases, and adrenal diseases	Michio Otsuki	2	The progress of diagnosis and treatment in hypothalamic and pituitary diseases, and adrenal diseases
	Michio Otsuki	2	The progress of diagnosis and treatment in thyroid and parathyroid diseases, gonadal diseases, polyendocrine diseases and immunoendocrinopathy syndrome and the problem of transition of endocrine diseases
Case and research conference (once a week)	Michio Otsuki	1	Discussion by all members
Experiment and practice (Research project)	Michio Otsuki	10	Conducting a research project and writing a manuscript
計		15	

Endocrinology Syllabus

Syllabus Title	Hypothalamic and pituitary diseases, Adrenal diseases		
Instructor	Michio Otsuki		
Credit	2		
Type of Class	Lecture * Practice		
Theme	Lectures and practices about hypothalamic and pituitary diseases, and adrenal diseases		
Schedule	undecided (70min)		
Course Objective	To understand the pathophysiology of hypothalamic and pituitary diseases, and adrenal diseases to make the proper diagnosis and treatment. To check the latest information about pathophysiology, diagnosis and treatment of these diseases.		
Evaluation Methods	Attendance (50%) , Report (50%)		
Grading Scale	S (more than or equal to 90 points~100 points), A (more than or equal to 80 points~less than 90 points), B (more than or equal to 70 points~less than 80 points), C (more than or equal to 60 points~less than 70 points), D (less than 60 points), S, A, B, C are success and D is failure.		
Textbooks/References	Williams Textbook of Endocrinology 14th Edition		
Independent Study Outside of Class	To read the textbook and check the latest articles according to the course.		
Room	undecided		
Special Note			
Course Plan	Number	Instructor	Contents
	1	Michio Otsuki	Hypothalamic and pituitary hormone-physiological action
	2	Michio Otsuki	Diagnosis of pituitary diseases-Imaging
	3	Michio Otsuki	Acromegaly
	4	Michio Otsuki	TSH producing adenoma and prolactinoma
	5	Michio Otsuki	Cushing disease
	6	Michio Otsuki	non-functional pituitary tumors and others
	7	Michio Otsuki	Hypopituitarism
	8	Michio Otsuki	Adrenal steroids and catecholamines-physiological action
	9	Michio Otsuki	Diagnosis of adrenal diseases-Imaging
	10	Michio Otsuki	Primary aldosteronism
	11	Michio Otsuki	Cushing syndrome
	12	Michio Otsuki	Pheochromocytoma and paraganglioma
	13	Michio Otsuki	Adrenal incidentaloma and adrenal carcinoma
	14	Michio Otsuki	Addison disease
	15	Michio Otsuki	Congenital adrenal hyperplasia
	16	Michio Otsuki	Adrenal crisis

Endocrinology Syllabus

Syllabus Title	Thyroid and parathyroid diseases, Gonadal diseases, Polyendocrine disease, Immunoendocrinopathy syndrome and Transition of endocrine diseases		
Instructor	Michio Otsuki		
Credit	2		
Type of Class	Lecture・Practice		
Theme	Lectures and practices about thyroid and parathyroid diseases, gonadal diseases, polyendocrine disease, immunoendocrinopathy syndrome and the transition of endocrine diseases		
Schedule	undecided (70min)		
Course Objective	To understand the pathophysiology of thyroid and parathyroid diseases, gonadal diseases, polyendocrine disease, immunoendocrinopathy syndrome and the transition of endocrine diseases to make the proper diagnosis and treatment. To check the latest information about pathophysiology, diagnosis and treatment of these diseases.		
Evaluation Methods	Attendance (50%)、Report (50%)		
Grading Scale	S (more than or equal to 90 points~100 points), A (more than or equal to 80 points~less than 90 points), B (more than or equal to 70 points~less than 80 points), C (more than or equal to 60 points~less than 70 points), D (less than 60 points), S, A, B, C are success and D is failure.		
Textbooks/References	Williams Textbook of Endocrinology 14th Edition		
Independent Study Outside of Class	To read the textbook and check the latest articles according to the course.		
Room	undecided		
Special Note			
Course Plan	Number	Instructor	Contents
	1	Michio Otsuki	Thyroid hormone-physiological action
	2	Michio Otsuki	Diagnosis of thyroid diseases-Imaging
	3	Michio Otsuki	Hyperthyroidism
	4	Michio Otsuki	Hypothyroidism
	5	Michio Otsuki	Thyroid tumor (benign and malignant)
	6	Michio Otsuki	Hormone related to calcium metabolism-physiological action
	7	Michio Otsuki	Hypercalcemia
	8	Michio Otsuki	hypocalcemia
	9	Michio Otsuki	Osteoporosis
	10	Michio Otsuki	Sex hormone-physiological action
	11	Michio Otsuki	Hypogonadism (male and female)
	12	Michio Otsuki	Precocious puberty and delayed puberty
	13	Michio Otsuki	Turner syndrome, Klinefelter syndrome、polycystic ovary syndrome
	14	Michio Otsuki	polyendocrine diseases and hereditary diseases
	15	Michio Otsuki	Immunoendocrinopathy syndrome
16	Michio Otsuki	Transition of endocrine diseases	

Endocrinology Syllabus

Syllabus Title	Case and research conference		
Instructor	Michio Otsuki		
Credit	1		
Type of Class	Discussion about case and research		
Theme	To learn logical thinking and discussion trick through the discussion about case and research		
Schedule	undecided (70min)		
Course Objective	To show the case properly and interpret the pathophysiology. To judge the research results properly.		
Evaluation Methods	Attendance (50%)、Case and research conference (50%)		
Grading Scale	S (more than or equal to 90 points~100 points), A (more than or equal to 80 points~less than 90 points), B (more than or equal to 70 points~less than 80 points), C (more than or equal to 60 points~less than 70 points), D (less than 60 points), S, A, B, C are success and D is failure.		
Textbooks/References	Williams Textbook of Endocrinology 14th Edition		
Independent Study Outside of Class	To read the related articles and explain the pathophysiology of the case or the research results theoretically.		
Room	undecided		
Special Note			
Course Plan	Number	Instructor	Contents
	1	Michio Otsuki	Case and research conference
	2	Same as 1 (Once a week for the whole year)	
	3		
	4		
	5		
	6		
	7		
	8		

Endocrinology Syllabus

Syllabus Title	Experiment and practice (Research project)	
Instructor	Michio Otsuki	
Credit	10	
Type of Class	Experiment and practice (Research project)	
Theme	Conducting a research project and writing a manuscript	
Schedule	undecided (240min)	
Course Objective	<ol style="list-style-type: none"> 1. To conduct the clinical and basic research in accordance with the research plan 2. To record and save the research data correctly in accordance with the ethical guideline 3. To integrate the research results properly 4. To make a research presentation at an academic conference properly 5. To write a manuscript and submit it 	
Evaluation Methods	Research plan (30%), presentation slide (30%), manuscript (40%)	
Grading Scale	S (more than or equal to 90 points~100 points), A (more than or equal to 80 points~less than 90 points), B (more than or equal to 70 points~less than 80 points), C (more than or equal to 60 points~less than 70 points), D (less than 60 points), S, A, B, C are success and D is failure.	
Textbooks/References	Research plan related article and review	
Independent Study Outside of Class	To participate make a research presentation in the related academic conference and meeting actively.	
Room	undecided	
Special Note	The research period is decided after consultation. Questions etc. are accepted any time.	
Course Plan	Number	Contents
	1	The achievement of Goals 1~2
	~	
	50	
	51	The achievement of Goals 3~5
	~	
150		

Gastroenterology

I Educational Policy

Gastroenterology covers many organs of the digestive tract (esophagus, stomach, duodenum, small and large intestines), liver, gallbladder and pancreas. In particular, the incidence of gastric, colorectal, and liver cancers is high, and pancreatic cancer is difficult to detect in the early stages. Pancreatic cancer is difficult to detect at an early stage and is one of the leading causes of death in Japan. The mission of our department is to elucidate the pathogenesis of these diseases and to establish early diagnosis and treatment methods, and we have many research themes. At the graduate school, we offer a wide range of research opportunities from basic to clinical research. Basic and experimental research is conducted not only in our laboratory but also in other departments within and outside the university. In the graduate school, a wide range of basic and clinical research is available. The number of patients, examinations and treatments in our department is one of the largest institutes in Japan. Clinical research on various diseases is being conducted, and the results are contributing to clinical practice. The number of patients, tests, and treatment cases is one of the largest institutes in Japan. In addition, advances in morphology and diagnostic imaging techniques are essential for the early diagnosis of cancer, and we are able to research the development of these techniques in collaboration with science and engineering departments. We are looking for young researchers who are interested in gastroenterology.

II Goals

1. The excellent research results in gastroenterology, wide knowledge and high skills
2. The ability to lead original research in gastroenterology, and a sense of research ethics.

III Supervisor•Research theme

(* = for doctor's license holders)

Name and position	Research theme
Prof Nakamura	<p>(1) Investigation of the status and etiology of Helicobacter heilmannii infection in humans*.</p> <p>It is well known that Helicobacter pylori (H. pylori) infection causes chronic gastritis, gastroduodenal ulcer, and gastric cancer. Helicobacter heilmannii (H. heilmannii) is found in the gastric mucosa of animals such as cats and dogs, and has been reported to infect the gastric mucosa of humans as a zoonosis. Like H. pylori, H. heilmannii has been thought to cause chronic gastritis, and recently its association with MALT lymphoma has been pointed out. The purpose of this study is to investigate the status of H. heilmannii infection and to elucidate its etiology.</p>
Prof. Nakamura	<p>(2) Research on hemodynamics and treatment of esophageal varices*.</p> <p>Although endoscopic variceal ligation (EVL), endoscopic sclerotherapy (EIS), and balloon-occluded retrograde transvenous obliteration (BRTO) have been performed for gastroesophageal varices, standardization of treatment based on evidence is required. With the improvement of diagnostic imaging, it has become possible to observe the vasculature involved in varicose veins, and ultrasound endoscopy (EUS) has revealed that treatment efficacy and recurrence rates differ depending on the degree of development of the blood supply tract and paraesophageal veins. In this study, we will analyze the hemodynamics using EUS, 3D CT, and color Doppler EUS, and decide rational treatment method.</p>
Prof. Nonaka and Associated prof. Kishino	<p>(3) Study on the actual situation and pathogenesis of drug-induced gastrointestinal disorders*.</p> <p>With the aging of the population, prescriptions of antithrombotic agents, nonsteroidal anti-inflammatory analgesics, and osteoporosis drugs have increased rapidly. Recently, novel oral anticoagulants (NOACs) have also been used. These drugs have benefits such as prevention of neurological and cardiovascular events, but side effects such as gastrointestinal mucosal damage and bleeding have been a problem. In this study, we will conduct an observational study of endoscopic findings, frequency of gastrointestinal bleeding, and its treatments in patients taking these drugs to make clear the situation and prevention method.</p>

<p>Prof. Nonaka and Associated prof. Kishino</p>	<p>(4) Research on esophageal motor function and pathophysiology*. Functional gastroenteropathies that do not show abnormalities on endoscopy, such as non-erosive reflux esophagitis (NERD) and functional dyspepsia (FD), have been attracting attention. These diseases have been difficult to diagnose and evaluate objectively because of the absence of organic abnormalities. The aim of this study is to analyze esophageal motility by HRM and to elucidate the pathophysiology of these diseases.</p>
<p>Prof. Tokushige and associaetd prof. Taniai</p>	<p>(5) Clinicopathological study of autoimmune hepatitis*. The pathogenesis of autoimmune hepatitis (AIH) in the elderly differs from that of conventionally known AIH, and some cases are resistant to steroids and have a poor prognosis. In recent years, the number of AIH in the elderly is expected to increase due to the aging of society, and countermeasures are urgently needed. In this study, we will analyze the dynamics of immunomodulatory cytokines by cDNA microarray, and mRNA quantification. And we will also study the identification of disease-specific antigens and their functions using animal models of diseases.</p>
<p>Prof. Tokushige and Dr. Kogiso</p>	<p>(6) The mechanism of hepatocellular carcinogenesis in NASH In recent years, hepatocellular carcinoma (HCC) in NASH is increasing. Although the mechanism of HCC carcinogenesis is not clear, it is believed that HCC carcinogenesis is caused by a complex combination of insulin resistance and oxidative stress, which are the main pathogenesis of NASH, liver fibrosis, and various external and internal factors, the most important of which is oxidative stress. Reactive oxygen species (ROS) cause oxidative damage to nuclear DNA, induce gene mutations, decrease DNA repair enzyme activity, and activate transcription factors, leading to carcinogenesis. In this study, we investigated the relationship between the expression of various ROS and 8-OHdG in liver tissue and hepatocarcinogenesis, focusing on NASH carcinogenesis cases. In addition, we will compare the expression of cytokines and apoptosis-related molecules related to hepatocarcinogenesis in NASH carcinoma cases and non-carcinoma cases, including comprehensive expression analysis using cDNA microarrays in liver tissues, quantitative study of signaling by mRNA quantification, and immunohistochemical study of expression localization.</p>
<p>Prof. Tokushige and Dr. Kogiso</p>	<p>(7) Involvement of oxidative stress in NASH It is assumed that fatty liver develops due to insulin resistance induced by visceral obesity, and that oxidative stress generated by impaired beta-oxidation of fatty acids in mitochondria acts on the basis of this fatty liver to develop NASH. In other words, elucidation of the involvement of oxidative stress in NASH will lead to treatment. In this study, we will examine the expression of oxidative stress markers in liver tissue using molecular biological techniques and examine their relationship to the pathogenesis of NASH. Furthermore, we will examine the modification by treatment effects.</p>
<p>Prof. Tokushige and Dr. Kogiso</p>	<p>(8) SNP analysis of liver diseases Although many SNPs (single nucleotide polymorphism) have been studied in recent years, we will focus on SNPs in liver diseases that are directly relevant to clinical practice. Specifically, we will 1) search for SNPs in inflammatory cytokines, fibrosis growth factor, IFN receptor, IFN-inducible gene, etc., as SNPs that determine the progression of hepatitis C and the effects of interferon and rebabirin combination therapy, and 2) analyze SNPs in non-alcoholic steatohepatitis (NASH). (2) SNP search for adipocytokines as SNPs involved in the development and progression of steatohepatitis (NASH) (3) SNP search for inflammatory cytokines and liver regeneration factors as SNPs involved in the development and prognosis of fulminant hepatitis. We will also attempt a comprehensive study using GWAS. We analyze the relationship between the above SNP results and clinical data, and aim to apply the SNPs clinically.</p>
<p>Dr. Takayama and Dr. Tahara</p>	<p>(9) Molecular biological and clinicopathological studies for the early diagnosis of pancreatic tumors Clinicopathological studies based on accumulated cases will be conducted to improve diagnostic accuracy mainly in imaging diagnosis of pancreatic tumors such as pancreatic cancer, cystic pancreatic tumor and pancreatic neuroendocrine tumor. To establish a precise and accurate preoperative diagnosis process, we will promote research that combines a wide range of information from genetic analysis, pathology, and clinical practice.</p>

<p>Dr. Takayama and Dr. Tahara</p>	<p>(10) Basic and clinical research to elucidate the pathogenesis of autoimmune pancreatitis*. Autoimmune pancreatitis originated in our department. In addition, we have succeeded in creating an animal model in collaboration with the Department of Microbiology and Immunology at Tohoku University. Using this model. We will analyze the pathogenesis of autoimmune hepatitis and develop new markers by adding analysis from bacteriology and immunology. In addition, we will conduct detailed clinicopathological studies on a wide variety of clinical cases, including imaging, serodiagnosis, treatment, and prognosis, to elucidate the pathogenesis of the disease.</p>
<p>Dr. Takayama and Dr. Tahara</p>	<p>(11) Experimental and clinical studies to elucidate the pancreatic exocrine regulatory factors and the pathogenesis of the pathogenesis of pancreatic diseases To investigate how the pancreatic exocrine secretion is physiologically regulated by brain gut hormones and neurotransmission. The experimental subjects include living rats, excised pancreas, or free pancreatic adenohypophysis at various stages from organ to cell level. We are also conducting experimental and clinical studies on the regulatory mechanisms of pancreatic endocrine secretion, focusing on the well-known complication of diabetes mellitus and pancreatic diseases.</p>
<p>Dr. Takayama and Dr. Tahara</p>	<p>(12) Elucidation of the mechanism of fibrosis in pancreatic diseases Pancreatic astrocytes in the periadventitial region play a central role in pancreatic fibrosis associated with chronic pancreatitis and pancreatic cancer. During pancreatic injury, quiescent pancreatic astrocytes are activated and transformed into α-smooth muscle actin (α SMA)-positive myofibroblast-like cells, and their production of extracellular matrix and adhesion factors as well as their migration ability are enhanced by cytokines and growth factors, thereby promoting pancreatic fibrosis. We will examine how the phagocytic ability of pancreatic astrocytes is involved in fibrosis and pancreatic cancer progression. We are developing novel therapeutic strategies targeting pancreatic astrocytes as a therapeutic strategy for pancreatic cancer.</p>
<p>Dr. Takayama and Dr. Tahara</p>	<p>(13) Investigation of High Risk Group for Pancreatic Cancer: Genetic Study of Familial Pancreatitis Despite the development of various diagnostic and therapeutic methods, the prognosis of pancreatic cancer remains poor. Although advances in imaging methods such as ultrasound, CT and MRCP have improved the diagnostic capability of pancreatic cancer, early diagnosis that leads to improved outcomes is difficult. One of this reasons, it is difficult to define high-risk groups to narrow down pancreatic cancer. The relationship between diabetes mellitus and pancreatic cancer is often a problem, but it is still unclear whether diabetes mellitus can be a high-risk group for carcinogenesis. We are conducting whole genome analysis of familial pancreatic cancer cases at our center using next-generation sequencers to analyze the remains of familial pancreatic cancer.</p>
<p>Dr Omori</p>	<p>(14) Research on clinical pathogenesis of inflammatory bowel diseases (ulcerative colitis, Crohn's disease, Behcet's disease, etc.)*. We will study advanced specialized treatments for ulcerative colitis (UC), Crohn's disease (CD), and Behcet's disease. We will also study the conceptualization and advocacy of intestinal flora, colitic cancer, and PSC-associated enteritis, as well as medical devices such as small bowel speculum, small bowel capsule, and colon capsule. In addition, we will analyze the factors of relapse in various clinical pathological studies, special cases (schoolchildren, pregnancy, childbirth, elderly), response to various treatments, and the course of the disease, as well as new medical devices (small intestine and capsule endoscopy).</p>

IV Syllabus

(* = for doctor's license holders)

Title	Instructor	Credit	Theme
Review of Gastroenterology	Prof. Tokushige	1	Review of Gastroenterology*
Digestive Tube Disorders	Prof. Nakamura	2	Diagnosis, pathogenesis, and treatment of gastrointestinal diseases *
Hepatic, Biliary, and Pancreatic Diseases	Associaetd Prof. Taniai	2	Hepatic, Biliary, and Pancreatic Diseases *
Experiments and practical training (research projects)	Prof. Tokushige, Prof. Nakamura, Prof. Nonaka, Associated Prof. Taniai, Dr. Kishino, Dr. Kogiso, Dr. Takayama	10	Conducting research projects and writing research papers
計		15	

(Gastroenterology) Syllabus (1)

Syllabus Title	Review of Gastroenterology *		
Instructor	Prof. Tokushige		
Credit	1		
Type of Class	Lectures, Exercises, Conferences		
Theme	Review of Gastroenterology		
Schedule	Monday 1st period, Friday 2nd period		
Course Objective	Acquire a proper understanding and knowledge of the digestive system organs		
Evaluation Methods	Attendance (50%), Report (50%)		
Grading Scale	The five categories are S (90 points or more to 100 points), A (80 points or more to less than 90 points), B (70 points or more to less than 80 points), C (60 points or more to less than 70 points), and D (less than 60 points). S, A, B, and C are acceptable, and D is not acceptable.		
Textbooks/References	Textbooks related to gastroenterology		
Independent Study Outside of Class	Students are expected to have an understanding of the current knowledge of the class theme through textbooks and literature in advance.		
Room	West A2nd Floor Conference Room, Gastroenterology Department		
Special Note	For those who cannot participate in the above time, the time schedule will be decided after consultation. Questions will be accepted at any time. Feedback will be given at the final session.		
Course Plan	Number	Instructor	Contents
	1	Prof. Tokushige	Anatomy and function of the digestive organs
	2	Prof. Tokushige	Anatomy and function of the digestive organs
	3	Prof. Tokushige	Anatomy and function of the digestive organs
	4	Prof. Tokushige	Introduction to Gastrointestinal Diseases
	5	Prof. Tokushige	Introduction to Gastrointestinal Diseases
	6	Prof. Tokushige	Introduction to Liver, Biliary and Pancreatic Diseases
	7	Prof. Tokushige	Introduction to Liver, Biliary and Pancreatic Diseases
8	Prof. Tokushige	Introduction to Liver, Biliary and Pancreatic Diseases	

(Gastroenterology) Syllabus (2)

Syllabus Title	Alimentary canal disease *		
Instructor	Prof. Nakamura		
Credit	2		
Type of Class	Lectures, Exercises, Conferences		
Theme	Diagnosis, pathogenesis, and treatment of gastrointestinal diseases		
Schedule	Wednesday 3rd period, Friday 1st period		
Course Objective	Organize correct understanding and knowledge of gastrointestinal diseases		
Evaluation Methods	Attendance (50%), Report (50%)		
Grading Scale	The five categories are S (90 points or more to 100 points), A (80 points or more to less than 90 points), B (70 points or more to less than 80 points), C (60 points or more to less than 70 points), and D (less than 60 points). S, A, B, and C are acceptable, and D is not acceptable.		
Textbooks/References	Textbooks, review articles, and original papers on gastrointestinal diseases		
Independent Study Outside of Class	Students are expected to have an understanding of the current knowledge of the class theme through textbooks and literature in advance.		
Room	West A2nd Floor Conference Room, Gastroenterology Department, Endoscopy Room		
Special Note	For those who cannot participate in the above time, the time schedule will be decided after consultation. Questions will be accepted at any time. Feedback will be given at the final session.		
Course Plan	Number	Instructor	Contents
	1	Prof. Nakamura	Pathogenesis of upper gastrointestinal diseases
	2	Prof. Nakamura	Pathogenesis of upper gastrointestinal diseases
	3	Prof. Nakamura	Pathogenesis of upper gastrointestinal diseases
	4	Prof. Nakamura	Pathogenesis of upper gastrointestinal diseases
	5	Prof. Nakamura	Pathogenesis of upper gastrointestinal diseases
	6	Prof. Nakamura	Pathogenesis of upper gastrointestinal diseases
	7	Prof. Nakamura	Pathogenesis of upper gastrointestinal diseases
	8	Prof. Nakamura	Pathogenesis of upper gastrointestinal diseases
	9	Prof. Nonaka	Treatment of upper gastrointestinal diseases
	10	Prof. Nonaka	Treatment of upper gastrointestinal diseases
	11	Prof. Nonaka	Treatment of upper gastrointestinal diseases
	12	Prof. Nonaka	Treatment of upper gastrointestinal diseases
	13	Prof. Nakamura	<i>Helicobacter pylori</i>
	14	Prof. Nakamura	<i>Helicobacter pylori</i>
15	Prof. Nakamura	<i>Helicobacter pylori</i>	

(Gastroenterology) Syllabus (3)

Syllabus Title	Hepatic, Biliary, and Pancreatic Diseases *		
Instructor	Associate Prof. Taniai		
Credit	2		
Type of Class	Lectures, Exercises, Conferences		
Theme	Diagnosis, pathogenesis, and treatment of liver, biliary system, and pancreatic diseases		
Schedule	Tuesday, 4th period, Monday, 2nd period		
Course Objective	Acquire correct understanding and knowledge of liver, biliary tract, and pancreas diseases.		
Evaluation Methods	Attendance (50%), Report (50%)		
Grading Scale	The five categories are S (90 points or more to 100 points), A (80 points or more to less than 90 points), B (70 points or more to less than 80 points), C (60 points or more to less than 70 points), and D (less than 60 points). S, A, B, and C are acceptable, and D is not acceptable.		
Textbooks/References	Textbooks, review articles, and original papers on liver, biliary tract, and pancreas diseases		
Independent Study Outside of Class	Students are expected to have an understanding of the current knowledge of the class theme through textbooks and literature in advance.		
Room	West A2nd Floor Conference Room, Gastroenterology Department, South Lab.		
Special Note	For those who cannot participate in the above time, the time schedule will be decided after consultation. Questions will be accepted at any time. Feedback will be given at the final session.		
Course Plan	Number	Instructor	Contents
	1	Dr. Takayama	Pathogenesis, diagnosis, and treatment of pancreatic diseases
	2	Dr. Takayama	Pathogenesis, diagnosis, and treatment of pancreatic diseases
	3	Dr. Takayama	Pathogenesis, diagnosis, and treatment of pancreatic diseases
	4	Dr. Takayama	Pathogenesis, diagnosis, and treatment of pancreatic diseases
	5	Dr. Takayama	Pathogenesis, diagnosis, and treatment of pancreatic diseases
	6	Dr. Takayama	Pathogenesis, diagnosis, and treatment of biliary tract diseases
	7	Dr. Takayama	Pathogenesis, diagnosis, and treatment of biliary tract diseases
	8	Dr. Takayama	Pathogenesis, diagnosis, and treatment of biliary tract diseases
	9	Dr. Kogiso	Pathogenesis, diagnosis, and treatment of biliary tract diseases
	10	Dr. Kogiso	Pathogenesis, diagnosis, and treatment of biliary tract diseases
	11	Dr. Kogiso	Pathogenesis, diagnosis, and treatment of liver diseases
	12	Dr. Kogiso	Pathogenesis, diagnosis, and treatment of liver diseases
	13	Dr. Kogiso	Pathogenesis, diagnosis, and treatment of liver diseases
	14	Dr. Kogiso	Pathogenesis, diagnosis, and treatment of liver diseases
15	Dr. Kogiso	Pathogenesis, diagnosis, and treatment of liver diseases	

(Gastroenterology) Syllabus (4)

Syllabus Title	Experiments and practical training (research projects) *	
Instructor	Prof. Tokushige, Prof. Nakamura, Prof. Nonaka, Associated prof. Taniai, Associated prof. Kishino, Dr. Kogio, Dr. Takayama, Dr. Omori, Dr. Tahara	
Credit	10	
Type of Class	Experiments and practical training (research projects)	
Theme	Conducting research projects and writing research papers	
Schedule	Monday – Friday (other than syllabus 1–3)	
Course Objective	1. Formulation of research hypothesis and research plan. Acquisition and implementation of skills for the research. 2. Document the research and its results correctly, and devise a plan for these results. 3. Summarize research results in appropriate charts and graphs. 4. Present research findings at internal and external research meetings and engage in appropriate discussions. 5. Submit research results as a paper. Respond appropriately to reviewers' comments.	
Evaluation Methods	Research reports (60%) Interviews (10%) Research presentations and discussions (10%) Essay writing (20%)	
Grading Scale	The five categories are S (90 points or more to 100 points), A (80 points or more to less than 90 points), B (70 points or more to less than 80 points), C (60 points or more to less than 70 points), and D (less than 60 points). S, A, B, and C are acceptable, and D is not acceptable.	
Textbooks/References	Original papers and review articles related to the research topic	
Independent Study Outside of Class	Actively participate in and present at related academic conferences to gather information and engage in discussions.	
Room	Genetic Testing Laboratory, South Laboratory, Research Institute, West A2nd Floor Conference Room, Endoscopy Room	
Special Note	For those who cannot participate in the above time, the time schedule will be decided after consultation. Questions will be accepted at any time. Feedback will be given at the final session.	
Course Plan	Number	Contents
	1	Achievement of Objectives 1–2
	~	
	90	
	91	Achievement of Objectives 3–4
	~	
	120	
	121	Achievement of Objectives 5
~		
150		

Hematology

I Educational Policy

Hematological diseases, such as leukemia, were once considered incurable but can now be cured thanks to recent remarkable advances in chemotherapy and hematopoietic stem cell transplantation therapy.

Hematologists are accountable for all stages of medical care, from diagnosis to chemotherapy and hematopoietic stem cell transplantation intended to cure diseases such as leukemia.

Although the work involves no small amount of hardship, the ability to use medical treatment to cure diseases such as leukemia is what makes being a hematologist a truly rewarding vocation.

The field of hematology is also suited to translational research due to the relative ease of collecting blood cells, which provides opportunities for pursuing "from the bench to the bedside" medicine.

Using clinical and foundational research to resolve problems that arise in the course of everyday care and passing the benefits of these achievements on to clinical settings is both the duty and privilege of the hematologist.

The basic educational policy of this department is to pursue research that will contribute toward the development of chemotherapies and transplant therapies, as well as new cell therapies and molecularly targeted therapies aimed at curing as many patients with intractable hematological diseases as possible.

II Objectives

- Gain wide-ranging knowledge of the diagnosis, pathogenesis, and treatment of hematological diseases.
- Acquire knowledge of the immune response in hematopoietic cell transplantation.
- Acquire knowledge of epigenetics and genetic abnormalities in oncogenes and tumor suppressor genes for hematopoietic malignancies.
- Acquire knowledge of the genetic mutations involved in polycythemia vera, essential thrombocythemia, myelofibrosis, and other conditions.
- Acquire knowledge of immune-evasion mechanisms in multiple myeloma.
- Propose and pursue a research plan based on acquired knowledge of hematological diseases.
 1. Perform the necessary experimental techniques and pursue research based on a proposed research plan.
 2. Correctly record and archive details of experiments and data.
 3. Appropriately summarize the results of experiments in tables and figures.
 4. Appropriately present and discuss research at external conferences and study groups.
 5. Write an academic paper on research and submit the paper for publication. Respond appropriately to reviewers' comments and successfully publish the paper.

III Supervisors and Research Themes

(* = for those with a medical practitioner's license)

Faculty Member	Research Theme
Professor and Head of division Tanaka	(1) Research the immune response in hematopoietic cell transplantation * Analyze the immune response to regulate GVHD and GVL in cases of hematopoietic cell transplantation used to cure refractory hematological malignancies.
Associate Professor Shiseki	(2) The significance and functional analysis of tumor-suppressor gene abnormalities in hematopoietic tumors * Elucidate the significance of tumor-suppressor gene abnormalities in hematopoietic tumors by attempting to introduce genes into tumor cell lines and analyze function.
Assistant Professor Yoshinaga	(3) Analyzing genetic mutations involved in causing and effecting pathological changes in myeloproliferative tumors, such as polycythemia vera, essential thrombocythemia, and myelofibrosis * Epidemiological investigation of causes, clinical symptoms, and complications.
Assistant Professor Shinohara	(4) Research the mechanisms of hematological malignancy recurrence after hematopoietic cell transplantation (HSC); analysis of specimens from the recurrence case after HSC * Epidemiological research of HSC in Japan using nationwide data to improve outcomes of HSC.

IV Syllabus

(* = for those with a medical practitioner's license)

Title	Supervisors	Credit	Theme
Diagnosis of Hematological Diseases*	Professor Tanaka, Associate Professor Shiseki, Assistant Professor Yoshinaga, Assistant Professor Shinohara	2	Seminars and discussion about the diagnosis of hematological diseases
Treatment of Hematological Diseases*	Professor Tanaka, Associate Professor Shiseki, Assistant Professor Yoshinaga, Assistant Professor Shinohara	2	Seminars and discussion about the treatment of hematological diseases
Pathophysiology of Hematological Diseases*	Professor Tanaka, Associate Professor Shiseki, Assistant Professor Yoshinaga, Assistant Professor Shinohara	1	Seminars and discussion about the pathophysiology of hematological diseases
Experiments and Practical Study (Project Study)*	Professor Tanaka, Associate Professor Shiseki, Assistant Professor Yoshinaga, Assistant Professor Shinohara	10	Conducting a project study and writing a research paper
Total credit		15	

Hematology Syllabus

(* = for those with a medical practitioner's license)

Syllabus Title	Diagnosis of Hematological Diseases		
Instructor(s)	Professor and Head of division Tanaka, Associate Professor Shiseki, Assistant Professor Yoshinaga, Assistant Professor Shinohara		
Supervisors	10		
Credit	2		
Format of Class	Lectures and exercises		
Theme	Seminars and discussion about the diagnosis of hematological diseases		
Schedule	Wednesday 09:00 to 10:10, 10:20 to 11:40		
Course Objective(s)	Gain wide-ranging knowledge of the diagnosis of hematological diseases.		
Evaluation Methods	Attendance (50%), Submitted reports on lecture contents (50%)		
Grading Scale	Five grades. S: 90 to 100 points. A: 80 to <90 points. B: 70 to <80 points. C: 60 to <70 points. D: <60 points. S, A, B, and C are passing grades. D is a failing grade.		
Textbooks/References	Hematology (Bunkodo), Textbook of Hematology (Nankodo)		
Independent Study Outside of Class	Reading the aforementioned references and related literature.		
Room	Conference room, etc.		
Special Note	For those unable to participate during the aforementioned times, a class schedule will be determined upon consultation. Questions will be accepted at any time. Feedback will be given at the final class.		
Course Plan	Number	Instructor(s)	Contents
	1	Junji Tanaka and other supervisors	Diagnosis of Hematological Diseases 1
	2	Junji Tanaka and other supervisors	Diagnosis of Hematological Diseases 2
	3	Junji Tanaka and other supervisors	Diagnosis of Hematological Diseases 3
	4	Junji Tanaka and other supervisors	Diagnosis of Hematological Diseases 4
	5	Junji Tanaka and other supervisors	Diagnosis of Hematological Diseases 5
	6	Junji Tanaka and other supervisors	Diagnosis of Hematological Diseases 6
	7	Junji Tanaka and other supervisors	Diagnosis of Hematological Diseases 7
	8	Junji Tanaka and other supervisors	Diagnosis of Hematological Diseases 8

Hematology Syllabus

(* = for those with a medical practitioner's license)

Syllabus Title	Treatment of Hematological Diseases		
Instructor(s)	Professor and Head of division Tanaka, Associate Professor Shiseki, Assistant Professor Yoshinaga, Assistant Professor Shinohara		
Supervisors	10		
Credit	2		
Format of Class	Lectures and exercises		
Theme	Seminars and discussion about treating hematological diseases		
Schedule	Wednesday 09:00 to 10:10, 10:20 to 11:40		
Course Objective(s)	Gain wide-ranging knowledge of the treatment of hematological diseases.		
Evaluation Methods	Attendance (50%), Submitted reports on lecture contents (50%)		
Grading Scale	Five grades. S: 90 to 100 points. A: 80 to <90 points. B: 70 to <80 points. C: 60 to <70 points. D: <60 points. S, A, B, and C are passing grades. D is a failing grade.		
Textbooks/References	Hematology (Bunkodo), Textbook of Hematology (Nankodo)		
Independent Study Outside of Class	Reading the aforementioned references and related literature.		
Room	Conference room, etc.		
Special Note	For those unable to participate during the aforementioned times, a time schedule will be determined upon consultation. Questions will be accepted at any time. Feedback will be given at the final class.		
Course Plan	Number	Instructor(s)	Contents
	1	Junji Tanaka and other supervisors	Treatment of Hematological Diseases 1
	2	Junji Tanaka and other supervisors	Treatment of Hematological Diseases 2
	3	Junji Tanaka and other supervisors	Treatment of Hematological Diseases 3
	4	Junji Tanaka and other supervisors	Treatment of Hematological Diseases 4
	5	Junji Tanaka and other supervisors	Treatment of Hematological Diseases 5
	6	Junji Tanaka and other supervisors	Treatment of Hematological Diseases 6
	7	Junji Tanaka and other supervisors	Treatment of Hematological Diseases 7
	8	Junji Tanaka and other supervisors	Treatment of Hematological Diseases 8

Hematology Syllabus

(* = for those with a medical practitioner's license)

Syllabus Title	Pathophysiology of Hematological Diseases		
Instructor(s)	Professor and Head of division Tanaka, Associate Professor Shiseki, Assistant Professor Yoshinaga, Assistant Professor Shinohara		
Supervisors	10		
Credit	1		
Format of Class	Lectures and exercises		
Theme	Seminars and discussion about the pathophysiology of hematological diseases		
Schedule	Wednesday 13:00 to 14:10		
Course Objective(s)	Gain wide-ranging knowledge of the pathophysiology of hematological diseases.		
Evaluation Methods	Attendance (50%), Submitted reports on lecture contents (50%)		
Grading Scale	Five grades. S: 90 to 100 points. A: 80 to <90 points. B: 70 to <80 points. C: 60 to <70 points. D: <60 points. S, A, B, and C are passing grades. D is a failing grade.		
Textbooks/References	Hematology (Bunkodo), Textbook of Hematology (Nankodo)		
Independent Study Outside of Class	Reading the aforementioned references and related literature.		
Room	Conference room, etc.		
Special Note	For those unable to participate during the aforementioned times, a class schedule will be determined upon consultation. Questions will be accepted at any time. Feedback will be given at the final class.		
Course Plan	Number	Instructor(s)	Contents
	1	Junji Tanaka and other supervisors	Pathophysiology of Hematological Diseases 1
	2	Junji Tanaka and other supervisors	Pathophysiology of Hematological Diseases 2
	3	Junji Tanaka and other supervisors	Pathophysiology of Hematological Diseases 3
	4	Junji Tanaka and other supervisors	Pathophysiology of Hematological Diseases 4
	5	Junji Tanaka and other supervisors	Pathophysiology of Hematological Diseases 5
	6	Junji Tanaka and other supervisors	Pathophysiology of Hematological Diseases 6
	7	Junji Tanaka and other supervisors	Pathophysiology of Hematological Diseases 7
	8	Junji Tanaka and other supervisors	Pathophysiology of Hematological Diseases 8

Hematology Syllabus

Syllabus Title	Experiments and Practical Study (Project Study)	
Instructor(s)	Professor and Head of division Tanaka, Associate Professor Shiseki, Assistant Professor Yoshinaga, Assistant Professor Shinohara	
Credit	10	
Format of Class	Experiments and practical study (project study)	
Theme	Conducting a project study and writing a research paper	
Schedule	Monday, Tuesday, Thursday, and Friday 09:00 to 12:00, 13:00 to 17:00. Wednesday 15:00 to 17:00	
Course Objective(s)	<ol style="list-style-type: none"> 1. To perform the necessary experimental techniques and pursue research based on a proposed research plan. 2. To correctly record and archive details of experiments and data. 3. To appropriately summarize the results of experiments in tables and figures. 4. To appropriately present and discuss research at external conferences and study groups. 5. To write an academic paper on the research, submit the paper for publication, respond appropriately to reviewers' comments, and successfully publish the paper. 	
Evaluation Methods	Experimental notes and research reports (60%), Preparation of figures and tables (10%), Presentation and discussion of research (10%). Academic paper writing (20%)	
Grading Scale	Five grades. S: 90 to 100 points. A: 80 to <90 points. B: 70 to <80 points. C: 60 to <70 points. D: <60 points. S, A, B, and C are passing grades. D is a failing grade.	
Textbooks/References	Original papers and review papers related to the project study	
Independent Study Outside of Class	Actively participating in, presenting at, gathering information from, and engaging in discussion at relevant academic conferences.	
Room	Hematology laboratory, etc.	
Special Note	Timing and duration of research will be determined upon consultation. Questions will be accepted at any time.	
Course Plan	Number	Contents
	Class 1	Attainment of course objectives 1 and 2
	...	
	Class 90	
	Class 91	Attainment of course objectives 3 and 4
	...	
	Class 120	
	Class 121	Attainment of course objective 5
...		
Class 150		

Rheumatology

I Educational Policy

With progress made in research on the etiology and pathology of systemic rheumatic diseases, treatment outcomes have improved in recent years. For rheumatoid arthritis in particular, the practical application of molecular targeted therapies, mainly biologics, has made it possible to treat patients curatively, and this has significantly improved their QOL. The clinical developments of a wide range of molecularly targeted therapies are underway for other systemic rheumatic diseases, and the need for research results that connect work–bench to bedside is becoming increasingly important. With this in mind, graduate education in our department aims to foster researchers who understand both basic and clinical medical research in the field of rheumatology, and who can plan, execute, and lead, advanced and internationally–acclaimed research. In basic medical research, the aim is for students to understand systemic rheumatic diseases at the molecular level and to acquire the ability to discover new etiologies and pathologies. In clinical medical research, the aim is for students to acquire an understanding of clinical epidemiology and biostatistics and the ability to create and communicate new evidence based on ethical and scientific clinical research. Considering the characteristics of systemic rheumatic diseases, with their complex pathology and long–term treatment, we believe that not only is the acquisition of natural scientific knowledge required, but also a broad, social perspective, a rich sense of humanity, and excellent communication skills. The goal of this course is, therefore, to train physician scientists and researchers who have these skills and qualities.

II Goals

1. To understand and explain the etiology and pathology of major systemic rheumatic diseases at the molecular level.
2. To understand and explain the diagnostic criteria and diagnostic methods for major systemic rheumatic diseases.
3. To understand and explain the mechanism of action, efficacy, and safety of major therapeutic drugs used for systemic rheumatic diseases, and to be able to use them.
4. To understand and explain the prognosis for major systemic rheumatic diseases.
5. To acquire basic knowledge of clinical epidemiology and to be able to critically examine existing research papers as well as to plan/execute scientific clinical research.
6. To acquire basic knowledge of biostatistics and to be able to critically examine research papers, as well as to plan/execute scientific clinical research.
7. To acquire basic knowledge of molecular biology and molecular genetics, and to be able to plan/ execute scientific research.
8. To understand the laws and guidelines related to medical research, and to be able to plan/execute an appropriate research plan that complies with the same.
9. To be able to actively interact with domestic and international researchers through presentations of research results at conferences and the publication of papers.
10. To acquire a high level of communication skills and to be able to educate and guide younger students.

III Supervisor• Research theme

(* = for doctor's license holders)

Name and position	Research theme
Masayoshi Harigai	1. Efficacy and safety of molecularly targeted therapies in rheumatoid arthritis. A multicenter study of rheumatoid arthritis patients will be conducted to analyze the efficacy and safety of molecularly targeted therapies using a longitudinal clinical database. An efficacy analysis will identify factors associated with specific treatment outcomes, and a safety analysis will identify risk factors for adverse events. Appropriate treatment strategies based on these factors will be developed. 2. Molecular genetic and clinical epidemiological studies on ANCA–associated vasculitis (AAV), and the development of novel molecular targeted therapies. A genome–wide association analysis and whole genome sequencing analysis of Japanese AAV patients will be conducted to establish their molecular genetic characteristics. Physician–led clinical trials with tocilizumab will be carried out, with the aim of applying for regulatory approval.
Yasushi Kawaguchi	Research on the pathology, diagnosis, and treatment of systemic scleroderma. 1. Research aimed at elucidating the pathology of fibrosis in systemic scleroderma. Patient–derived fibroblasts will be cultured and the biological features that promote that fibrosis will be studied. 2. Research on the genetic background of systemic scleroderma. Patient–specific genetic polymorphisms will be investigated and their involvement in the pathology of systemic scleroderma will be studied. 3. Research on the development of novel therapeutic agents. Fibroblasts or mouse models will be used to comprehensively screen for molecules with anti–fibrotic properties, with the aim of clinical application.

Eiichi Tanaka	<p>1. Clinical epidemiological study on rheumatoid arthritis. A database of 3,000 patients with rheumatoid arthritis currently receiving care at our center, and recorded for 21 years from the year 2000 (total of 110,000 person-years) will be used, and clinical research will be conducted to address various clinical questions related to the treatment of rheumatoid arthritis. In particular, instruction will be given with an emphasis on originality, in which graduate students are expected to come up with insightful clinical questions as part of their daily clinical practice, and to solve these issues using novel approaches.</p> <p>2. Healthcare economics research on rheumatoid arthritis. Although significant progress has been made in terms of the treatment strategies for rheumatoid arthritis, such as the introduction of biologics, there are concerns that the cost of rheumatoid arthritis care will rise further, placing a heavy burden not only on patients but also on society. Using a database of 6,000 patients with rheumatoid arthritis currently receiving care at this center, a multifaceted analyses will be conducted of direct costs, indirect costs such as labor loss, and the cost-effectiveness of high-cost drugs, with the aim of achieving optimization of medical care from a healthcare economic perspective.</p>
Yasuhiro Katsumata	<p>1. Research on the pathology, diagnosis, and treatment of systemic lupus erythematosus. Research on the pathology will be conducted, using serum from patients with systemic lupus erythematosus, as well as other research involving a search for biomarkers and studies using mouse models. An international collaborative study on remission, low disease activity and QoL, using data from an international multicenter study in the Asian Pacific region (The Asia Pacific Lupus Collaboration) will be carried out.</p> <p>2. Research on the pathology, diagnosis, and treatment of polymyositis and dermatomyositis. Research on the pathology of and search for biomarkers in polymyositis and dermatomyositis will be carried out using serum from patients with these diseases. In addition, clinical and epidemiological research using our department's clinical database will be carried out.</p>
Takako Nunomura	<p>Research on the pathology, diagnosis, and treatment of pediatric rheumatic diseases. Pediatric rheumatic diseases have come to be referred to as rare diseases (intractable diseases). An understanding of the actual situation is becoming clearer through disease registration of all cases. Diseases are wide-ranging, including juvenile idiopathic arthritis, childhood-onset SLE, and autoinflammatory diseases. An understanding of the differences in pathology and treatment between adult-onset and childhood-onset diseases will be gained.</p>
Yuko Okamoto	<p>Research on the etiology and prevention of rheumatoid arthritis. Pathological research on the pathogenesis of rheumatoid arthritis will be conducted using clinical specimens obtained from individuals at high risk of developing this disease in the future. Autoantibodies in patients' serum will be measured, genetic factors will be identified, profiling of peripheral blood immune cells will be carried out, and oral and intestinal bacterial flora will be examined to identify new targets for preventing the onset of rheumatoid arthritis.</p>
Tomoaki Higuchi	<p>1. Research on the pathology, diagnosis, and treatment of systemic scleroderma. Analysis will be conducted using our department's clinical database of systemic scleroderma to clarify the clinical characteristics and the temporal changes brought about by treatment. In addition, a search will be conducted for candidate molecules for anti-fibrotic drugs using patient-derived skin fibroblasts and scleroderma model mice, to lead to the development of new therapeutic agents.</p> <p>2. Clinical epidemiological research on rheumatoid arthritis. Research to resolve clinical questions will be conducted using the IORRA cohort, a database of rheumatoid arthritis patients receiving care at our hospital.</p> <p>3. Operation and utilization of the Vasculitis Registry. Data obtained from the JPVAS Vasculitis Prospective Cohort Study, which is a multicenter collaborative study, will be analyzed, with the aim of elucidating the pathology and treatment of vasculitis.</p>
Ryoko Sakai	<p>Pharmacoepidemiological study of rheumatic diseases using a large database. By using big data such as receipt data, which has been actively utilized in recent years, the actual status of the medical treatment of rheumatic diseases such as rheumatoid arthritis, and the safety of drugs will be clarified. Through this study, the aim is to obtain basic data on the status and disparities in medical treatment for rheumatic diseases in Japan, which will hopefully lead to the standardization of medical treatment for these disorders.</p>

IV Syllabus

(* = for doctor's license holders)

Title	Instructor	Credit	Theme
Rheumatoid arthritis	Eiichi Tanaka Yuko Okamoto	1	Etiology, pathology, diagnosis and treatment for rheumatoid arthritis (RA) and RA-related diseases
Connective tissue diseases	Masayoshi Harigai Yasushi Kawaguchi Yasuhiro Katsumata	2	Etiology, pathogenesis, diagnosis and treatment in connective tissue diseases including systemic lupus erythematosus, polymyositis/dermatomyositis, vasculitides and systemic sclerosis
Pediatric rheumatic diseases	Takako Nunomura	1	Etiology, pathogenesis, diagnosis, and treatment of pediatric rheumatic diseases
Pharmacoepidemiology of rheumatic diseases	Masayoshi Harigai Ryoko Sakai	1	Pharmacoepidemiology and basic biostatistics, application of these knowledge to epidemiological studies for systemic rheumatic diseases
Experiment, practical training (research task)	Masayoshi Harigai Yasushi Kawaguchi Eiichi Tanaka Takako Nunomura Yasuhiro Katsumata Yuko Okamoto Tomoaki Higuchi Ryoko Sakai	10	Perform the research task and write the thesis
Total credits		15	

Rheumatology Syllabus (1)

Syllabus Title	Rheumatoid arthritis		
Instructor	Eiichi Tanaka, Yuko Okamoto		
Credit	1		
Type of Class	Lecture		
Theme	Etiology, pathology, diagnosis and treatment for rheumatoid arthritis (RA) and RA-related diseases		
Schedule	Tuesday, 13: 30-15: 00		
Course Objective	<ol style="list-style-type: none"> 1. Understand and explain the disease concept and etiology of rheumatoid arthritis. 2. Understand and explain the molecular pathology of rheumatoid arthritis. 3. Understand and practice (explain if you are not a doctor) the diagnostic method for rheumatoid arthritis. 4. Understand and practice (explain if you are not a doctor) drug treatment for rheumatoid arthritis. 5. Understand and explain the development of new therapeutic drugs for rheumatoid arthritis. 6. Explain the progress of clinical epidemiological research on rheumatoid arthritis. 		
Evaluation Methods	Video attendance (70%) Report submission (30%)		
Grading Scale	A perfect score of 100 points, a score of 60 or more is passed, and a score of less than 60 is failed. (S: 100-90%、A: 89-80%、B: 79-70%、C: 69-60%、D: 59-0%)		
Textbooks/References	Rheumatology (Ed by Hochberg MC et al, 7th edition, Elsevier) Kelley and Firestein's Textbook of Rheumatology (Ed by Firestein et al, Elsevier, 10th edition) The EULAR Textbook on Rheumatic diseases (BMJ, 2nd edition) Rheumatoid disease medical care visual text (Yukio Ueno, 2nd edition, Igaku-shoin) Use of evidence based medicine in clinical practice: Rheumatic disease-4th edition (Ed by Harigai et al, Medical View Co., Ltd.)		
Independent Study Outside of Class	Understand the knowledge up to the present time using the literature etc. in advance regarding the theme of the lesson plan. Read the above reference books and related literatures and attend class. Students themselves conduct experiments and surveys to solve problems regarding the points that received guidance or suggestions related to the research theme.		
Room	Former building of Institute of Rheumatology Center, 3rd Floor		
Special Note	If students cannot participate in the lecture on the above time, we will decide the timetable after consultation. We accept questions at any time. We will give feedback in the final lecture.		
Course Plan	Number	Instructor	Contents
	1	Eiichi Tanaka, Yuko Okamoto	Pathology of rheumatoid arthritis 1 (preclinical RA)
	2	Eiichi Tanaka, Yuko Okamoto	Pathology of rheumatoid arthritis 2
	3	Eiichi Tanaka	Diagnosis of rheumatoid arthritis
	4	Eiichi Tanaka	Evaluation of rheumatoid arthritis
	5	Eiichi Tanaka	Drug treatment for rheumatoid arthritis 1
	6	Eiichi Tanaka	Drug treatment for rheumatoid arthritis 2
	7	Eiichi Tanaka	Pharmacoeconomics study of Rheumatoid Arthritis 1
	8	Eiichi Tanaka	Pharmacoeconomics study of Rheumatoid Arthritis 2

Rheumatology Syllabus (2)

Syllabus Title	Connective tissue diseases		
Instructor	Masayoshi Harigai, Yasushi Kawaguchi, Yasuhiro Katsumata, Tomoaki Higuchi		
Credit	2		
Type of Class	Lecture		
Theme	Etiology, pathogenesis, diagnosis and treatment in connective tissue diseases including systemic lupus erythematosus, polymyositis/dermatomyositis, vasculitides and systemic sclerosis		
Schedule	Yasuhiro Katsumata: Tuesday, 10:25 – 11:35 a.m.; Yasushi Kawaguchi: Thursday, 2:00 to 3:10 p.m.; Masayoshi Harigai: Monday 10:00 to 11:10 a.m.		
Course Objective	<ol style="list-style-type: none"> 1. To understand and explain the etiology and pathogenesis of systemic lupus erythematosus. 2. To understand and practice (or explain if not a physician) the diagnosis and treatment of systemic lupus erythematosus 3. To understand and explain the etiology and pathogenesis of polymyositis and dermatomyositis. 4. To understand and practice (or explain if not a physician) the diagnosis and treatment of polymyositis and dermatomyositis. 5. To understand and explain the etiology and pathogenesis of vasculitides 6. To understand and practice (or explain if you are not a physician) the diagnosis and treatment of vasculitides 7. To understand and explain the etiology and pathogenesis of systemic sclerosis. 8. To understand and practice (or explain if not a physician) the diagnosis and treatment of systemic sclerosis 		
Evaluation Methods	Video audition (70%), report submission (30%)		
Grading Scale	A score of 100 points is the maximum score, a score of 60 points or higher is a passing score, and a score of less than 60 points is a failing score. (S: 100–90%, A: 89–80%, B: 79–70%, C: 69–60%, D: 59–0%)		
Textbooks/References	Rheumatology, 6th Ed., Elsevier, Dubois Lupus Erythematosus and Related Syndromes, 9th Ed., Elsevier, Oxford Textbook of Vasculitis, 3rd Ed., Oxford, Myositis (Oxford Rheumatology Library), Oxford Univ Press, 第4版 EBMを活かす膠原病・リウマチ診療(メディカルビュー社) (in Japanese)		
Independent Study Outside of Class	<ol style="list-style-type: none"> 1. Understanding the current knowledge in the theme of the course plan through the literature etc. 2. Reading the above reference books and related literature before the lecture. 3. Conducting additional experiments and investigations by students themselves regarding points that were instructed or pointed out. 		
Room	3rd floor of the building of former Institute of Rheumatology		
Special Note	For those who cannot participate in the above time, the schedule will be changed after consultation. Questions will be accepted at any time. Feedback will be given at the final session.		
Course Plan	Number	Instructor	Contents
	1	Masayoshi Harigai, Yasushi Kawaguchi, Yasuhiro Katsumata	Etiology and pathogenesis of systemic lupus erythematosus
	2	Masayoshi Harigai, Yasushi Kawaguchi, Yasuhiro Katsumata	Diagnosis and treatment of systemic lupus erythematosus
	3	Masayoshi Harigai, Yasushi Kawaguchi, Yasuhiro Katsumata	Etiology and pathogenesis of polymyositis and dermatomyositis
	4	Masayoshi Harigai, Yasushi Kawaguchi, Yasuhiro Katsumata	Diagnosis and treatment of polymyositis and dermatomyositis
	5	Masayoshi Harigai, Yasushi Kawaguchi, Yasuhiro Katsumata	Etiology and pathogenesis of vasculitides
	6	Masayoshi Harigai, Yasushi Kawaguchi, Yasuhiro Katsumata	Diagnosis and treatment of vasculitides
	7	Masayoshi Harigai, Yasushi Kawaguchi, Yasuhiro Katsumata	Etiology and pathogenesis of systemic sclerosis
	8	Masayoshi Harigai, Yasushi Kawaguchi, Yasuhiro Katsumata	Diagnosis and treatment of systemic sclerosis

Rheumatology Syllabus (3)

Syllabus Title	Pediatric rheumatic diseases		
Instructor	Takako Nunomura		
Credit	1		
Type of Class	lecture		
Theme	Etiology, pathogenesis, diagnosis, and treatment of pediatric rheumatic diseases		
Schedule	Monday, 10:30–11:40 a.m.		
Course Objective	<ol style="list-style-type: none"> 1. Understand and explain the characteristics and classification of pediatric rheumatic diseases. 2. Understand and explain the disease concept, etiology, and molecular pathogenesis of juvenile idiopathic arthritis. 3. Understand and practice (or explain if you are not a physician) the diagnosis and drug treatment of juvenile idiopathic arthritis. 4. Understand and explain the disease concept, etiology, and molecular pathogenesis of autoinflammatory diseases. 5. Understand and practice (or explain if not a physician) the diagnosis and pharmacotherapy of autoinflammatory diseases. 6. To understand and explain the etiology and pathogenesis of childhood collagen diseases. 7. Understand and practice (or explain if not a physician) the diagnosis and treatment of pediatric collagen diseases. 		
Evaluation Methods	Video auditing (70%) Report submission (30%)		
Grading Scale	A score of 100 is the maximum score, and a score of 60 or higher is a passing score, and a score of less than 60 is a failing score. (S: 100–90%, A: 89–80%, B: 79–70%, C: 69–60%, D: 59–0%)		
Textbooks/References	Textbook of Pediatric Rheumatology, 7th (Elsevier), Handbook of Juvenile Idiopathic Arthritis 2017, Guidelines for the Treatment of Autoinflammatory Diseases 2017		
Independent Study Outside of Class	<p>Understand the current state of knowledge on the topic of the class plan through literature, etc. in advance. Read the above reference books and related literature before attending class. Conduct experiments and investigations on their own to solve problems that they have been instructed or pointed out in relation to their research.</p>		
Room	Third floor of the former Institute of Rheumatology, Tokyo Women's Medical University		
Special Note			
Course Plan	Number	Instructor	Contents
	1	Takako Nunomura	Disease concept, etiology, and molecular pathogenesis of juvenile idiopathic arthritis 1
	2	Takako Nunomura	Disease concept, etiology, and molecular pathogenesis of juvenile idiopathic arthritis 2
	3	Takako Nunomura	Diagnosis and treatment of juvenile idiopathic arthritis
	4	Takako Nunomura	Disease concept, etiology, and molecular pathogenesis of autoinflammatory diseases
	5	Takako Nunomura	Diagnosis and treatment of autoinflammatory diseases
	6	Takako Nunomura	Etiology, pathogenesis, diagnosis, and treatment of pediatric connective tissue diseases 1
	7	Takako Nunomura	Etiology, pathogenesis, diagnosis, and treatment of pediatric connective tissue diseases 2
	8	Takako Nunomura	Etiology, pathogenesis, diagnosis, and treatment of pediatric connective tissue diseases 3

Rheumatology Syllabus (4)

Syllabus Title	Pharmacoepidemiology of rheumatic diseases		
Instructor	Masayoshi Harigai, Ryoko Sakai		
Credit	1		
Type of Class	lecture		
Theme	Pharmacoepidemiology and basic biostatistics, application of this knowledge to epidemiological studies for systemic rheumatic diseases		
Schedule	10:00–11:20 on Monday		
Course Objective	<ol style="list-style-type: none"> 1. Understanding and explanation of terminology in pharmacoepidemiology 2. Understanding and explanation of terminology in biostatistics 3. Understanding and explanation of observational study 4. Understanding and explanation of interventional study 5. Appropriate processing of the database for the study objectives 6. Understanding and application of parametric and non-parametric tests 7. Understanding and application of survival analysis 8. Understanding and application of univariable and multivariable analysis 9. Scientific planning and implementation of the epidemiological study for rheumatic diseases using the epidemiological and statistical knowledge and techniques 		
Evaluation Methods	Video lecture attendance (70%), reports (30%)		
Grading Scale	100 points: perfect score, ≥ 60 points: acceptance, < 60 : failure		
Textbooks/References	Epidemiology (Kenneth Rothman), Clinical Epidemiology (Fletcher RW, Fletcher SW), Textbook of pharmacoepidemiology (Brian L. Strom)		
Independent Study Outside of Class	Reading the textbooks and references before the attendance of lecture and understanding latest knowledge of the theme in articles. To investigate and solve the points and problems in the study.		
Room	3rd floor in the building of division of rheumatology		
Special Note	If students cannot attend on the above schedule (10:00–12:00 on Monday), the timeschedule will be determined after consultation. Questions will be accepted at any time. Feedbacks will be provided to students in the last lecture.		
Course Plan	Number	Instructor	Contents
	1	Harigai M, Sakai R	Basic pharmacoepidemiology_1
	2	Harigai M, Sakai R	Basic pharmacoepidemiology_2
	3	Harigai M, Sakai R	Basic biostatistics: basic statistics, parametric test, non-parametric test, cross table
	4	Harigai M, Sakai R	Applied biostatistics: survival analysis, multivariable analysis
	5	Harigai M, Sakai R	Pharmacoepidemiological studies in rheumatoid arthritis_1
	6	Harigai M, Sakai R	Pharmacoepidemiological studies in rheumatoid arthritis_2
	7	Harigai M, Sakai R	Epidemiological study of rheumatic diseases: from clinical question to presentation_1
	8	Harigai M, Sakai R	Epidemiological study of rheumatic diseases: from clinical question to presentation_2

Rheumatology Syllabus (5)

(* = for doctor's license holders)

Syllabus Title	Experiment, practical training (research task)		
Instructor	Masayoshi Harigai, Yasushi Kawaguchi, Eiichi Tanaka, Takako Miyamae (Nunomura), Yasuhiro Katsumata, Yuko Okamoto, Tomoaki Higuchi, Ryoko Sakai (Part-time)		
Credit	10		
Type of Class	Experiment, practical training (research task)		
Theme	Perform the research task and write the thesis		
Schedule	From Monday to Friday, 9AM to 12AM and 1PM to 5PM		
Course Objective	<ol style="list-style-type: none"> 1. Explain and discuss scientific backgrounds of the research theme 2. Explain and discuss recent papers and meeting presentations related to the research, and explain the significance of the research theme 3. Make proper plans for the methods of the research and submit an application to the Ethics Committee 4. Record the contents and data of the research appropriately 5. Summarize the results of the research properly using figures and tables 6. Present and discuss the own research at international and domestic scientific meetings 7. Understand the general formats of papers, and summarize the results of the own research 8. Following the submission of the manuscripts, respond to the reviewers' opinions together with the academic instructor 		
Evaluation Methods	Lab notebook and research report (40%), research presentation and discussion (20%), discussion about other students' research presentation (10%), preparation of figures and tables (10%), and writing of the thesis (20%)		
Grading Scale	A passing score is a score of 60 or more out of 100, and less than 60 results in failure (S: 100-90%, A: 89-80%, B: 79-70%, C: 69-60%, D: 59-0%)		
Textbooks/References	English Journals about general medicine and rheumatology such as Ann Rheum Dis, Arthritis Rheumatol, Arthritis Care Res, and Mod Rheumatol		
Independent Study Outside of Class	Discuss periodically with the academic advisor on the research and the thesis. Join scientific meetings actively. Present the research, collect information, and discuss with other investigators at the meetings.		
Room	3rd floor of the ex-institution of rheumatology		
Special Note	Time schedules are arranged for those who cannot follow the regular schedules. Feel free to contact the academic instructor anytime.		
Course Plan	Number	Instructor	Contents
	1		Accomplishment of course objectives 1 to 2
	~		
	90		
	91		Accomplishment of course objectives 3 to 4
	~		
	120		
	121		Accomplishment of course objectives 5 to 7
	~		
150			

General Medicine

I Educational Policy

Greetings from Professor Yousuke C. Takemura

“Ambition” and “Passion”

Keys for Family Medicine/General Medicine

Share your “Ambition” with us.

You may think it impossible to become true.

Believe me, we are here for you.

We can take it with all our strength and our heart

Exert your passionate ebullience

We are ready to support you.

Professor Yousuke C. Takemura

Department of General Medicine

Tokyo Women’s Medical University Graduate School of Medicine

II Goals

The Department of General Medicine provides education and research for Tokyo Women’s Medical University Graduate School of Medicine. The department accepts international students from all over the world.

In our department of the graduate school, we want students to learn how to resolve problems in the real community via research. Our research should not be mere finding or exploring the facts but contribute towards people in communities. Research is only one of the tools for resolving problems in communities, improving clinical practices, and contributing to patients and people in community. Therefore, we should keep in our mind to implement the research findings into the real world.

III Supervisor•Research theme

(* = for doctor’s license holders)

Name and position	Research theme
<p>Yousuke TAKEMURA, MD, PhD</p>	<p>The Department of General Medicine, TWMU Graduate School of Medicine conducts research several themes in general medicine/family medicine, communication, community medicine, and medical education. We especially focus on the behavioral aspects of patients and medical professionals, as well as collaborations between specialties or healthcare professionals. We use both quantitative and qualitative approaches.</p> <p>The examples of ongoing research are as follows:</p> <ol style="list-style-type: none"> 1. Research on the relationship between the characteristic (patient centeredness, comprehensiveness, cooperation, etc.) of physicians and patients’ medical seeking behavior or their health status 2. Research on non-verbal communication (facial expression and voice) using artificial intelligence (AI) 3. Research to confirm reliability and validity of questionnaires 4. Other research of family medicine/general medicine

IV Syllabus

(* = for doctor's license holders)

Title	Instructor	Credit	Theme
lectures 'General Medicine Research'	Yousuke TAKEMURA, MD, PhD	2	<p>To enable students to fulfill our aims above mentioned, we provide didactic lectures about general medicine/family medicine, biostatistics, clinical epidemiology, qualitative research, how to build questionnaire and so on. However, attending these lectures for students is not enough to resolve problems in communities and they should: approach the target community or field; get familiar with the people living there; feel known or unknown needs from the people living there; and suggest some resolution for their needs or problems. These processes require students not only technical and academic skills, but also communication or social skills. As well, these processes train students to learn by their own mistakes. Therefore, we provide students safe environments to think their own interests for themselves.</p>
research works 'General Medicine Research'	Yousuke TAKEMURA, MD, PhD	13	<p>To enable students to fulfill our aims above mentioned, we provide didactic lectures about general medicine/family medicine, biostatistics, clinical epidemiology, qualitative research, how to build questionnaire and so on. However, attending these lectures for students is not enough to resolve problems in communities and they should: approach the target community or field; get familiar with the people living there; feel known or unknown needs from the people living there; and suggest some resolution for their needs or problems. These processes require students not only technical and academic skills, but also communication or social skills. As well, these processes train students to learn by their own mistakes. Therefore, we provide students safe environments to think their own interests for themselves.</p>
Total credits		15	

Psychiatry

I Educational policies

Psychiatry is a field of clinical medicine that deals with a wide range of human cognitive and behavioral functions, from mental disorders to the general mental health of healthy individuals. The tools of inquiry used in psychiatry similarly range from traditional (e.g., physiology, biochemistry, pharmacology, and public health) to humanistic (e.g., psychology), cognitive-behavioral sciences, and computer analysis. Understanding and treating mental disorders has also become increasingly necessary, as these disorders are some of the most damaging to human health in the 21st century. The field of psychiatry has, therefore, greatly expanded, and is now a field from which society holds high expectations to produce accurate research and results, such as the clear elucidation of disease states and treatments. Students motivated to do research can achieve a great sense of academic fulfilment and achievement should they choose to study psychiatry, as there is no shortage of interesting topics.

II Achievement goals

1. To deepen knowledge and skills concerning symptoms and signs of mental disorders, pathophysiology, and laboratory tests, as well as the diagnostic imaging necessary for differential diagnosis.
2. To enhance knowledge and skills on rational pharmacotherapy for mental disorders, psychotherapy emphasize individuality and psychosocial therapy.
3. To acquire knowledge and skills in consultation-liaison psychiatry and understand treatment cooperation with other departments and team medical treatment.
4. To cultivate the ability to conduct advanced and original clinical and basic research.
5. To present the research results at conferences and to formulate a formal academic paper on this topic.
6. To have an interest in research in and across various psychiatric fields, and to acquire the ability to guide younger/novice researchers in their research endeavors.

III Research instructors/research topics

(* = Applicable to those with medical licenses)

Instructor name	Research topics
Professor Nishimura	<p>1) Organ donation decision-making and psychosocial outcomes in living organ transplantation No adequate investigation has been conducted in the decision-making of live-donor organ donation and psychosocial outcomes after a transplantation. Factors related to the decision-making process regarding live-donor organ donation, as well as factors related to donor satisfaction, such as a psychosocial outcome index after transplantation, are examined in a prospective cohort. The results of this study are expected to provide guidance for psychosocial assistance to donors.</p>
Professor Nishimura	<p>2) Establishing a comprehensive approach to the prevention and treatment of delirium Currently, as the aging of the Japanese population is significant, delirium is becoming an important problem facing psychiatry consultation in both general and university hospitals. However, evidence of pharmacotherapy and non-pharmacotherapy for the treatment of delirium remains insufficient. This research is, therefore, promoting clinical research regarding treatment algorithm preparation through cooperative research with other facilities. In addition, Professor Nishimura has been conducting clinical research related to the prevention of delirium in recent years.</p>
Associate Professor Akaho	<p>3) Study on the system of liaison for psychiatric patients to receive standard medical treatment* If patients with a mental disorder, such as schizophrenia or bipolar, have a physical disorder, there may be cases where they cannot receive standard physical treatment. Some of the causes for this include: 1) uncontrolled psychiatric symptoms, 2) insufficient understanding and/or prejudice surrounding mental disorders by those in the general medical department, and 3) insufficient cooperation between the general medical and psychiatry departments. Therefore, the liaison system necessary for psychiatric patients to receive standard physical treatment is being examined.</p>

Associate Professor Akaho	<p>4) Palliative care systems that are effective in treating cardiovascular diseases Previously, palliative care was practiced primarily in the treatment of cancer and HIV. However, the frequency of circulatory diseases is high in Japan, and it has been found that there is a peculiar stress in the advanced stages of such diseases. Therefore, alleviation of the psychological symptoms of the circulatory disease patient is required. Thus, the palliative care system that could prove to be the most effective in treating circulatory diseases is being examined.</p>
Associate Professor Oshibuchi	<p>5) Emotional memory impairment in schizophrenia model animals In methamphetamine-treated animals, which are asserted to present the animal model of schizophrenia, it was found that amygdala dopamine release increased during stress loading. This finding suggests the presence of emotional memory impairment. Using this model, Professor Oshibuchi examines the effectiveness of various drugs in addressing emotional memory impairment.</p>
Associate Professor Oshibuchi	<p>6) Support for the selection of treatment for patients with organ failure Patients with organ failure are often provided with extensive medical information while facing periods of severe psychological stress. Then these patients are burdened with selecting important treatments that will affect their prognosis. Therefore, a tool for conducting interactive psychiatric support for medical professionals and patients under such conditions is being developed in such a way as to aid patients in processing the information offered to them, as well as to help medical professionals effectively present such information to their patients.</p>
Associate Professor Oshibuchi	<p>7) The relationship between intelligence tests, psychiatric symptoms, and life difficulties Neurodevelopmental disorders are suggested to cause the impairment of cognitive function, even in individuals with "normal" intelligence. However, the relationship between such cognitive dysfunction and learning difficulties, mental symptoms, such as tantrums, anxiety, depression, and truancy, and general life difficulties is currently unclear. Therefore, interventions are generally based on empirical knowledge of each disease, rather than on individual characteristics of cognitive function. In this research, basic knowledge is created for the development of intervention methods based on individual cognitive functions by clarifying the relationship between the results of intelligence test and clinical observation.</p>

IV Syllabus

(* = Applicable to those with medical licenses)

Items	Instructors	Unit	Topics
Diagnostics in psychiatry	Professor Nishimura, Associate Professor Akaho, and Professor Oshibuchi	1	Symptoms and diagnosis of mental disorders
Therapeutics in psychiatry	Professor Nishimura, Associate Professor Akaho, and Associate Professor Oshibuchi	2	Treatment of mental disorders (pharmacotherapy, non-pharmacotherapy)
Consultation-liaison psychiatry	Professor Nishimura, Associate Professor Akaho, and Associate Professor Oshibuchi	2	Foundations and practices of consultation-liaison psychiatry
Experiments and practices (research work)	Professor Nishimura, Associate Professor Akaho, Associate Professor Oshibuchi, and Assistant Professor Muraoka	10	Implementation of project study and the preparation of research papers
Total		15	

Psychiatry Syllabus

(* = Applicable to those with medical license)

Course title	Diagnostics in psychiatry		
Instructors	Professor Nishimura, Associate Professor Akaho, and Associate Professor Oshibuchi		
Unit count	1		
Lesson format	Lectures and seminars		
Topic	Lectures and seminars on the diagnosis of mental disorders.		
Class times	Mondays, 9:00 AM to 12:00 PM; 1:00 PM to 5:00 PM.		
Achievement targets	Acquire the correct diagnostic knowledge regarding symptoms, tests, and differential diagnoses for organic mental disorders, schizophrenia, mood disorders, stress-related and neurotic disorders, personality disorders, developmental disorders, and intellectual disabilities.		
Grading system	Attendance (50%), reports (50%).		
Grading definition	There are five grades of evaluation: S (90-100 points), A (80-90 points), B (70-80 points), C (60-70 points), and D (<60 points). Achieving S, A, B, or C is equivalent to a pass, while achieving D results in a fail.		
Textbooks/ reference texts	Standard Psychiatry, Igaku Shoin, 2015 DSM-5 Diagnostic and Statistical Manual of Mental Disorders, Igaku Shoin, 2013.		
Study preparations and out-of-classroom study methods	Read the reference bibliography in your own time and according to the given lesson plans and then look up and read the indicated literature.		
Class location	South Hospital Ward 2F, Conference Room; South Hospital Ward 2F, Reference Room		
Notes	Those who are unable to attend the class at the scheduled times (see above) must determine their timetable by consultation. Questions may be asked at any time. Feedback will be provided during the final lesson.		
Lesson plan	Lesson	Instructor	Content
	1	Professor Nishimura	General Principles of Psychiatry and Diagnosis
	2	Professor Nishimura	Psychiatric Symptomatology
	3	Professor Nishimura	Symptoms and Diagnoses of Organic Mental Disorders
	4	Associate Professor Oshibuchi	Symptoms and Diagnoses of Mental Disorders in the Elderly (Including Dementia)
	5	Associate Professor Oshibuchi	Symptoms and Diagnosis of Schizophrenia
	6	Associate Professor Oshibuchi	Symptoms and Diagnoses of Mood Disorders
	7	Associate Professor Akaho	Symptoms and Diagnoses of Stress-Related and Neurological Disorders
	8	Associate Professor Akaho	Symptoms and Diagnoses of Personality Disorders
	9	Associate Professor Akaho	Symptoms and Diagnoses of Developmental Disorders
10	Associate Professor Akaho	Symptoms and Diagnoses of Intellectual Disabilities	

Psychiatry Syllabus

(* = Applicable to those with medical license)

Course title	Therapeutics in psychiatry		
Instructors	Professor Nishimura, Associate Professor Akaho, and Associate Professor Oshibuchi		
Unit count	2		
Lesson format	Lectures and seminars		
Topic	Lectures and seminars on the diagnosis of mental disorders		
Class times	Mondays, 9:00 AM to 12:00 PM; 1:00 PM to 5:00 PM		
Achievement targets	Acquire knowledge of the correct therapeutics, including pharmacotherapy and non-pharmacotherapy (e.g., psychotherapy and psychosocial therapy), for organic mental disorders, schizophrenia, mood disorders, stress-related and neurotic disorders, personality disorders, developmental disorders, and intellectual disabilities.		
Grading system	Attendance (50%), reports (50%)		
Grading definition	There are five grades of evaluation: S (90-100 points), A (80-90 points), B (70-80 points), C (60-70 points), and D (<60 points). Achieving S, A, B, or C is equivalent to a pass, while achieving D results in a fail.		
Textbooks/ reference texts	Standard Psychiatry, Igaku Shoin, 2015 DSM-5 Diagnostic and Statistical Manual of Mental Disorders, Igaku Shoin, 2013		
Study preparations and out-of-classroom study methods	Read the reference bibliography in your own time and according to the given lesson plans and then look up and read the indicated literature.		
Class location	South Hospital Ward 2F, Conference Room; South Hospital Ward 2F, Reference Room.		
Notes	Those who are unable to attend the class at the scheduled times (see above) must determine their timetable by consultation. Questions may be asked at any time. Feedback will be provided during the final lesson.		
Lesson plan	Lesson	Instructor	Content
	1	Professor Nishimura	General Principles of Psychiatry and Therapeutics
	2	Professor Nishimura	Basis of Psychiatric Drug Therapy
	3	Professor Nishimura	Basis of Psychotherapy
	4	Professor Nishimura	Basis of Psychosocial Treatment in Psychiatry
	5	Associate Professor Oshibuchi	Treatment of Organic Mental Disorders
	6	Associate Professor Oshibuchi	Treatment of Mental Disorders in the Elderly (Including Dementia)
	7	Associate Professor Oshibuchi	Treatment of Schizophrenia
	8	Associate Professor Oshibuchi	Treatment of Mood Disorders
	9	Associate Professor Akaho	Treatment of Stress-Related and Neurotic Disorders
	10	Associate Professor Akaho	Treatment of Personality Disorders
	11	Associate Professor Akaho	Treatment of Developmental Disorders
12	Associate Professor Akaho	Treatment of Intellectual Disability	

Psychiatry Syllabus

(* = Applicable to those with medical license)

Course title	Consultation-liaison psychiatry		
Instructors	Professor Nishimura, Associate Professor Akaho, and Associate Professor Oshibuchi		
Unit count	2		
Lesson format	Lectures and seminars		
Topic	Lectures and seminars on consultation-liaison psychiatry		
Class times	Mondays, 9:00 AM to 12:00 PM; 1:00 PM to 5:00 PM		
Achievement targets	Acquire knowledge of the correct diagnosis and treatment of mental disorders in consultation-liaison psychiatry, including delirium, depression, and adjustment disorders. Additionally, to acquire the correct knowledge and methods necessary to address various psychiatric and psychosocial problems that arise in and across different medical fields.		
Grading system	Attendance (50%), reports (50%)		
Grading definition	There are five grades of evaluation: S (90-100 points), A (80-90 points), B (70-80 points), C (60-70 points), and D (<60 points). Achieving S, A, B, or C is equivalent to a pass, while achieving D results in a fail.		
Textbooks/ reference texts	Standard Psychiatry, Igaku Shoin, 2015 DSM-5 Diagnostic and Statistical Manual of Mental Disorders, Igaku Shoin, 2013.		
Study preparations and out-of-classroom study methods	Read the reference bibliography in your own time and according to the given lesson plans and then look up and read the indicated literature.		
Class location	South Hospital Ward 2F, Conference Room; South Hospital Ward 2F, Reference Room.		
Notes	Those who are unable to attend the class at the scheduled times (see above) must determine their timetable by consultation. Questions may be asked at any time. Feedback will be provided during the final lesson.		
Lesson plan	Lesson	Instructor	Content
	1	Associate Professor Akaho	General Theory on Consultation-Liaison Psychiatry
	2	Associate Professor Akaho	Delirium
	3	Associate Professor Akaho	Depression and Adjustment Disorders
	4	Associate Professor Akaho	Team Medicine in Psychiatric Liaison
	5	Professor Nishimura	Psychocardiology
	6	Professor Nishimura	Psychonephrology
	7	Associate Professor Akaho	Psycho-Oncology
	8	Associate Professor Oshibuchi	Model for Treating Depression Associated with Physical Disorders
	9	Professor Nishimura	Psychorheumatology
	10	Professor Nishimura	Consultation-Liaison Psychiatry in ICU
	11	Associate Professor Akaho	Consultation-Liaison Psychiatry in Critical Care Centers
	12	Professor Nishimura	Consultation-Liaison Psychiatry in Organ Transplantation
	13	Associate Professor Oshibuchi	Ethical Issues in Consultation-Liaison Psychiatry
14	Associate Professor Oshibuchi	Mental Health of Medical Practitioners	

Psychiatry Syllabus

(* = Applicable to those with medical license)

Course title	Experiments and practices (research work)	
Instructors	Professor Nishimura, Associate Professor Akaho, Associate Professor Oshibuchi, and Assistant Professor Muraoka	
Unit count	10	
Lesson format	Experiments and practices (research work)	
Topic	Implementation of a research project and the preparation of relevant research papers	
Class times	Mondays, 1:00 PM to 5:00 PM	
Achievement targets	<ol style="list-style-type: none"> 1.To acquire the necessary techniques and conduct research according to an established research plan. 2.To correctly record and store research contents and data. 3.To summarize the research results in diagrams. 4.To appropriately present the research content at academic conferences and research groups in and across both Japan and overseas, and to be able to discuss the said content clearly and accurately. 5. To create and submit a thesis paper on the research content and respond appropriately to the comments of the reviewers in order to publish the research findings. 6.To teach the knowledge and skills gained through research to younger/novice researchers. 	
Grading system	Research report (60%), diagrams (10%), research presentation/discussion (10%), and thesis paper (20%)	
Grading definition	There are five grades of evaluation: S (90-100 points), A (80-90 points), B (70-80 points), C (60-70 points), and D (<60 points). Achieving S, A, B, or C is equivalent to a pass, while achieving D results in a fail.	
Textbooks/ reference texts	Original papers and reviews related to subject research	
Study preparations and out-of-classroom study methods	Actively participate in related conferences and study groups and engage in presentations, information gathering, and discussions.	
Class location	South Hospital Ward 2F, Conference Room; South Hospital Ward 2F, Reference Room.	
Notes	Those who are unable to attend the class at the scheduled times (see above) must determine their timetable by consultation. Questions may be asked at any time. Feedback will be provided during the final lesson.	
Lesson plan	Lesson	Content
	1	Achievement of Goals 1-2
	~	
	90	
	91	Achievement of Goals 3-4
	~	
	120	
	121	Achievement of Goals 5-6
~		
150		

Dermatological fields

I Education policy

Dermatology covers topics on the skin, the largest organ, which can naturally be affected by a diversity of diseases. Various diseases are observed in the skin, including congenital hereditary diseases, inflammatory diseases, allergy-based diseases, infections, benign and malignant tumors, and skin diseases associated with systemic diseases. Thus, the field of research is so extensive that it can be considered a treasure trove of medical research. The skin can also be easily observed by the naked eye, and such studies in humans are less burdensome when compared to studies of other organs, which is an advantage for research in this field. The main focus of dermatology and related fields is to develop research that will lead to the development of therapeutics and contribute to society by initiating research that will lead to the clarification of disease pathologies, such as the involvement of cytokines and chemokines and the involvement of bacteria.

II Goals

- Gain broad knowledge of the structure of normal skin.
- Acquire broad knowledge of rashes and how they develop with corresponding histopathology for better understanding.
- Gain basic knowledge of pharmacotherapy and laser treatment for skin diseases.
- Understand and acquire knowledge on the pathology and treatment of representative dermatological diseases such as inflammatory skin diseases, skin infections, collagen diseases and vasculitis, urticaria and drug eruption, skin tumors, dermatomycosis, and bullous dermatosis.
- Establish research topics related to dermatology, design experimental plans, and conduct research in line with the plans.
- Foster abilities to represent experimental results in figures and tables and present them.
- Gain proficiency in writing research papers to present the research results.
- Develop a broad interest in dermatology and the ability to discuss one's own and others' topics of study related to dermatology.

III Supervisor · Research theme

(* = for doctor's license holders)

Name and position	Research theme
Associate Professor Yamagami	(1) Research on autoantibodies/autoreactive B cells causing pemphigus* Pemphigus is an autoimmune disease in which autoantibodies against desmoglein, an adhesion molecule between epidermal keratinocytes, cause blistering of the skin and mucous membranes. Based on the results of previous studies on autoreactive B cells, which play an important role in the production of autoantibodies in pemphigus, we aim to elucidate the mechanism of autoantibody production using patient samples such as serum, peripheral lymphocytes, and skin tissues.
Professor Ishiguro Assistant Professor Fukuya	(2) Studies on the bacterial flora, including fusobacteria, in dermatitis of the face * Detection of bacteria, including fusobacteria, from the perioral soft hair, skin, and saliva of patients with dermatitis of the face is attempted for genetic identification to analyze for differences associated with the disease. Investigating the dynamics of the bacterial flora during the course of treatment is expected to lead to the clarification of the etiological significance and mechanism of pathogenesis and to the establishment of more appropriate therapies.
Professor Ishiguro Assistant Professor Takenaka	(3) Dynamics of inflammatory findings in cutaneous arteritis and search for long-term prognosis.* It remains to be determine whether cutaneous arteritis is a partial manifestation of systemic polyarteritis nodosa or an independent disease. By examining the clinical features and biopsy histopathology image and inflammation findings including various cytokines in the blood sampling data at diagnosis as well as changes in similar data in the course of disease, we attempt to detect findings and laboratory data that can predict the transition to systemic disease in the early stage of cutaneous arteritis. Ultimately, this will lead to the establishment of more appropriate therapies for cutaneous arteritis.

IV Syllabus

(* = for doctor's license holders)

Title	Instructor	Credit	Theme
Introduction to Dermatology	Professor Ishiguro	1	Understanding the normal structure and function and abnormal findings of the skin
Introduction to Skin Diseases	Assistant Professor Fukuya Assistant Professor Takenaka	2	Clinical and histopathological presentation of skin diseases
Experimental and practical training (subject research)	Associate Professor Yamagami	12	Implementation of subject research, development of research papers, and presentation of results
Total		15	

Dermatological fields syllabus

Syllabus Title	Introduction to Dermatology		
Syllabus Title (English)	Introduction to Dermatology		
Instructor	Professor Ishiguro		
Credit	1		
Type of Class	Lectures and exercises		
Theme	Understanding the normal structure and functions and abnormal findings of the skin		
Schedule	Tuesday 15:00-16:00		
Course Objectives	Understand <ul style="list-style-type: none"> • the normal structure and functions of the skin. • formation of rashes. • various findings related to skin histopathology and their implications. 		
Evaluation Methods	Attendance (70%) and submission of reports on lecture content (30%)		
Grading Scale	Five letter grades: S (90 to 100 points), A (80 to fewer than 90 points), B (70 to fewer than 80 points), C (60 to fewer than 70 points), and D (fewer than 60 points). S, A, B, and C are passing grades. D is a fail.		
Textbooks/References	Yasushi Tomita Ed.: Standard Dermatology Version 10, Igaku Shoin, 2013 Hiroshi Shimizu: Textbook of Modern Dermatology Second Edition, Nakayama Shoten, 2011 Fujio Otsuka: Dermatology, 10th edition, Kinpodo, 2016 Ichiro Katayama et al.: Dermatology, Bunkodo, 2006 Toshiaki Saita: A Guide to Histopathologic Diagnosis of Skin Diseases, 3rd edition, Nankodo, 2017 Masanobu Kumagiri Ed.: Dermatology Practice, Bunkodo, 1998 Tetsunori Kimura: Skin Pathology in One Book, Bunkodo, 2010\		
Independent Study Outside of Class	Read the reference documents listed in textbooks, materials, etc., during the study period, review the lecture content, and grasp the overall picture.		
Room	1st Ward Conference Room, Department of Dermatology, or Dermatology Laboratory, Tomoe Teaching Ward		
Special Note	For students who are unable to participate at the above-mentioned time, the time schedule shall be determined after due consultation. Questions are accepted at any time. Feedback is provided in the final class.		
Course Plan	Number of time	Faculty in charge	Class content
	1	Professor Ishiguro	Structure and function of the epidermis
	2	Professor Ishiguro	Structure and function of the dermis
	3	Professor Ishiguro	Structure and function of the subcutaneous tissue
	4	Professor Ishiguro	Structure and function of skin appendages
	5	Professor Ishiguro	Structure and function of skin blood vessels
	6	Professor Ishiguro	Pigment cells and the mechanisms of melanogenesis
	7	Professor Ishiguro	Immunocompetent cells and functions in the skin
	8	Professor Ishiguro	Basic skin eruption and its formation
	9	Professor Ishiguro	Methods for describing skin eruptions
	10	Professor Ishiguro	Histopathology of the epidermis
	11	Professor Ishiguro	Histopathology of the dermis
	12	Professor Ishiguro	Histopathology of the subcutaneous tissue
	13	Professor Ishiguro	Histopathological images of skin appendages and blood vessels
	14	Professor Ishiguro	Correspondence between skin eruption and histopathology
15	Professor Ishiguro	Review	

Dermatological fields syllabus

Syllabus Title	Introduction to Skin Diseases		
Syllabus Title(English)	Introduction to Skin Diseases		
Instructor	Assistant Professor Fukuya/ Assistant Professor Takenaka		
Credeit	2		
Type of Class	Lectures and exercises, experiments, and practical training		
Theme	Clinical and histopathological features of skin diseases		
Schedule	Thursday 14:30-17:00 (lectures 14:30-15:30, practical training 15:30-17:00)		
Course Objectives	Understand <ul style="list-style-type: none"> • Clinical features of various basic skin diseases • Histopathological images of various basic skin diseases • The relationship between pathology, histopathology, and clinical presentation 		
Evaluation Methods	Attendance (70%) and submission of reports on lecture content (30%)		
Grading Scale	Five letter grades: S (90 to 100 points), A (80 to fewer than 90 points), B (70 to fewer than 80 points), C (60 to fewer than 70 points), and D (fewer than 60 points). S, A, B, and C are passing grades. D is a fail.		
Textbooks/References	Yasushi Tomita Ed.: Standard Dermatology Version 10, Igaku Shoin, 2013 Hiroshi Shimizu: Textbook of Modern Dermatology Second Edition, Nakayama Shoten, 2011 Fujio Otsuka: Dermatology, 10th edition, Kinpodo, 2016 Ichiro Katayama et al.: Dermatology, Bunkodo, 2006 Toshiaki Saita: A Guide to Histopathologic Diagnosis of Skin Diseases, 3rd edition, Nankodo, 2017 Masanobu Kumagiri Ed.: Dermatology Practice, Bunkodo, 1998 Tetsunori Kimura: Skin Pathology in One Book, Bunkodo, 2010		
Independent Study Outside of Class	Read the reference documents listed in textbooks, materials, etc., during the study period, review the lecture content, and grasp the overall picture.		
Room	1st Ward Conference Room, Department of Dermatology, or Dermatology Laboratory, Tomoe Teaching Ward		
Special Note	For students who are unable to participate at the above-mentioned time, the time schedule shall be determined after due consultation. Questions are accepted at any time. Feedback is provided in the final class.		
Course Plan	Number of time	Faculty in charge	Class content
	1	Assistant Professor Takenaka	Clinical and histopathological features of eczema and dermatitis
	2	Assistant Professor Takenaka	Clinical and histopathological features of psoriasis
	3	Assistant Professor Takenaka	Clinical and histopathological features of bullous dermatosis
	4	Assistant Professor Takenaka	Clinical and histopathological features of granulomatosis
	5	Assistant Professor Takenaka	Clinical and histopathological features of erythema
	6	Assistant Professor Takenaka	Clinical and histopathological features of collagen disease
	7	Assistant Professor Takenaka	Clinical and histopathological features of vascular disease
	8	Assistant Professor Fukuya	Clinical and histopathological features of dysmetabolism and deposition disease
	9	Assistant Professor Fukuya	Clinical and histopathological features of cutaneous benign tumors
	10	Assistant Professor Fukuya	Clinical and histopathological features of cutaneous malignancies
	11	Assistant Professor Fukuya	Clinical and histopathological features of bacterial infections
	12	Assistant Professor Fukuya	Clinical and histopathological features of viral infections
	13	Assistant Professor Fukuya	Clinical and histopathological features of mycosis
	14	Assistant Professor Fukuya	Clinical and histopathological features of sexually transmitted diseases
15	Assistant Professor Fukuya	Review	

Dermatological fields syllabus

Syllabus Title	Experimental and practical training (subject research)	
Instructor	Associate Professor Yamagami	
Credit	12	
Type of Class	Experimental and practical training (subject research)	
Themes	Implement subject research, develop research papers, and presentation of results	
Schedule	Monday: 9:00-12:00 Thursday: 9:00-12:00	
Course Objectives	<p>Develop competencies to</p> <ol style="list-style-type: none"> 1. Gather information for planning research 2. Draft and plan studies 3. Acquire the experimental techniques necessary for research and carry out research 4. Correctly document and store experimental content and data 5. Perform appropriate statistical analyses 6. Summarize experimental results appropriately in figures and tables 7. Interpret experimental results correctly 8. Design additional experiments and implement them based on interpretation 9. Appropriately present the content of studies at internal and external scientific meetings and research meetings and discuss the content 10. Understand and carry out the procedures for the preparation and submission of papers 11. Respond appropriately to peer-reviewed comments and achieve article publication. 	
Evaluation Methods	Planning and preparation (10%), experimental note and data documentation (40%), interpretation and representation of results in figures and tables (20%), research publication and discussion (10%), and article preparation (20%)	
Grading Scale	Five letter grades: S (90 to 100 points), A (80 to fewer than 90 points), B (70 to fewer than 80 points), C (60 to fewer than 70 points), and D (fewer than 60 points). S, A, B, and C are passing grades. D is a fail.	
Textbooks/References	Instruction from faculty as appropriate.	
Independent Study Outside of Class	Actively participate in and present study meetings and related academic conferences, collect information, and hold discussions.	
Room	Dermatology Laboratory, Tomoe Teaching Ward	
Special Note	For students who are unable to participate at the above-mentioned time, the time schedule shall be determined after due consultation. Questions are accepted at any time. Feedback is provided in the final class.	
Course Plan	Classes	Class content
	1-10	Achieve Objectives 1 and 2
	11-80	Achieve Objectives 3 and 4
	81-100	Achieve Objectives 5, 6, and 7
	101-140	Achieve Objective 8
	141-150	Achieve Objective 9
	151-170	Achieve Objective 10
171-180	Achieve Objective 11	

Radiation Oncology

I Educational Policy

Department of Radiation Oncology

Radiation oncology is one of the three major fields in cancer treatment, as surgical oncology and internal oncology. The WHO report states that radiation treatment is the treatment method received by more than half of the world's cancer patients. One of the advantage of radiotherapy is that it is less invasive and less burdensome to patients, and its role is expected to increase as the super-aging society progresses. Recent technological developments have made it possible to concentrate radiation on tumors, and radiation treatment is becoming more accurate. Intensity Modulated Radiation Therapy (IMRT), Stereotactic irradiation (STI), Image Guided Radiation Therapy (IGRT), Proton beam therapy and Carbon beam therapy became available. Japan leads the world in STI and particle beam therapy for early lung cancer, but there are some parts, such as clinical application of IMRT, behind Europe and the United States. In any case, the technological progress of these high-precision radiotherapy methods is still in the developing stage, and further progress is required. In this field, we aim to develop excellent researchers, clinicians, and educators who will contribute to the development of cancer radiotherapy.

Medical physics

The interaction of radiation irradiated in human body causes physical, chemical and biological reaction over time killing cancer cells in radiotherapy. The medical physics course covers wide range of subjects such as radiological physics, nuclear physics, atomic & molecular physics, radiation measurement, electrodynamics, mathematics, data science, medical science and biology with fundamental knowledge of physics, and all of outcomes from those studies contribute to clinical use. The quality assurance and maintenance of a medical machine have been further complicated as radiotherapy has been highly developed. Consequently, the workload on a medical worker is increased in such circumstances, therefore it leads to an increase in demand of a medical physicist who take the central role. In addition, the medical physicist is required for research and development to keep high level of radiotherapy and for the education of a researcher in university and institution as well. We are willing to produce a medical physicist finishing the course, who can participate actively in hospital, university and institution.

II Goals

Department of Radiation Oncology

1. Acquire the ability to plan and carry out advanced and original research on radiation oncology.
2. Acquire a wide range of knowledge and high skills associated with research, as well as research philosophy and ethics.
3. Acquire the ability to play an active role internationally with a communication ability.
4. Acquire the ability to contribute to the future development of radiation oncology with rich humanity and high ethics.

Medical physics

- Understanding the researches in medical physics and their background.
- The ability to suggest the research theme on clinical needs properly.
- Initial plan preparation on the research in medical physics and carrying out the plan.
- The ability to discuss about the research in medical physics skillfully.
- The leadership in education, clinical practice and research in medical physics.
- Collaborating with other scientist from various fields to expand the territory of medical physics.
- The presentation and paper submission in domestic conference with your research results

III Supervisor•Research theme

(* = for doctor's license holders)

Name and position	Research theme
<p>Kumiko Karasawa (Professor and Head of division)</p>	<p>(1) Study of heavy ion beam therapy for early breast cancer Study for treatment of the early breast cancer with carbon ion beam without surgery combination with standard drug therapy, using the carbon ion beam therapy system of the National Institute of Radiological Sciences. Except for the low-risk group, X-ray breast irradiation is also used. Although carbon ion beam therapy is performed at 13 institutions around the world, only our group is systematically studying breast cancer, which is an advanced study that is drawing attention from around the world. There are many research themes that related with this research, and highly meaningful research can be conducted.</p>
<p>Kumiko Karasawa (Professor and Head of division) Yaichiro Hashimoro (Associate Professor) Sawa Kono (Assistant Professor)</p>	<p>(2) Study on the usefulness of hypofractionation radiation therapy The hypofractionation is a method in which the treatment is completed in a shorter period of time than the conventional irradiation therapy, by increasing the dose of one fraction. In radiotherapy, the higher the amount of one line, the higher the effect, but due to spare normal tissues, 2 Gy per fraction has been selected. However, it has become possible to perform high-precision radiotherapy, and it has been found that the adverse events in normal tissues do not increase even if the dose per fraction is increased. Our group has studied of hypofractionation for breast cancer, prostate cancer, brain tumor, etc., and is also conducting research on the optimal irradiation method for other tumors.</p>

<p>Kumiko Karasawa (Professor and Head of division) Mayumi Fujita (Visiting Assistant Professor)</p>	<p>(3) Research on genes related to radiosensitivity We will pursue the mechanism of individual differences in normal tissue radiosensitivity and differences in tumor radiosensitivity at the genetic level, and conduct a basic study on the onset mechanism of delayed radiation adverse events. Based on this, this research aims to develop an individualized and optimal radiotherapy method based on genetic diagnosis.</p>
<p>Kumiko Karasawa (Professor and Head of division) Mayumi Fujita (Visiting Assistant Professor)</p>	<p>(4) Study of factors related to radiosensitivity of X-ray and heavy particle beam In order to investigate the factors related to the radiosensitivity of X-ray and heavy particle beam, irradiation experiment is performed using various cancer cells or experimental animals, and various doses in combination with drugs is tested.</p>
<p>Kumiko Karasawa (Professor and Head of division) Yaichiro Hashimoro (Associate Professor) Kuribayashi, Shigehiko (Assistant Professor)</p>	<p>(5) Study on radiation therapy for the elderly people The aging of society is advancing, and the majority of radiation therapy patients are elderly people. There is no data on whether the elderly have different efficacy and safety of radiation treatment compared to healthy adults. Also there is no data how different of efficacy of radiation therapy depending on their age and degree of aging. Dr. Karasawa is a member of the group for creating cancer treatment guidelines for the elderly with a subsidy from the Health and Labor Sciences Research Fund. We are conducting various clinical studies in the field of radiotherapy to develop guidelines for the treatment of cancer in the elderly.</p>
<p>Yaichiro Hashimoro (Associate Professor)</p>	<p>(6) Introduction of AI to radiation oncology By introducing AI into the radiation treatment plan, improve the accuracy and optimization of the treatment plan.</p>
<p>Kumiko Karasawa (Professor and Head of division) Teiji Nishio (Visiting Professor)</p>	<p>(7) Development of the dose verification system and tumor response monitoring system To ensure a high-precision proton beam therapy, we perform imaging study of positron-emitting nuclei which are generated by target nuclear fragment reactions of incident protons and nuclei in patient's body. Also, we investigate the dose response of the tumors in individual patients by monitoring the distribution and time activity course of that generated positron-emitting nuclei in tumor. The purpose of this study is to realize an adaptive proton therapy using our dose verification system and tumor response monitoring system.</p>
<p>Chie Toramatsu (Assistant Professor)</p>	<p>(8) Development of Effective Optimization method for a charged particle pencil beam scanning therapy In charged particle pencil beam scanning therapy, localization of the dose in the Bragg peak makes dose distributions sensitive to lateral tissue heterogeneities. Sensitivity of a pencil beam scanning plan to lateral tissue heterogeneity can be reduced by selecting suitable treatment planning parameters, such as beam angle, beam size, particle numbers, etc. The purpose of this study is to establish an effective planning optimization method.</p>
<p>Chie Toramatsu (Assistant Professor)</p>	<p>(9) Kinetic analysis of particle beam irradiation induced positron emitters Positron emission tomography-based dose verification is based on the detection of irradiation induced positron emitters which are produced by fragmentation reactions in a patient. The quantitative washout effect of the induced positron emitters has a potential usefulness as a diagnostic index that provides a unique opportunity to probe the status of tumor viability. In this study, we irradiate radiation active beams into tumor bearing nude rats to explore the washout mechanism. The purpose of this study is to derive the biological decay constants assuming a radiopharmaceutical kinetic model aiming future clinical application.</p>
<p>Kumiko Karasawa (Professor and Head of division) Chie Toramatsu (Assistant Professor)</p>	<p>(10) Development of compact proton therapy system To generalise a proton therapy widely, design of compact proton therapy system is necessary (currently, a required space for proton therapy system is one tennis court). We develop a compact proton therapy system as a core medical physics research group by collaborating with the department of medical science and engineering of Waseda University.</p>

IV Syllabus

(* = for doctor's license holders)

Department of Radiation Oncology

Title	Instructor	Credit	Theme
introduction to Radiation Oncology	Kumiko Karasawa	2	Outline of radiation oncology, radiation treatment technology / method, brain nerve, head and neck, respiratory organs, breast gland, digestive organs, urinary organs, gynecology, bone and soft parts, hematopoietic organs, pediatric
Radiation Biology	Kumiko Karasawa Mayumi Fujita	2	Biological effects, basic biological processes, effects on the human body, factors involved in tumors and treatments
Radiation therapy physics I	Chie Toramatsu Narita Yuichiro	1	Characteristics of radiation, Treatment system, Dose calibration, Treatment Planning System, Treatment Planning, Quality Assurance
Experiment / Practice (Research)	Yaichiro Hashimoto Chie Toramatsu Mayumi Fujita Yuichiro Narita	10	Research and publication
Total credits		15	

Department of Medical Physics (Medical Physics Training Course)

In addition to the items in the medical physics field syllabus, take the necessary items from the following.

In consultation with the professor in charge of this course, consider the courses you have taken in the bachelor's and master's programs and their contents, select the necessary items for each student, and take the course.

Receive 12 credits (300 hours) or more of training in 4 years.

Title	Instructor	Credit	Theme
# Mechanics Lecture	Chie Toramatsu(Assistant Professor) Kiwoo Lee(Assistant Professor)	2	Mechanics and motion, solution of equation of motion, the law of conservation of energy, angular momentum, the law of universal gravitation, rigid body motion, analytical mechanics, special relativity theory
# Electromagnetism Lecture	Kiwoo Lee(Assistant Professor)	2	Electric field and potential, magnetic field, electromagnetic induction, Maxwell's equations, electromagnetic field energy, electrostatic field associated with conductor, circuit, dielectric and magnetic material, contact potential and electrode potential
# Thermodynamics and Statistical Mechanics Lecture	Chie Toramatsu(Assistant Professor) Kiwoo Lee(Assistant Professor)	2	Temperature and state equations, thermodynamic processes, equilibrium conditions and macroscopic state quantities, mechanics and probability, Boltzmann distribution and partition function, chemical reaction, phase transition, superconductivity and magnetic field, quantum statistical mechanics
# Quantum mechanics lecture	Chie Toramatsu(Assistant Professor) Teiji Nishio(Visiting Professor) Yuichiro Narita(Assistant Professor)	2	Old quantum theory, Schrodinger equation, approximate solution, scattering problem, relativistic quantum mechanics
# Nuclear physics Lecture	Chie Toramatsu(Assistant Professor) Kiwoo Lee(Assistant Professor) Yuichiro Narita(Assistant Professor)	2	Global nature of nuclei, nuclear force and two-body problem, nuclear structure, nuclear reaction, lifetime and decay of nuclei, fission and fusion

# Physical Mathematics Lecture	Chie Toramatsu(Assistant Professor) Yuichiro Narita(Assistant Professor)	1	Linear Algebra, Differentiation and Integral, fourier Analysis, Differential and Integral Equations, Calculation of Numerical Values
# Radiation Physics Lecture	Chie Toramatsu(Assistant Professor) Kiwoo Lee(Assistant Professor) Yuichiro Narita(Assistant Professor)	2	Structure of atoms and nuclei, history of radiation, classification of radiation, unit of radiation field, photon beam, interaction between photon and matter, attenuation of photon beam flux, electron beam, interaction between electron beam and matter, charged particle beam , Charged particle-matter interaction, neutron beam, neutron-matter interaction, radioactive decay, charged particle equilibrium and radiative equilibrium
Radiation therapy physics I Lecture	Chie Toramatsu(Assistant Professor) Yuichiro Narita	1	Radiation characteristics, radiation therapy related equipment, dose calibration, radiation therapy planning system, radiation therapy planning method, dose distribution verification
Radiation therapy physics I Training	Chie Toramatsu(Assistant Professor) Yuichiro Narita(Assistant Professor)	1	Radiation characteristics, radiation therapy related equipment, dose calibration, radiation therapy planning system, radiation therapy planning method, dose distribution verification
# Radiation therapy physics II Lecture	Chie Toramatsu(Assistant Professor) Teiji Nishio(Visiting Professor)	1	Radiation characteristics, radiation therapy related equipment / equipment, dose calibration, radiation therapy planning equipment, radiation therapy planning method, dose distribution verification
# Radiation therapy physics II Training	Chie Toramatsu(Assistant Professor) Yuichiro Narita(Assistant Professor)	1	Radiation characteristics, radiation therapy related equipment / equipment, dose calibration, radiation therapy planning equipment, radiation therapy planning method, dose distribution verification
Radiation Measurement I Lecture/Training	Kiwoo Lee(Assistant Professor) Yuichiro Narita(Assistant Professor)	2	Dosimetry, calorimeter dosimetry, chemical dosimeter, cavity theory, ionization chamber, dose calibration, relative dosimetry technology, pulse mode detector, counting / statistics
# Radiation Measurement II Lecture	Chie Toramatsu(Assistant Professor) Kiwoo Lee(Assistant Professor) Yuichiro Narita(Assistant Professor)	1	Dosimetry, relative dose measurement technology, radiation energy measurement, radiation stopping power measurement, particle number measurement
# Radiation Measurement II Training	Chie Toramatsu(Assistant Professor) Yuichiro Narita(Assistant Professor)	1	Radiation energy measurement, radiation stopping power measurement, particle number measurement
Health physics / radiation protection I Lecture/Training	Kumiko Karasawa (Professor and Head of division) Chie Toramatsu(Assistant Professor) Teiji Nishio(Visiting Professor)	2	Introduction and History, Protection-related organizations, Radiation sources and application, Radiation biological effects and risk, Dose classification, Radiation protection system, Radiation protection management, Protection-related regulations, Medical radiation protection and management, etc.
Radiation diagnostic physics I Lecture/Training	Chie Toramatsu(Assistant Professor) Kiwoo Lee(Assistant Professor)	2	X-ray photography, fluoroscopy, X-ray CT, magnetic resonance, ultrasound, QA/QC

# Health physics / radiation protection II Lecture/Training	Kumiko Karasawa (Professor and Head of division) Kiwoo Lee(Assistant Professor) Teiji Nishio(Visiting Professor)	1	Radiation protection system, external exposure evaluation, internal exposure evaluation, shielding design, medical radiation protection and management, environmental radiation protection, reduction of patient exposure dose, storage and management of radioactive waste
# Radiation diagnostic physics II Lectur	Kumiko Karasawa (Professor and Head of division) Chie Toramatsu(Assistant Professor) Teiji Nishio(Visiting Professor)	1	X-ray photography, fluoroscopy, X-ray CT, magnetic resonance, ultrasound, QA/QC
Nuclear Medicine Physics I Lecture/Training	Chie Toramatsu(Assistant Professor) Yuichiro Narita(Assistant Professor)	2	Radioisotope, radiopharmaceuticals, measuring instrument, image processing, tracer measurement & analysis, QA/QC of imaging device
# Nuclear Medicine Physics II /Training	Chie Toramatsu(Assistant Professor) Kiwoo Lee(Assistant Professor) Yuichiro Narita(Assistant Professor)	1	Performance assessment of gamma camera, SPECT(SPECT/CT) and PET (PET/CT), QA/QC of imaging device, Dose assessment of the internal radiation exposure
# Lecture on medical and image informatics Lecture	Chie Toramatsu(Assistant Professor) Kiwoo Lee(Assistant Professor)	1	Information theory, signal processing, image engineering, medical informatics etc.
Lecture on medical and image informatics Training	Chie Toramatsu(Assistant Professor) Kiwoo Lee(Assistant Professor)	1	Information theory, signal processing, image engineering, medical informatics etc.
# Radiation-related regulations, recommendations, medical ethics Lecture	Kumiko Karasawa(Professor and Head of division) Teiji Nishio(Visiting Professor)	1	Act on Prevention of Radiation Hazards, medical care act & enforcement regulation, industrial safety and health law & ordinance on prevention of ionizing radiation hazards, other relevant laws, recommendation & standard, medical ethics, research ethics
# Epidemiology / Medical Statistics (Syllabus: Public Health) Lecture	Yasuto Satou(Assistant Professor)	2	Epidemiology & Medical Statistics
# Lecture on human anatomy (Syllabus: neuromolecular morphology)	Hiroki Fujieda(Professor)	1	Structure of the human body
* Pathophysiology / Molecular Behavior Science / Cell Biology (Syllabus: Molecular Cell Physiology)	Shohei Mitani(Professor)	1	Disease developing mechanism of endoplasmic reticulum and cellular differentiation, generalised approach for behavioral manifestation in model organism, development of gene therapy with molecular mechanism of RNA interference
* General Pathology (Syllabus: pathological neuroscience) Lecture	Kenta Masui(Professor)	1	Cellular pathology, neoplastic pathology
* Introduction to diagnostic imaging (Syllabus: diagnostic imaging and nuclear medicine) Lecture	Shyuji Sakai(Professor)	1	Practical and clinical application on various examination
# Introduction to Nuclear Medicine (Syllabus: diagnostic imaging and nuclear medicine) Lecture	Shyuji Sakai(Professor)	1	Medical application of radioisotope

Radiation oncology Training	Kumiko Karasawa(Professor and Head of division) Yaichiro Hashimoto(Associate Professor)	1	Introduction to Radiation oncology, methology of radiotherapy, cerebral nerve, head & neck, respiratory organ, Mammary gland, digestive organ, urinary organs, gynecology, bone and soft tissue, hematopoietic organ, pediatrician
Introduction to Radiation oncology Lecture	Kumiko Karasawa(Professor and Head of division)	2	Introduction to Radiation oncology, methology of radiotherapy, cerebral nerve, head & neck, respiratory organ, Mammary gland, digestive organ, urinary organs, gynecology, bone and soft tissue, hematopoietic organ, pediatrician
Radiation Biology Training	Kumiko Karasawa(Professor and Head of division) Mayumi Fujita(Assistant Professor)	1	Biological reaction and basic process, effect on human body, factors on the radiotherapy
Radiation Biology Lecture	Kumiko Karasawa(Professor and Head of division) Mayumi Fujita(Assistant Professor)	2	Biological reaction and basic process, effect on human body, factors on the radiotherapy
Basic medicine (anatomy, physiology, tumor pathology) Lecture	Kumiko Karasawa(Professor and Head of division) Yaichiro Hashimoto(Associate Professor)	2	Fundamentals of the medical physics
# Science English	Chie Toramatsu(Assistant Professor) Kiwoo Lee(Assistant Professor)	1	English expression, presentation sturcture, writing english paper, english presentation with your research results
## Medical physicist clinical Training	Chie Toramatsu(Assistant Professor) Yuichiro Narita(Assistant Professor)	4	Dose measurement, dose calculation, plan optimization, QA/QC of the dose and a machine, conference
Total credits		53	

Radiation Oncology

(* = for medical doctor)

Syllabus Title	Introduction to Radiation Oncology		
Instructor	Kumiko Karasawa(Professor and Head of division)		
Credit	2		
Type of Class	Lecture & Training		
Theme	Acquire the basics of radiation oncology necessary for conducting research		
Schedule	Friday 9:00~10:30、10:40~12:10		
Course Objective	<ul style="list-style-type: none"> • Learn and understand a wide range of clinical practice from the basics of radiation oncology. • Acquire a wide range of knowledge about radiation oncology. • Acquire the ability to connect knowledge of radiation oncology to medical care and research. 		
Evaluation Methods	Attendance (50%) Submission of a report on lecture content (50%)		
Grading Scale	S (90 points to 100 points), A (80 points to less than 90 points), B (70 points to less than 80 points), C (60 points to less than 70 points), D (less than 60 points) There are five types, S, A, B, and C are accepted, and D is rejected.		
Textbooks/References	Radiation Oncology 2017 (Gakken Medical Shujunsha), Textbook of Radiation Oncology (Elsevier), Perez and Brady 's Principles and Practice of Radiation Oncology (Lippincott Williams & Wilkins), Radiotherapy Planning Guidelines 2016 (Japan Radiation Oncology Society), etc.□		
Independent Study Outside of Class	Read the above reference books and related literature.		
Room	Radiation therapy planning room on the 3rd basement floor of the General Outpatient Center, Conference Room in the Education and		
Special Note	Those who cannot participate in the above time will decide the timetable after consultation. Questions etc. are accepted at any time. Feedback will be given in the last class..		
Course Plan	Number	Instructor	Contents
	1	Kumiko Karasawa(Professor and Head of division)	History and characteristics of radiotherapy, basic philosophy
	2	Kumiko Karasawa(Professor and Head of division)	Radiotherapy facility structure and QC
	3	Kumiko Karasawa(Professor and Head of division)	Adverse effects of radiotherapy
	4	Kumiko Karasawa(Professor and Head of division)	Radiotherapy techniques and methods
	5	Yaichiro Hashimoto (Associate Professor)	Brain tumor
	6	Kumiko Karasawa(Professor and Head of division)	Head and Neck tumor
	7	Kumiko Karasawa(Professor and Head of division)	Respiratory tumor
	8	Kumiko Karasawa(Professor and Head of division)	Breast tumor
	9	Kumiko Karasawa(Professor and Head of division)	Digestive tumor
	10	Yaichiro Hashimoto (Associate Professor)	Urinary tumor
	11	Kumiko Karasawa(Professor and Head of division)	Gynecologic tumor
	12	Kumiko Karasawa(Professor and Head of division)	Bone and soft tissue tumor
	13	Yaichiro Hashimoto (Associate Professor)	Hematological tumor
	14	Kumiko Karasawa(Professor and Head of division)	Pediatric tumor
15	Kumiko Karasawa(Professor and Head of division)	Metastatic tumor, benign disease	

Radiation Oncology

(* = for medical doctor)

Syllabus Title	Radiation Biology		
Instructor	Kumiko Karasawa(Professor and Head of division), Mayumi Fujita(Part-time lecturer)		
Credit	2		
Type of Class	Lecture & Training		
Theme	Acquire the basics of radiobiology necessary for radiation oncology		
Schedule	Wednesday 9:00~10:30, 10:40~12:10		
Course Objective	<ul style="list-style-type: none"> • Learn and understand a wide range of topics from the basics of radiobiology to practical use. • Acquire a wide range of knowledge about radiobiology. • To acquire the ability to connect knowledge of radiobiology to radiation oncology research. 		
Evaluation Methods	Attendance (50%) Submission of a report on lecture content (50%)		
Grading Scale	S (90 points to 100 points), A (80 points to less than 90 points), B (70 points to less than 80 points), C (60 points to less than 70 points), D (less than 60 points) There are five types, S, A, B, and C are accepted, and D is rejected.		
Textbooks/References	Radiobiology for the Radiologist(Lippincott), Radiation Oncology 2017 (Gakken Medical Shujunsha), Basic Radiation Medicine (Kinshodo), Textbook of Radiation Oncology (Elsevier), Perez and Brady's Principles and Practice of Radiation Oncology (Lippincott Williams & Wilkins)		
Independent Study Outside of Class	Read the above reference books and related literature.		
Room	Radiation therapy planning room on the 3rd basement floor of the General Outpatient Center, Conference Room in the Education and		
Special Note	Those who cannot participate in the above time will decide the timetable after consultation. Questions etc. are accepted at any time. Feedback will be given in the last class..		
Course Plan	回数	Instructor	Contents
	1	Kumiko Karasawa(Professor and Head of division), Mayumi Fujita(Part-time lecturer)	Physical process of expression of biological action
	2	Kumiko Karasawa(Professor and Head of division), Mayumi Fujita(Part-time lecturer)	Chemical process of expression of biological action
	3	Kumiko Karasawa(Professor and Head of division), Mayumi Fujita(Part-time lecturer)	Expression of biological effects
	4	Kumiko Karasawa(Professor and Head of division), Mayumi Fujita(Part-time lecturer)	Action on DNA / chromosome
	5	Kumiko Karasawa(Professor and Head of division), Mayumi Fujita(Part-time lecturer)	Action on cells
	6	Kumiko Karasawa(Professor and Head of division), Mayumi Fujita(Part-time lecturer)	Radiation sensitivity, relative biological effectiveness
	7	Kumiko Karasawa(Professor and Head of division), Mayumi Fujita(Part-time lecturer)	Action on organs and tissues
	8	Kumiko Karasawa(Professor and Head of division), Mayumi Fujita(Part-time lecturer)	Action on individual level
	9	Kumiko Karasawa(Professor and Head of division), Mayumi Fujita(Part-time lecturer)	Radiation protection biology
	10	Kumiko Karasawa(Professor and Head of division), Mayumi Fujita(Part-time lecturer)	Radiation injury and recovery
	11	Kumiko Karasawa(Professor and Head of division), Mayumi Fujita(Part-time lecturer)	Action on tumors and normal tissues
	12	Kumiko Karasawa(Professor and Head of division), Mayumi Fujita(Part-time lecturer)	Radiation Sensitive Employment Physical Factors
	13	Kumiko Karasawa(Professor and Head of division), Mayumi Fujita(Part-time lecturer)	Combination therapy biology
	14	Kumiko Karasawa(Professor and Head of division), Mayumi Fujita(Part-time lecturer)	Applied Exercise 1
15	Kumiko Karasawa(Professor and Head of division), Mayumi Fujita(Part-time lecturer)	Applied Exercise 2	

Radiation Oncology

(* = for medical doctor)

Syllabus Title	Radiation Therapy Physics I		
Instructor	Chie Toramatsu(Assistant Professor), Yuichiro Narita(Part-time lecturer)		
Credit	1		
Type of Class	Lecture		
Theme	Characteristics of radiation, Treatment system, Dose calibration, Treatment Planning System, Treatment Planning, Quality Assurance		
Schedule	Wednesday 9:00~10:30, 10:40~12:10		
Course Objective	<ul style="list-style-type: none"> • Learning and understanding of radiation characteristics from actual therapeutic equipment, basic materials such as radiation measurement values to dose conversion, and practical use. • Acquire a wide range of knowledge of radiation therapy physics. • Acquire the ability to link knowledge of radiation therapy physics to radiation medicine and medical physics research. 		
Evaluation Methods	Attendance (50%) Submission of a report on lecture content (50%)		
Grading Scale	S (90 points to 100 points), A (80 points to less than 90 points), B (70 points to less than 80 points), C (60 points to less than 70 points), D (less than 60 points) There are five types, S, A, B, and C are accepted, and D is rejected.		
Textbooks/References	Radiation Physics (SHOKABO) etc.		
Independent Study Outside of Class	Read the above reference books and related literature.		
Room	Radiation therapy planning room on the 3rd basement floor of the General Outpatient Center, Conference Room in the Education and Research Building.		
Special Note	Those who cannot participate in the above time will decide the timetable after consultation. Questions etc. are accepted at any time. Feedback will be given in the last class..		
Course Plan	Number	Instructor	Contents
	1	Chie Toramatsu(Assistant Professor)	Radiation characteristics I
	2	Chie Toramatsu(Assistant Professor)	Radiation characteristics II
	3	Chie Toramatsu(Assistant Professor)	radiation therapy related equipment
	4	Yuichiro Narita(Part-time lecturer)	dose calibration I
	5	Yuichiro Narita(Part-time lecturer)	dose calibration II
	6	Yuichiro Narita(Part-time lecturer)	radiation therapy planning system
	7	Yuichiro Narita(Part-time lecturer)	radiation therapy planning method
	8	Yuichiro Narita(Part-time lecturer)	dose distribution verification I

Radiation Oncology

(* = for medical doctor)

Syllabus Title	Experiment / Practice (Research)	
Instructor	Yaichiro Hashimoro (Associate Professor) , Chie Toramatsu (Assistant Professor), Mayumi Fujita (Visiting Assistant Professor), Yuichiro Narita(Assistant Professor)	
Credit	10	
Type of Class	2	
Theme	Research and publication	
Schedule	Choose the better time in the time schedule 9:00~12:00, 13:00~17:00 on weekdays from Monday to Friday according to circumstances and your research schedule (Average over 50 times a full year)	
Course Objective	<ol style="list-style-type: none"> 1. Decide the research theme, then implement with the technique and analysis skills you obtained. 2. Discuss on the results from data you make a note properly. 3. Compile your results with sentence and figure properly. 4. Present your results and discuss with it in the internal or international conference. 5. Submit the paper on your research and response to the comments from reviewers to accomplish the publication. 	
Evaluation Methods	Research report(60%) Interview(10%) Presentation+discussion(10%) Editing a paper(20%)	
Grading Scale	S (90 points to 100 points), A (80 points to less than 90 points), B (70 points to less than 80 points), C (60 points to less than 70 points), D (less than 60 points) There are five types, S, A, B, and C are accepted, and D is rejected.	
Textbooks/References	Original papers and review on the research theme	
Independent Study Outside of Class	Obtain information from books, advice from seniors. Discuss with supervisor. Participate, present and discuss in the conference positively.	
Room	Radiation therapy planning room on the 3rd basement floor of the General Outpatient Center, Conference Room in the Education and Research Building.	
Special Note	Those who cannot participate in the above time will decide the timetable after consultation. Questions etc. are accepted at any time. Feedback will be given in the last class..	
Course Plan	Number	Contents
	1	Achieve course objectives1-2
	~	
	90	
	91	Achieve course objectives3-4
	~	
	120	
	121	Achieve course objectives5
	~	
150		

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	Mechanics Lecture		
Instructor	Chie Toramatsu(Assistant Professor), Kiwoo Lee(Assistant Professor)		
Credit	2		
Type of Class	Lecture		
Theme	Mechanics and motion, solution of equation of motion, the law of conservation of energy, angular momentum, the law of universal gravitation, rigid body motion, analytical mechanics, special relativity theory		
Schedule	Wednesday 9:00~10:30, 10:40~12:10		
Course Objective	<ul style="list-style-type: none"> • Learning and understanding of mechanics from the basics to practical use. • Acquire a wide range of knowledge about mechanics. • Acquire the ability to connect knowledge of mechanics to radiation medicine for medical physics research. 		
Evaluation Methods	Attendance (50%) Submission of a report on lecture content (50%)		
Grading Scale	S (90 points to 100 points), A (80 points to less than 90 points), B (70 points to less than 80 points), C (60 points to less than 70 points), D (less than 60 points) There are five types, S, A, B, and C are accepted, and D is rejected.		
Textbooks/References	Mechanics I•II(SHOKABO) etc.		
Independent Study Outside of Class	Read the above reference books and related literatures.		
Room	Radiation therapy planning room on the 3rd basement floor of the General Outpatient Center, Conference Room in the Education and Research Building.		
Special Note	Those who cannot participate in the above time will decide the timetable after consultation. Questions etc. are accepted at any time. Feedback will be given in the last class.		
Course Plan	Number	Instructor	Contents
	1	Chie Toramatsu(Assistant Professor)	Mechanics and motion,
	2	Chie Toramatsu(Assistant Professor)	Solution of equation of motion I
	3	Chie Toramatsu(Assistant Professor)	Solution of equation of motion II
	4	Chie Toramatsu(Assistant Professor)	The law of conservation of energy I
	5	Chie Toramatsu(Assistant Professor)	The law of conservation of energy II
	6	Kiwoo Lee(Assistant Professor)	Angular momentum I
	7	Kiwoo Lee(Assistant Professor)	Angular momentum II
	8	Kiwoo Lee(Assistant Professor)	The law of universal gravitation I
	9	Kiwoo Lee(Assistant Professor)	The law of universal gravitation II
	10	Kiwoo Lee(Assistant Professor)	Rigid body motion I
	11	Kiwoo Lee(Assistant Professor)	Rigid body motion II
	12	Chie Toramatsu(Assistant Professor)	Analytical mechanics I
	13	Chie Toramatsu(Assistant Professor)	Analytical mechanics II
	14	Chie Toramatsu(Assistant Professor)	Special relativity theory I
15	Chie Toramatsu(Assistant Professor)	Special relativity theory II	

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	Electromagnetism Lecture		
Instructor	Kiwoo Lee(Assistant Professor)		
Credit	2		
Type of Class	Lecture		
Theme	Electric field and potential, magnetic field, electromagnetic induction, Maxwell's equations, electromagnetic field energy, electrostatic field associated with conductor, circuit, dielectric and magnetic material, contact potential and electrode potential		
Schedule	Wednesday 9:00~10:30, 10:40~12:10		
Course Objective	<ul style="list-style-type: none"> • Learning and understanding of electromagnetics from the basics to practical use. • Acquire a wide range of knowledge about electromagnetism. • Acquire the ability to connect knowledge of electromagnetism to radiological medicine and medical physics research. 		
Evaluation Methods	Attendance (50%) Submission of a report on lecture content (50%)		
Grading Scale	S (90 points to 100 points), A (80 points to less than 90 points), B (70 points to less than 80 points), C (60 points to less than 70 points), D (less than 60 points) There are five types, S, A, B, and C are accepted, and D is rejected.		
Textbooks/References	Electromagnetism(SHOKABO) etc.		
Independent Study Outside of Class	Read the above reference books and related literature.		
Room	Radiation therapy planning room on the 3rd basement floor of the General Outpatient Center, Conference Room in the Education and Research Building.		
Special Note	Those who cannot participate in the above time will decide the timetable after consultation. Questions etc. are accepted at any time. Feedback will be given in the last class..		
Course Plan	Number	Instructor	Contents
	1	Kiwoo Lee(Assistant Professor)	Electric field and potential I
	2	Kiwoo Lee(Assistant Professor)	Electric field and potential II
	3	Kiwoo Lee(Assistant Professor)	magnetic field I
	4	Kiwoo Lee(Assistant Professor)	magnetic field II
	5	Kiwoo Lee(Assistant Professor)	electromagnetic induction I
	6	Kiwoo Lee(Assistant Professor)	electromagnetic induction II
	7	Kiwoo Lee(Assistant Professor)	Maxwell's equations I
	8	Kiwoo Lee(Assistant Professor)	Maxwell's equations II
	9	Kiwoo Lee(Assistant Professor)	Maxwell's equations III
	10	Kiwoo Lee(Assistant Professor)	electromagnetic field energy I
	11	Kiwoo Lee(Assistant Professor)	electromagnetic field energy II
	12	Kiwoo Lee(Assistant Professor)	electrostatic field associated with conductor
	13	Kiwoo Lee(Assistant Professor)	circuit
	14	Kiwoo Lee(Assistant Professor)	dielectric and magnetic material
15	Kiwoo Lee(Assistant Professor)	contact potential and electrode potential	

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	Thermodynamics and Statistical Mechanics		
Instructor	Chie Toramatsu(Assistant Professor), Kiwoo Lee(Assistant Professor)		
Credit	2		
Type of Class	Lecture		
Theme	Temperature and state equations, thermodynamic processes, equilibrium conditions and macroscopic state quantities, mechanics and probability, Boltzmann distribution and partition function, chemical reaction, phase transition, superconductivity and magnetic field, quantum statistical mechanics		
Schedule	Wednesday 9:00~10:30、10:40~12:10		
Course Objective	<ul style="list-style-type: none"> • Learning and understanding of thermodynamics and statistical mechanics from the basics to practical use. • Acquire a wide range of knowledge about thermodynamics and statistical mechanics. • Acquire the ability to connect knowledge of thermodynamics and statistical mechanics to radiological medicine for medical physics research. 		
Evaluation Methods	Attendance (50%) Submission of a report on lecture content (50%)		
Grading Scale	S (90 points to 100 points), A (80 points to less than 90 points), B (70 points to less than 80 points), C (60 points to less than 70 points), D (less than 60 points) There are five types, S, A, B, and C are accepted, and D is rejected.		
Textbooks/References	Thermodynamics and Statistical Mechanics (SHOKABO) etc.		
Independent Study Outside of Class	Read the above reference books and related literatures.		
Room	Radiation therapy planning room on the 3rd basement floor of the General Outpatient Center, Conference Room in the Education and Research Building.		
Special Note	Those who cannot participate in the above time will decide the timetable after consultation. Questions etc. are accepted at any time. Feedback will be given in the last class..		
Course Plan	Number	Instructor	Contents
	1	Kiwoo Lee(Assistant Professor)	Temperature and state equations I
	2	Kiwoo Lee(Assistant Professor)	Temperature and state equations II
	3	Kiwoo Lee(Assistant Professor)	thermodynamic processes I
	4	Kiwoo Lee(Assistant Professor)	thermodynamic processes II
	5	Kiwoo Lee(Assistant Professor)	equilibrium conditions and macroscopic state quantities I
	6	Kiwoo Lee(Assistant Professor)	equilibrium conditions and macroscopic state quantities II
	7	Chie Toramatsu(Assistant Professor)	mechanics and probability I
	8	Chie Toramatsu(Assistant Professor)	mechanics and probability II
	9	Chie Toramatsu(Assistant Professor)	Boltzmann distribution and partition function I
	10	Chie Toramatsu(Assistant Professor)	Boltzmann distribution and partition function II
	11	Chie Toramatsu(Assistant Professor)	chemical reaction
	12	Chie Toramatsu(Assistant Professor)	phase transition
	13	Chie Toramatsu(Assistant Professor)	superconductivity and magnetic field, quantum statistical mechanics
	14	Chie Toramatsu(Assistant Professor)	quantum statistical mechanics I
15	Chie Toramatsu(Assistant Professor)	quantum statistical mechanics II	

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	Quantum Mechanics Lecture		
Instructor	Chie Toramatsu(Assistant Professor), Teiji Nishio(Visiting Professor), Yuichiro Narita(Part-time lecturer)		
Credit	2		
Type of Class	Lecture		
Theme	Old quantum theory, Schrodinger equation, approximate solution, scattering problem, relativistic quantum mechanics		
Schedule	Wednesday 9:00~10:30、10:40~12:10		
Course Objective	<ul style="list-style-type: none"> • Learning and understanding of quantum mechanics from the basicsto practical use. • Acquire a wide range of knowledge about quantum mechanics. • Acquire the ability to connect knowledge of quantum mechanics to radiation medicine for medical physics research. 		
Evaluation Methods	Attendance (50%) Submission of a report on lecture content (50%)		
Grading Scale	S (90 points to 100 points), A (80 points to less than 90 points), B (70 points to less than 80 points), C (60 points to less than 70 points), D (less than 60 points) There are five types, S, A, B, and C are accepted, and D is rejected.		
Textbooks/References	Quantum Mechanics (SHOKABO) etc.		
Independent Study Outside of Class	Read the above reference books and related literature.		
Room	Radiation therapy planning room on the 3rd basement floor of the General Outpatient Center, Conference Room in the Education and Research Building.		
Special Note	Those who cannot participate in the above time will decide the timetable after consultation. Questions etc. are accepted at any time. Feedback will be given in the last class..		
Course Plan	Number	Instructor	Contents
	1	Chie Toramatsu(Assistant Professor)	Old quantum theory I
	2	Chie Toramatsu(Assistant Professor)	Old quantum theory II
	3	Chie Toramatsu(Assistant Professor)	Old quantum theory III
	4	Teiji Nishio(Visiting Professor)	Schrodinger equation I
	5	Teiji Nishio(Visiting Professor)	Schrodinger equation II
	6	Teiji Nishio(Visiting Professor)	Schrodinger equation III
	7	Yuichiro Narita(Part-time lecturer)	approximate solution I
	8	Yuichiro Narita(Part-time lecturer)	approximate solution II
	9	Yuichiro Narita(Part-time lecturer)	approximate solution III
	10	Chie Toramatsu(Assistant Professor)	scattering problem I
	11	Chie Toramatsu(Assistant Professor)	scattering problem III
	12	Chie Toramatsu(Assistant Professor)	scattering problem III
	13	Yuichiro Narita(Part-time lecturer)	relativistic quantum mechanics I
	14	Yuichiro Narita(Part-time lecturer)	relativistic quantum mechanics II
15	Yuichiro Narita(Part-time lecturer)	relativistic quantum mechanics III	

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	Nuclear Physics Lecture		
Instructor	Chie Toramatsu(Assistant Professor), Kiwoo Lee(Assistant Professor), Yuichiro Narita(Part-time lecturer)		
Credit	2		
Type of Class	Lecture		
Theme	Global nature of nuclei, nuclear force and two-body problem, nuclear structure, nuclear reaction, lifetime and decay of nuclei, fission and fusion		
Schedule	Wednesday 9:00~10:30, 10:40~12:10		
Course Objective	<ul style="list-style-type: none"> • Learning and understanding of nuclear physics from the basics to practical use. • Acquire a wide range of knowledge about nuclear physics. • Acquire the ability to connect knowledge of nuclear physics to radiation medicine for medical physics research. 		
Evaluation Methods	Attendance (50%) Submission of a report on lecture content (50%)		
Grading Scale	S (90 points to 100 points), A (80 points to less than 90 points), B (70 points to less than 80 points), C (60 points to less than 70 points), D (less than 60 points) There are five types, S, A, B, and C are accepted, and D is rejected.		
Textbooks/References	Nuclear Physics (SHOKABO) etc.		
Independent Study Outside of Class	Read the above reference books and related literature.		
Room	Radiation therapy planning room on the 3rd basement floor of the General Outpatient Center, Conference Room in the Education and Research Building.		
Special Note	Those who cannot participate in the above time will decide the timetable after consultation. Questions etc. are accepted at any time. Feedback will be given in the last class..		
Course Plan	Number	Instructor	Contents
	1	Kiwoo Lee(Assistant Professor)	Global nature of nuclei I
	2	Kiwoo Lee(Assistant Professor)	Global nature of nuclei II
	3	Kiwoo Lee(Assistant Professor)	nuclear force and two-body problem I
	4	Kiwoo Lee(Assistant Professor)	nuclear force and two-body problem II
	5	Kiwoo Lee(Assistant Professor)	nuclear force and two-body problem III
	6	Chie Toramatsu(Assistant Professor)	nuclear structure I
	7	Chie Toramatsu(Assistant Professor)	nuclear structure II
	8	Chie Toramatsu(Assistant Professor)	nuclear structure III
	9	Chie Toramatsu(Assistant Professor)	nuclear reaction I
	10	Chie Toramatsu(Assistant Professor)	nuclear reaction II
	11	Chie Toramatsu(Assistant Professor)	nuclear reaction III
	12	Yuichiro Narita(Part-time lecturer)	lifetime and decay of nuclei I
	13	Yuichiro Narita(Part-time lecturer)	lifetime and decay of nuclei II
	14	Yuichiro Narita(Part-time lecturer)	fission and fusion I
15	Yuichiro Narita(Part-time lecturer)	fission and fusion II	

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	Physical Mathematics Lecture		
Instructor	Chie Toramatsu(Assistant Professor), Yuichiro Narita(Part-time lecturer)		
Credit	1		
Type of Class	Lecture		
Theme	Linear Algebra, Differentiation and Integral, Fourier Analysis, Differential and Integral Equations, Calculation of Numerical Values		
Schedule	Wednesday 9:00~10:30, 10:40~12:10		
Course Objective	<ul style="list-style-type: none"> • Learning and understanding of physical mathematics from the basics to practical use. • Acquire a wide range of knowledge about physical mathematics. • To acquire the ability to connect knowledge of physical mathematics to radiation medicine and medical physics research. 		
Evaluation Methods	Attendance (50%) Submission of a report on lecture content (50%)		
Grading Scale	S (90 points to 100 points), A (80 points to less than 90 points), B (70 points to less than 80 points), C (60 points to less than 70 points), D (less than 60 points) There are five types, S, A, B, and C are accepted, and D is rejected.		
Textbooks/References	Physical Mathematics (SHOKABO) etc.		
Independent Study Outside of Class	Read the above reference books and related literature.		
Room	Radiation therapy planning room on the 3rd basement floor of the General Outpatient Center, Conference Room in the Education and Research Building.		
Special Note	Those who cannot participate in the above time will decide the timetable after consultation. Questions etc. are accepted at any time. Feedback will be given in the last class..		
Course Plan	Number	Instructor	Contents
	1	Chie Toramatsu(Assistant Professor), Yuichiro Narita(Part-time lecturer)	Linear Algebra
	2	Chie Toramatsu(Assistant Professor), Yuichiro Narita(Part-time lecturer)	Differentiation and Integral
	3	Chie Toramatsu(Assistant Professor), Yuichiro Narita(Part-time lecturer)	Fourier Analysis I
	4	Chie Toramatsu(Assistant Professor), Yuichiro Narita(Part-time lecturer)	Fourier Analysis II
	5	Chie Toramatsu(Assistant Professor), Yuichiro Narita(Part-time lecturer)	Differential and Integral Equations I
	6	Chie Toramatsu(Assistant Professor), Yuichiro Narita(Part-time lecturer)	Differential and Integral Equations II
	7	Chie Toramatsu(Assistant Professor), Yuichiro Narita(Part-time lecturer)	Calculation of Numerical Values I
	8	Chie Toramatsu(Assistant Professor), Yuichiro Narita(Part-time lecturer)	Calculation of Numerical Values II

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	Radiation Physics Lecture		
Instructor	Chie Toramatsu(Assistant Professor), Kiwoo Lee(Assistant Professor) , Yuichiro Narita(Part-time lecturer)		
Credit	2		
Type of Class	Lecture		
Theme	Structure of atoms and nuclei, history of radiation, classification of radiation, unit of radiation field, photon beam, interaction between photon and matter, attenuation of photon beam flux, electron beam, interaction between electron beam and matter, charged particle beam , Charged particle-matter interaction, neutron beam, neutron-matter interaction, radioactive decay, charged particle equilibrium and radiative equilibrium		
Schedule	Wednesday 9:00~10:30、10:40~12:10		
Course Objective	<ul style="list-style-type: none"> • Learning and understanding of radiation physics from the basics of to practical use. • Acquire a wide range of knowledge about radiation physics. • To acquire the ability to connect knowledge of radiation physics to radiation medicine and medical physics research. 		
Evaluation Methods	Attendance (50%) Submission of a report on lecture content (50%)		
Grading Scale	S (90 points to 100 points), A (80 points to less than 90 points), B (70 points to less than 80 points), C (60 points to less than 70 points), D (less than 60 points) There are five types, S, A, B, and C are accepted, and D is rejected.		
Textbooks/References	Radiation Physics (SHOKABO) etc.		
Independent Study Outside of Class	Read the above reference books and related literature.		
Room	Radiation therapy planning room on the 3rd basement floor of the General Outpatient Center, Conference Room in the Education and Research Building.		
Special Note	Those who cannot participate in the above time will decide the timetable after consultation. Questions etc. are accepted at any time. Feedback will be given in the last class.		
Course Plan	Number	Instructor	Contents
	1	Chie Toramatsu(Assistant Professor), Kiwoo Lee(Assistant Professor) , Yuichiro Narita(Part-time lecturer)	Structure of atoms and nuclei
	2	Chie Toramatsu(Assistant Professor), Kiwoo Lee(Assistant Professor) , Yuichiro Narita(Part-time lecturer)	History of radiation
	3	Chie Toramatsu(Assistant Professor), Kiwoo Lee(Assistant Professor) , Yuichiro Narita(Part-time lecturer)	Classification of radiation
	4	Chie Toramatsu(Assistant Professor), Kiwoo Lee(Assistant Professor) , Yuichiro Narita(Part-time lecturer)	Units of radiation field
	5	Chie Toramatsu(Assistant Professor), Kiwoo Lee(Assistant Professor) , Yuichiro Narita(Part-time lecturer)	Generation of X-rays
	6	Chie Toramatsu(Assistant Professor), Kiwoo Lee(Assistant Professor) , Yuichiro Narita(Part-time lecturer)	Interaction between photons and materials
	7	Chie Toramatsu(Assistant Professor), Kiwoo Lee(Assistant Professor) , Yuichiro Narita(Part-time lecturer)	Attenuation of photon flux
	8	Chie Toramatsu(Assistant Professor), Kiwoo Lee(Assistant Professor) , Yuichiro Narita(Part-time lecturer)	Electron beam
	9	Chie Toramatsu(Assistant Professor), Kiwoo Lee(Assistant Professor) , Yuichiro Narita(Part-time lecturer)	Interaction between electron beam and matter
	10	Chie Toramatsu(Assistant Professor), Kiwoo Lee(Assistant Professor) , Yuichiro Narita(Part-time lecturer)	Charged particle beams
	11	Chie Toramatsu(Assistant Professor), Kiwoo Lee(Assistant Professor) , Yuichiro Narita(Part-time lecturer)	Interaction of charged particles and materials
	12	Chie Toramatsu(Assistant Professor), Kiwoo Lee(Assistant Professor) , Yuichiro Narita(Part-time lecturer)	Neutron rays
	13	Chie Toramatsu(Assistant Professor), Kiwoo Lee(Assistant Professor) , Yuichiro Narita(Part-time lecturer)	Neutron-material interaction
	14	Chie Toramatsu(Assistant Professor), Kiwoo Lee(Assistant Professor) , Yuichiro Narita(Part-time lecturer)	Radioactive decay
15	Chie Toramatsu(Assistant Professor), Kiwoo Lee(Assistant Professor) , Yuichiro Narita(Part-time lecturer)	Charged particle equilibrium and radiation equilibrium	

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	Radiation Therapy Physics I Lecture		
Instructor	Chie Toramatsu(Assistant Professor), Yuichiro Narita(Part-time lecturer)		
Credit	1		
Type of Class	Lecture		
Theme	Radiation characteristics, radiation therapy related equipment, dose calibration, radiation therapy planning system, radiation therapy planning method, dose distribution verification		
Schedule	Wednesday 9:00~10:30, 10:40~12:10		
Course Objective	<ul style="list-style-type: none"> • Learning and understanding of radiation characteristics from actual therapeutic equipment, basic materials such as radiation measurement values to dose conversion, and practical use. • Acquire a wide range of knowledge of radiation therapy physics. • Acquire the ability to link knowledge of radiation therapy physics to radiation medicine and medical physics research. 		
Evaluation Methods	Attendance (50%) Submission of a report on lecture content (50%)		
Grading Scale	S (90 points to 100 points), A (80 points to less than 90 points), B (70 points to less than 80 points), C (60 points to less than 70 points), D (less than 60 points) There are five types, S, A, B, and C are accepted, and D is rejected.		
Textbooks/References	Radiation Physics (SHOKABO) etc.		
Independent Study Outside of Class	Read the above reference books and related literature.		
Room	Radiation therapy planning room on the 3rd basement floor of the General Outpatient Center, Conference Room in the Education and Research Building.		
Special Note	Those who cannot participate in the above time will decide the timetable after consultation. Questions etc. are accepted at any time. Feedback will be given in the last class..		
Course Plan	Number	Instructor	Contents
	1	Chie Toramatsu(Assistant Professor)	Radiation characteristics I
	2	Chie Toramatsu(Assistant Professor)	Radiation characteristics II
	3	Chie Toramatsu(Assistant Professor)	radiation therapy related equipment
	4	Yuichiro Narita(Part-time lecturer)	dose calibration I
	5	Yuichiro Narita(Part-time lecturer)	dose calibration II
	6	Yuichiro Narita(Part-time lecturer)	radiation therapy planning system
	7	Yuichiro Narita(Part-time lecturer)	radiation therapy planning method
	8	Yuichiro Narita(Part-time lecturer)	dose distribution verification I

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	Radiation Therapy Physics I(Training)		
Instructor	Chie Toramatsu(Assistant Professor), Yuichiro Narita(Part-time lecturer)		
Credit	1		
Type of Class	training		
Theme	Radiation characteristics, radiation therapy related equipment, dose calibration, radiation therapy planning system, radiation therapy planning method, dose distribution verification		
Schedule	Wednesday 9:00~10:30, 10:40~12:10		
Course Objective	<ol style="list-style-type: none"> 1. Students will understand the characteristics of radiation therapy equipment and equipment by conducting practical training using actual radiotherapy equipment and equipment. 2. Basic dose calibration and dose distribution verification can be performed after understanding radiation characteristics. 3. By conducting practical training using the actual radiation therapy planning equipment, students will understand the characteristics of radiation therapy planning equipment and planning procedures. 4. Treatment planning can be carried out. 5. Dose verification and dose distribution verification of the proposed treatment plan can be carried out. 		
Evaluation Methods	Attendance (50%) Submission of a report on lecture content (50%)		
Grading Scale	S (90 points to 100 points), A (80 points to less than 90 points), B (70 points to less than 80 points), C (60 points to less than 70 points), D (less than 60 points) There are five types, S, A, B, and C are accepted, and D is rejected.		
Textbooks/References	Radiation Physics (SHOKABO) etc.		
Independent Study Outside of Class	Read the above reference books and related literature.		
Room	Radiation therapy planning room on the 3rd basement floor of the General Outpatient Center, Conference Room in the Education and Research Building.		
Special Note	Those who cannot participate in the above time will decide the timetable after consultation. Questions etc. are accepted at any time. Feedback will be given in the last class..		
Course Plan	Number	Instructor	Contents
	1	Chie Toramatsu(Assistant Professor)	Radiation characteristics I
	2	Chie Toramatsu(Assistant Professor)	Radiation characteristics II
	3	Chie Toramatsu(Assistant Professor)	radiation therapy related equipment
	4	Yuichiro Narita(Part-time lecturer)	dose calibration I
	5	Yuichiro Narita(Part-time lecturer)	dose calibration II
	6	Yuichiro Narita(Part-time lecturer)	radiation therapy planning system
	7	Yuichiro Narita(Part-time lecturer)	radiation therapy planning method
8	Yuichiro Narita(Part-time lecturer)	dose distribution verification I	

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	Radiation Therapy Physics II Lecture		
Instructor	Chie Toramatsu(Assistant Professor), Teiji Nishio(Visiting Professor)		
Credit	1		
Type of Class	lecture		
Theme	Radiation characteristics, radiation therapy related equipment, dose calibration, radiation therapy planning system, radiation therapy planning method, dose distribution verification		
Schedule	Wednesday 9:00~10:30、10:40~12:10		
Course Objective	<ol style="list-style-type: none"> 1. Students will understand the characteristics of radiation therapy equipment and equipment by conducting practical training using actual radiotherapy equipment and equipment. 2. Basic dose calibration and dose distribution verification can be performed after understanding radiation characteristics. 3. By conducting practical training using the actual radiation therapy planning equipment, students will understand the characteristics of radiation therapy planning equipment and planning procedures. 4. Treatment planning can be carried out. 5. Dose verification and dose distribution verification of the proposed treatment plan can be carried out. 		
Evaluation Methods	Attendance (50%) Submission of a report on lecture content (50%)		
Grading Scale	S (90 points to 100 points), A (80 points to less than 90 points), B (70 points to less than 80 points), C (60 points to less than 70 points), D (less than 60 points) There are five types, S, A, B, and C are accepted, and D is rejected.		
Textbooks/References	Radiation Physics (SHOKABO) etc.		
Independent Study Outside of Class	Read the above reference books and related literature.		
Room	Radiation therapy planning room on the 3rd basement floor of the General Outpatient Center, Conference Room in the Education and Research Building.		
Special Note	Those who cannot participate in the above time will decide the timetable after consultation. Questions etc. are accepted at any time. Feedback will be given in the last class.		
Course Plan	Number	Instructor	Contents
	1	matsu(Assistant Professor), Teiji Nishio(Visiting	Radiation characteristics III
	2	matsu(Assistant Professor), Teiji Nishio(Visiting	Radiation characteristics IV
	3	matsu(Assistant Professor), Teiji Nishio(Visiting	radiation therapy related equipment II
	4	matsu(Assistant Professor), Teiji Nishio(Visiting	dose calibration III
	5	matsu(Assistant Professor), Teiji Nishio(Visiting	dose calibration IV
	6	matsu(Assistant Professor), Teiji Nishio(Visiting	radiation therapy planning system II
	7	matsu(Assistant Professor), Teiji Nishio(Visiting	radiation therapy planning method II
8	matsu(Assistant Professor), Teiji Nishio(Visiting	dose distribution verification II	

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	Radiation Therapy Physics II Training	
Instructor	Chie Toramatsu(Assistant Professor), Teiji Nishio(Visiting Professor)	
Credit	1	
Type of Class	training	
Theme	Radiation characteristics, radiation therapy related equipment, dose calibration, radiation therapy planning system, radiation therapy planning method, dose distribution verification	
Schedule	Wednesday 9:00~10:30、10:40~12:10	
Course Objective	<ol style="list-style-type: none"> 1. Students will understand the characteristics of radiation therapy equipment and equipment by conducting practical training using actual radiotherapy equipment and equipment. 2. Basic dose calibration and dose distribution verification can be performed after understanding radiation characteristics. 3. By conducting practical training using the actual radiation therapy planning equipment, students will understand the characteristics of radiation therapy planning equipment and planning procedures. 4. Treatment planning can be carried out. 5. Dose verification and dose distribution verification of the proposed treatment plan can be carried out. 	
Evaluation Methods	Attendance (50%) Submission of a report on lecture content (50%)	
Grading Scale	S (90 points to 100 points), A (80 points to less than 90 points), B (70 points to less than 80 points), C (60 points to less than 70 points), D (less than 60 points) There are five types, S, A, B, and C are accepted, and D is rejected.	
Textbooks/References	Radiation Physics (SHOKABO) etc.	
Independent Study Outside of Class	Read the above reference books and related literature.	
Room	Radiation therapy planning room on the 3rd basement floor of the General Outpatient Center, Conference Room in the Education and Research Building.	
Special Note	Those who cannot participate in the above time will decide the timetable after consultation. Questions etc. are accepted at any time. Feedback will be given in the last class.	
Course Plan	Number	Contents
	1~2	Achievement of Goal 1
	3~4	Achievement of Goal 2
	5~6	Achievement of Goal 3
	7~8	Achievement of Goal 4
	9~10	Achievement of Goal 5

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	Radiation Measurement I (Training/Lecture)		
Instructor	Chie Toramatsu(Assistant Professor), Yuichiro Narita(Part-time lecturer)		
Credit	2		
Type of Class	Training/Lecture		
Theme	Dosimetry, calorimeter dosimetry, chemical dosimeter, cavity theory, ionization chamber, dose calibration, relative dosimetry technology, pulse mode detector, counting / statistics		
Schedule	Wednesday 9:00~10:30, 10:40~12:10, 13:00~16:00		
Course Objective	<p>lecture</p> <ol style="list-style-type: none"> 1. Learning and understanding of radiation measurement from the basics to practical use, and acquire a wide range of knowledge of radiation measurement that are required for medical physics. 2. Learning and understanding of dose measuring equipment, measured value data processing and statistical processing methods. 3. Acquire knowledge of radiation measurement, radiation medicine and medical physics research. <p>training</p> <ol style="list-style-type: none"> 1. Understanding of the characteristics of radiation measuring equipment by practicing using various radiation measuring equipment. 2. Understanding of the radiation information required in clinical practice and a radiation measurement method. 3. Acquire data of radiation measurement values and analyze the data. 4. Measurement and calculation of the absolute dose in radiation therapy. 5. Measurement and calculation of the dose distribution in radiation therapy. 		
Evaluation Methods	Attendance (50%) Submission of a report on lecture content (50%)		
Grading Scale	S (90 points to 100 points), A (80 points to less than 90 points), B (70 points to less than 80 points), C (60 points to less than 70 points), D (less than 60 points) There are five types, S, A, B, and C are accepted, and D is rejected.		
Textbooks/References	Radiation Physics (SHOKABO) etc.		
Independent Study Outside of Class	Read the above reference books and related literature.		
Room	Radiation therapy planning room on the 3rd basement floor of the General Outpatient Center, Conference Room in the Education and Research Building.		
Special Note	Those who cannot participate in the above time will decide the timetable after consultation. Questions etc. are accepted at any time. Feedback will be given in the last class.		
Course Plan	Number	Instructor	Contents
	1	Chie Toramatsu(Assistant Professor), Yuichiro Narita(Part-time lecturer)	Dosimetry
	2	Chie Toramatsu(Assistant Professor), Yuichiro Narita(Part-time lecturer)	calorimeter dosimetry
	3	Chie Toramatsu(Assistant Professor), Yuichiro Narita(Part-time lecturer)	chemical dosimeter
	4	Chie Toramatsu(Assistant Professor), Yuichiro Narita(Part-time lecturer)	cavity theory
	5	Chie Toramatsu(Assistant Professor), Yuichiro Narita(Part-time lecturer)	ionization chamber
	6	Chie Toramatsu(Assistant Professor), Yuichiro Narita(Part-time lecturer)	dose calibration
	7	Chie Toramatsu(Assistant Professor), Yuichiro Narita(Part-time lecturer)	relative dosimetry technology
	8	Chie Toramatsu(Assistant Professor), Yuichiro Narita(Part-time lecturer)	pulse mode detector, counting / statistics

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	Radiation Measurement II		
Instructor	Chie Toramatsu(Assistant Professor), Kiwoo Lee(Assistant Professor), Yuichiro Narita(Part-time lecturer)		
Credit	1		
Type of Class	lecture		
Theme	Dose calibration, relative dose measurement, radiation energy measurement, radiation stopping power measurement, particle number measurement		
Schedule	Wednesday 9:00~10:30、10:40~12:10		
Course Objective	1. Learn about radiation measurement from the basics to practical use, and acquire extensive knowledge of radiation measurement necessary for medical physics. 2. Understand the characteristics of radiation measurement, and learn about radiation measurement systems, data processing and statistical processing. 3. Acquire extensive skills for medical physics research from the basic knowledge of radiation measurement.		
Evaluation Methods	Attendance (50%) Submission of a report on lecture content (50%)		
Grading Scale	S (90 points to 100 points), A (80 points to less than 90 points), B (70 points to less than 80 points), C (60 points to less than 70 points), D (less than 60 points) There are five types, S, A, B, and C are accepted, and D is rejected.		
Textbooks/References	Radiation Measurement (SHOKABO) etc.		
Independent Study Outside of Class	Read the above reference books and related literature.		
Room	Radiation therapy planning room on the 3rd basement floor of the General Outpatient Center, Conference Room in the Education and Research Building.		
Special Note	Those who cannot participate in the above time will decide the timetable after consultation. Questions etc. are accepted at any time. Feedback will be given in the last class..		
Course Plan	Number	Instructor	Contents
	1	Kiwoo Lee(Assistant Professor)	Dose calibration II
	2	Kiwoo Lee(Assistant Professor)	Relative dose measurement II
	3	Yuichiro Narita(Part-time lecture)	Radiation energy measurement I
	4	Yuichiro Narita(Part-time lecture)	Radiation energy measurement II
	5	Kiwoo Lee(Assistant Professor)	Radiation stopping power measurement I
	6	Kiwoo Lee(Assistant Professor)	Radiation stopping power measurement II
	7	Chie Toramatsu(Assistant Professor)	Particle number measurement I
	8	Chie Toramatsu(Assistant Professor)	Particle number measurement II

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	Radiation Measurement II(Training)	
Instructor	Chie Toramatsu(Assistant Professor), Yuichiro Narita(Part-time lecturer)	
Credit	1	
Type of Class	training	
Theme	radiation energy measurement, radiation stopping power measurement, particle number measurement	
Schedule	Wednesday 13:00~16:00	
Course Objective	1. Perform measurement and calculation of radiation energy using radiation measuring devices for various types of radiation. 2. Perform measurement and calculation of radiation stopping power using a radiation measuring device for various types of radiation. 3. Perform measurement and calculation of number of particles using a radiation measuring device for various types of radiation.	
Evaluation Methods	Attendance (50%) Submission of a report on lecture content (50%)	
Grading Scale	S (90 points to 100 points), A (80 points to less than 90 points), B (70 points to less than 80 points), C (60 points to less than 70 points), D (less than 60 points) There are five types, S, A, B, and C are accepted, and D is rejected.	
Textbooks/References	Radiation Measurement (Kokusai Bunken-sha), Standard absorbed dose measurement in external beam radiation therapy (The society of Japanese medical physics), Hand book of radiation measurement (Ohm Ltd.), Techniques for Nuclear and Particle Physics Experiment (Springer社), Cancer Radiation Therapy method 2017 (Name: Gakken Medical Shujunsha Co., Ltd.) etc.	
Independent Study Outside of Class	Self study of related books, attend conferences to collect information	
Room	Radiation therapy planning room on the 3rd basement floor of the General Outpatient Center, Conference Room in the Education and Research Building.	
Special Note	Those who cannot participate in the above time will decide the timetable after consultation. Questions etc. are accepted at any time. Feedback will be given in the last class..	
Course Plan	Number	Contents
	1~4	Achievement of Goal 1
	5~7	Achievement of Goal 2
	8~10	Achievement of Goal 3

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	Health Physics and Radiation Protection I		
Instructor	Kumiko Karasawa(Professor and Head of division), Chie Toramatsu(Assistant Professor),Teiji Nishio (Visiting Professor)		
Credit	2		
Type of Class	Lecture/Training		
Theme	Introduction and History, Protection-related organizations, Radiation sources and application, Radiation biological effects and risk, Dose classification, Radiation protection system, Radiation protection management, Protection-related regulations, Medical radiation protection and management, etc.		
Schedule	Wednesday 9:00~10:30, 10:40~12:10, 13:00~16:00		
Course Objective	Lecture 1. Learn and understand the radiation protection and management from basics to practical use. 2. Acquire a wide range of knowledge about health physics and radiation protection. 3. Acquire the skills to connect knowledge of health physics and radiation protection to medical physics research. Practical training 1. Understand the characteristics and properties of each radiation type, and perform radiation protection practices. 2. Understand the characteristics and properties of each radiation type, and handle appropriate radiation management and storage. 3. Understand the characteristics and properties of each radiation type, and perform practical work including radiation decontamination methods.		
Evaluation Methods	Attendance (50%) Submission of a report on lecture content (50%)		
Grading Scale	S (90 points to 100 points), A (80 points to less than 90 points), B (70 points to less than 80 points), C (60 points to less than 70 points), D (less than 60 points) There are five types, S, A, B, and C are accepted, and D is rejected.		
Textbooks/References	Radiation Safety Management (Ohm. Ltd.) , Cancer•Radiation Therapy method 2017 (Name: Gakken Medical Shujunsha Co., Ltd.) , Basics of Radiation protection (Nikkan-kogyo Newspaper publishing company) , etc		
Independent Study Outside of Class	Self study of related books, attend conferences to collect information.		
Room	Radiation therapy planning room on the 3rd basement floor of the General Outpatient Center, Conference Room in the Education and Research Building.		
Special Note	Those who cannot participate in the above time will decide the timetable after consultation. Questions etc. are accepted at any time. Feedback will be given in the last class..		
Course Plan	Number	Instructor	Contents
	1	Kumiko Karasawa(Professor and Head of division), Chie Toramatsu	Introduction and History
	2	Kumiko Karasawa(Professor and Head of division), Chie Toramatsu	Protection-related organizations
	3	Kumiko Karasawa(Professor and Head of division), Chie Toramatsu	Radiation sources and application
	4	Kumiko Karasawa(Professor and Head of division), Chie Toramatsu	Radiation biological effects and risk
	5	Kumiko Karasawa(Professor and Head of division), Chie Toramatsu	Dose classification
	6	Kumiko Karasawa(Professor and Head of division), Chie Toramatsu	Radiation protection system
	7	Kumiko Karasawa(Professor and Head of division), Chie Toramatsu	Radiation protection management, Protection-related regulations
	8	Kumiko Karasawa(Professor and Head of division), Chie Toramatsu	Medical radiation protection and management, etc.

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	Diagnostic Radiology Physics I (Lecture and Training)		
Instructor	Chie Toramatsu (Assistant Professor), Kiwoo Lee (Assistant Professor)		
Credit	2		
Type of Class	Lecture and Training		
Theme	X-ray photography, fluoroscopy, X-ray CT, magnetic resonance, ultrasound, QA/QC		
Schedule	Wednesday 9:00~10:30, 10:40~12:10, 13:00~16:00		
Course Objective	<p>Lecture</p> <ol style="list-style-type: none"> 1. Learn and understand the characteristics of radiation and actual radiation diagnostic equipment from the basics to practical use. 2. Acquire a wide range of knowledge about radiological diagnostic physics. 3. Acquire the skills to connect knowledge of radiological diagnostic physics to radiomedical and medical physics research. <p>Practical training</p> <ol style="list-style-type: none"> 1. Perform image quality and dose verification of X-ray fluoroscope image. 2. Perform image quality and dose verification of X-ray CT image. 3. Perform image quality verification of magnetic resonance image. 4. Perform image quality verification of ultrasound image. 5. Perform Quality assurance and management of radiation diagnostic equipment. 		
Evaluation Methods	Attendance (50%) Submission of a report on lecture content (50%)		
Grading Scale	S (90 points to 100 points), A (80 points to less than 90 points), B (70 points to less than 80 points), C (60 points to less than 70 points), D (less than 60 points) There are five types, S, A, B, and C are accepted, and D is rejected.		
Textbooks/References	Diagnostic Radiation Physics (Kokusai Bunken Ltd.), Cancer Radiation therapy 2017 (Gakken Medical Shyubun Ltd.) etc.		
Independent Study Outside of Class	Self study of related books, attend conferences to collect information		
Room	Radiation therapy planning room on the 3rd basement floor of the General Outpatient Center, Conference Room in the Education and Research Building.		
Special Note	Those who cannot participate in the above time will decide the timetable after consultation. Questions etc. are accepted at any time. Feedback will be given in the last class.		
Course Plan	Number	Instructor	Contents
	1	Chie Toramatsu (Assistant Professor)	X-ray photography, fluoroscopy I
	2	Chie Toramatsu (Assistant Professor)	X-ray photography, fluoroscopy II
	3	Kiwoo Lee (Assistant Professor)	X-ray CT I
	4	Kiwoo Lee (Assistant Professor)	X-ray CT II
	5	Chie Toramatsu (Assistant Professor)	Magnetic resonance I
	6	Chie Toramatsu (Assistant Professor)	Magnetic resonance II
	7	Chie Toramatsu (Assistant Professor)	Ultrasound
8	Chie Toramatsu (Assistant Professor)	QA/QC	

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	Health Physics and Radiation Protection II Lecture/Training		
Instructor	Kumiko Karasawa(Professor and Head of division), Kiwoo Lee(Assistant Professor),Teiji Nishio (Visiting Professor)		
Credit	1		
Type of Class	Lecture/Training		
Theme	Radiation protection system, external exposure evaluation, internal exposure evaluation, shielding design, medical radiation protection and management, environmental radiation protection, reduction of patient exposure dose, storage and management of radioactive waste		
Schedule	Wednesday 9:00~10:30, 10:40~12:10, 13:00~16:00		
Course Objective	Lecture 1. Learn and understand the radiation protection and management from basics to practical use. 2. Acquire a wide range of knowledge about health physics and radiation protection. 3. Acquire the skills to connect knowledge of health physics and radiation protection to medical physics research.		
Evaluation Methods	Attendance (50%) Submission of a report on lecture content (50%)		
Grading Scale	S (90 points to 100 points), A (80 points to less than 90 points), B (70 points to less than 80 points), C (60 points to less than 70 points), D (less than 60 points) There are five types, S, A, B, and C are accepted, and D is rejected.		
Textbooks/References	Radiation Safety Management (Ohm. Ltd.)、Cancer・Radiation Therapy method 2017 (Name: Gakken Medical Shujunsha Co., Ltd.)、Basics of Radiation protection (Nikkan-kogyo Newspaper publishing company), etc		
Independent Study Outside of Class	Self study of related books, attend conferences to collect information.		
Room	Radiation therapy planning room on the 3rd basement floor of the General Outpatient Center, Conference Room in the Education and Research Building.		
Special Note	Those who cannot participate in the above time will decide the timetable after consultation. Questions etc. are accepted at any time. Feedback will be given in the last class..		
Course Plan	Number	Instructor	Contents
	1	Kumiko Karasawa(Professor and Head of division), Kiwoo Lee(Assistant Professor),Teiji Nishio (Visiting Professor)	Radiation protection system
	2	Kumiko Karasawa(Professor and Head of division), Kiwoo Lee(Assistant Professor),Teiji Nishio (Visiting Professor)	external exposure evaluation
	3	Kumiko Karasawa(Professor and Head of division), Kiwoo Lee(Assistant Professor),Teiji Nishio (Visiting Professor)	internal exposure evaluation
	4	Kumiko Karasawa(Professor and Head of division), Kiwoo Lee(Assistant Professor),Teiji Nishio (Visiting Professor)	shielding design
	5	Kumiko Karasawa(Professor and Head of division), Kiwoo Lee(Assistant Professor),Teiji Nishio (Visiting Professor)	medical radiation protection and management
	6	Kumiko Karasawa(Professor and Head of division), Kiwoo Lee(Assistant Professor),Teiji Nishio (Visiting Professor)	environmental radiation protection
	7	Kumiko Karasawa(Professor and Head of division), Kiwoo Lee(Assistant Professor),Teiji Nishio (Visiting Professor)	reduction of patient exposure dose
	8	Kumiko Karasawa(Professor and Head of division), Kiwoo Lee(Assistant Professor),Teiji Nishio (Visiting Professor)	storage and management of radioactive waste

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	Diagnostic Radiology Physics II Lecture		
Instructor	Kumiko Karasawa(Professor and Head of division), Chie Toramatsu(Assistant Professor),Teiji Nishio (Visiting Professor)		
Credit	1		
Type of Class	Lecture and Training		
Theme	X-ray photography, fluoroscopy, X-ray CT, magnetic resonance, ultrasound, QA/QC		
Schedule	Wednesday 9:00~10:30, 10:40~12:10, 13:00~16:00		
Course Objective	Lecture 1. Learn and understand the characteristics of radiation and actual radiation diagnostic equipment from the basics to practical use. 2. Acquire a wide range of knowledge about radiological diagnostic physics. 3. Acquire the skills to connect knowledge of radiological diagnostic physics to radiomedical and medical physics research.		
Evaluation Methods	Attendance (50%) Submission of a report on lecture content (50%)		
Grading Scale	S (90 points to 100 points), A (80 points to less than 90 points), B (70 points to less than 80 points), C (60 points to less than 70 points), D (less than 60 points) There are five types, S, A, B, and C are accepted, and D is rejected.		
Textbooks/References	Diagnostit Radiation Physics (Kokusai Bunken Ltd.), Cancer•Radiation therapy2017 (Gakken Medical Shyubun Ltd.) etc.		
Independent Study Outside of Class	Self study of related books, attend conferences to collect information		
Room	Radiation therapy planning room on the 3rd basement floor of the General Outpatient Center, Conference Room in the Education and Research Building.		
Special Note	Those who cannot participate in the above time will decide the timetable after consultation. Questions etc. are accepted at any time. Feedback will be given in the last class..		
Course Plan	Number	Instructor	Contents
	1	Kumiko Karasawa(Professor and Head of division), Chie Toramatsu(Assistant Professor),Teiji Nishio (Visiting Professor)	X-ray photography, fluoroscopy III
	2	Kumiko Karasawa(Professor and Head of division), Chie Toramatsu(Assistant Professor),Teiji Nishio (Visiting Professor)	X-ray photography, fluoroscopy IV
	3	Kumiko Karasawa(Professor and Head of division), Chie Toramatsu(Assistant Professor),Teiji Nishio (Visiting Professor)	X-ray CT III
	4	Kumiko Karasawa(Professor and Head of division), Chie Toramatsu(Assistant Professor),Teiji Nishio (Visiting Professor)	X-ray CT IV
	5	Kumiko Karasawa(Professor and Head of division), Chie Toramatsu(Assistant Professor),Teiji Nishio (Visiting Professor)	Magnetic resonance III
	6	Kumiko Karasawa(Professor and Head of division), Chie Toramatsu(Assistant Professor),Teiji Nishio (Visiting Professor)	Magnetic resonance IV
	7	Kumiko Karasawa(Professor and Head of division), Chie Toramatsu(Assistant Professor),Teiji Nishio (Visiting Professor)	Ultrasound II
	8	Kumiko Karasawa(Professor and Head of division), Chie Toramatsu(Assistant Professor),Teiji Nishio (Visiting Professor)	Ultrasound III

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	Nuclear Medicine Physics I (Training)		
Instructor	Toramatsu, Chie(Assistant Professor)/Narita, Yuichiro(Part-time lecturer)		
Credit	2		
Type of Class	Lecture & Training		
Theme	Radioisotope, radiopharmaceuticals, measuring instrument, image processing, tracer measurement & analysis, QA/QC of imaging device		
Schedule	The second half of the year: Friday, Saturday, Sunday; intensive course		
Course Objective	<p>Lecture</p> <ol style="list-style-type: none"> 1. Understanding the nuclear medicine diagnosis device from the fundamental to practical level 2. Acquiring knowledge of the nuclear medicine physics 3. Applying the acquired knowledge of the nuclear medicine physics to the radiomedical & medical physics <p>Training</p> <ol style="list-style-type: none"> 1. Operating the nuclear medicine diagnosis device to understand a feature 2. Practicing the image quality analysis with images from the nuclear medicine diagnosis device 3. Practicing the radiation dose assurance with the nuclear medicine diagnosis device 4. Practicing the QA/QC of the nuclear medicine diagnosis device 		
Evaluation Methods	Attendance (50%) Submission of a report on lecture content (50%)		
Grading Scale	S, A, B, C are passing grade, D is not passing grade (S: 100-90%, A: 89-80%, B: 79-70%, C: 69-60%, D: 59-0%)		
Textbooks/References	Nuclear Medicine Physics (Kokusai Bunken Ltd.), Cancer Radiotherapy 2017 (Gakken Medical Shyubun Ltd.) etc.		
Independent Study Outside of Class	Studying with Textbook&Reference above. Obtaining the latest information from studying with materials and participating a conference		
Room	Radiation therapy planning room on the 3rd basement floor of the General Outpatient Center, Conference Room in the Education and Research Building.		
Special Note	New timetable will be remaded on an agreement for those who can not participate. Questioning from students as needed. Feedback will be given in the last class.		
Course Plan	Number	Instructor	Contents
	1	Chie Toramatsu(Assistant Professor), Yuichiro Narita(Part-time lecturer)	Radioisotope
	2	Chie Toramatsu(Assistant Professor), Yuichiro Narita(Part-time lecturer)	Radiopharmaceuticals
	3	Chie Toramatsu(Assistant Professor), Yuichiro Narita(Part-time lecturer)	Measuring instrument I
	4	Chie Toramatsu(Assistant Professor), Yuichiro Narita(Part-time lecturer)	Measuring instrument II
	5	Chie Toramatsu(Assistant Professor), Yuichiro Narita(Part-time lecturer)	Image processing I
	6	Chie Toramatsu(Assistant Professor), Yuichiro Narita(Part-time lecturer)	Image processing II
	7	Chie Toramatsu(Assistant Professor), Yuichiro Narita(Part-time lecturer)	Tracer measurement & analysis
	8	Chie Toramatsu(Assistant Professor), Yuichiro Narita(Part-time lecturer)	QA/QC of imaging device

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	Nuclear Medicine Physics II (Lecture)		
Instructor	Toramatsu, Chie(Assistant Professor)/Kiwoo Lee(Assistant Professor)/Narita, Yuichiro(Part-time Lecturer)		
Credit	1		
Type of Class	Lecture & Training		
Theme	Performance assessment of gamma camera, SPECT(SPECT/CT) and PET(PET/CT), QA/QC of imaging device, Dose assessment of the internal radiation exposure		
Schedule	The second half of the year: Friday, Saturday, Sunday; intensive course		
Course Objective	<ul style="list-style-type: none"> • Understanding the nuclear medicine diagnosis device from the fundamental to practical level • Acquiring knowledge of the nuclear medicine physics • Applying the acquired knowledge of the nuclear medicine physics to the radiomedical & medical physics 		
Evaluation Methods	Attendance (50%) Submission of a report on lecture content (50%)		
Grading Scale	S (90 points to 100 points), A (80 points to less than 90 points), B (70 points to less than 80 points), C (60 points to less than 70 points), D (less than 60 points) There are five types, S, A, B, and C are accepted, and D is rejected.		
Textbooks/References	Nuclear Medicine Physics(Kokusai Bunken Ltd.), Cancer•Radiotherapy2017(Gakken Medical Shyubun Ltd.)etc.		
Independent Study Outside of Class	Studying with Textbook&Reference above.		
Room	Radiation therapy planning room on the 3rd basement floor of the General Outpatient Center, Conference Room in the Education and Research Building.		
Special Note	New timetable will be remaded on an agreement for those who can not participate. Questioning from students as needed. Feedback will be given in the last class.		
Course Plan	Number	Instructor	Contents
	1	Chie Toramatsu(Assistant Professor), Yuichiro Narita(Part-time Lecturer)	Performance assessment of gamma camera I
	2	Chie Toramatsu(Assistant Professor), Yuichiro Narita(Part-time Lecturer)	Performance assessment of gamma camera II
	3	Chie Toramatsu(Assistant Professor), Yuichiro Narita(Part-time Lecturer)	Performance assessment of SPECT(SPECT/CT) I
	4	Chie Toramatsu(Assistant Professor), Yuichiro Narita(Part-time Lecturer)	Performance assessment of SPECT(SPECT/CT) II
	5	Chie Toramatsu(Assistant Professor), Yuichiro Narita(Part-time Lecturer)	Performance assessment of PET(PET/CT) I
	6	Chie Toramatsu(Assistant Professor), Yuichiro Narita(Part-time Lecturer)	Performance assessment of PET(PET/CT) II
	7	Chie Toramatsu(Assistant Professor), Yuichiro Narita(Part-time Lecturer)	QA/QC of imaging device
	8	Chie Toramatsu(Assistant Professor), Yuichiro Narita(Part-time Lecturer)	Dose assessment of the internal radiation exposure

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	Medical Imaging and Information(Lecture)		
Instructor	Toramatsu, Chie(Assistant Professor)/Lee, Kiwoo(Assistant Professor)		
Credit	1		
Type of Class	Lecture & Training		
Theme	Information theory, signal processing, image engineering, medical informatics etc.		
Schedule	Wednesday 9:00-10:30, 10:40-12:10		
Course Objective	<ul style="list-style-type: none"> •Understanding the medical imaging device from the fundamental to practical level •Acquiring knowledge of the medical imaging and information •Applying the acquired knowledge of the medical imaging and information to the radiomedical & medical physics 		
Evaluation Methods	Attendance (50%) Submission of a report on lecture content (50%)		
Grading Scale	S (90 points to 100 points), A (80 points to less than 90 points), B (70 points to less than 80 points), C (60 points to less than 70 points), D (less than 60 points) There are five types, S, A, B, and C are accepted, and D is rejected.		
Textbooks/References	Information and systems in radiological technology (Ohm Ltd.), medical image processing and information technology (Nanzando Ltd.), medical information technology (Kyoritsu-pub Ltd.), Cancer Radiotherapy 2017 (Gakken Medical Shyubun Ltd.) etc.		
Independent Study Outside of Class	Studying with Textbook&Reference above.		
Room	Radiation therapy planning room on the 3rd basement floor of the General Outpatient Center, Conference Room in the Education and Research Building.		
Special Note	New timetable will be remaded on an agreement for those who can not participate. Questioning from students as needed. Feedback will be given in the last class.		
Course Plan	Number	Instructor	Contents
	1	Kiwoo Lee(Assistant Professor)	Information theory I
	2	Kiwoo Lee(Assistant Professor)	Information theory II *signal processing I
	3	Kiwoo Lee(Assistant Professor)	Signal processing II
	4	Chie Toramatsu(Assistant Professor)	Image engineering I
	5	Chie Toramatsu(Assistant Professor)	Image engineering II
	6	Kiwoo Lee(Assistant Professor)	Medical informatics I
	7	Kiwoo Lee(Assistant Professor)	Medical informatics II
	8	Kiwoo Lee(Assistant Professor)	Extra

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	Medical Imaging and Information(Training)	
Instructor	Toramatsu, Chie(Assistant Professor)/Lee, Kiwoo(Assistant Professor)	
Credit	1	
Type of Class	Experiment & Training	
Theme	Information theory, signal processing, image engineering, medical informatics etc.	
Schedule	Wednesday 13:00-16:00	
Course Objective	<ol style="list-style-type: none"> 1. Understanding the feature of medical imaging device by training with real machine. 2. Figuring out the role and function of the medical imaging and information device on the medical spot. 3. Understanding the data standard of medical image and extracting the information you want from it. 4. Inspecting the data communication within medical modalities with medical images. 	
Evaluation Methods	Attendance (50%) Submission of a report on lecture content (50%)	
Grading Scale	S, A, B, C are passing grade, D is not passing grade (S: 100-90%、A: 89-80%、B: 79-70%、C: 69-60%、D: 59-0%)	
Textbooks/References	Information and systems in radiological technology (Ohm Ltd.), medical image processing and information technology (Nanzando Ltd.), medical information technology (Kyoritsu-pub Ltd.), Cancer Radiotherapy 2017 (Gakken Medical Shyubun Ltd.) etc.	
Independent Study Outside of Class	Studying with Textbook&Reference above. Obtaining the latest information from studying by participating a conference	
Room	Radiation therapy planning room on the 3rd basement floor of the General Outpatient Center, Conference Room in the Education and Research Building.	
Special Note	The term and timetable will be decided on our discussions. Questioning from students as needed.	
Course Plan	Number	Contents
	1~2	Achievement of Goal 1
	3~4	Achievement of Goal 2
	5~7	Achievement of Goal 3
	8~10	Achievement of Goal 4

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	Laws and Regulations, Recommendation, Medical Ethics in Radiation		
Instructor	Kumiko Karasawa(Professor and Head of division),Teiji Nishio (Visiting Professor)		
Credit	1		
Type of Class	Lecture & Training		
Theme	Act on Prevention of Radiation Hazards, medical care act & enforcement regulation, industrial safety and health law & ordinance on prevention of ionizing radiation hazards, other relevant laws, recommendation & standard, medical ethics, research ethics		
Schedule	Wednesday 9:00-10:30, 10:40-12:10		
Course Objective	<ul style="list-style-type: none"> • Understanding laws and regulation on the radiation • Acquiring adequately the medical ethics on the radiation • Acquiring adequately the research ethics on the radiation 		
Evaluation Methods	Attendance (50%) Submission of a report on lecture content (50%)		
Grading Scale	S (90 points to 100 points), A (80 points to less than 90 points), B (70 points to less than 80 points), C (60 points to less than 70 points), D (less than 60 points) There are five types, S, A, B, and C are accepted, and D is rejected.		
Textbooks/References	Act on radioisotope & Prevention of Radiation Hazards (Japan radioisotope association Ltd.), Act on Prevention of Radiation Hazards (Japan radioisotope association Ltd), Cancer*Radiotherapy2017 (Gakken Medical Shyubun Ltd.) etc.		
Independent Study Outside of Class	Studying with Textbook&Reference above.		
Room	Radiation therapy planning room on the 3rd basement floor of the General Outpatient Center, Conference Room in the Education and Research Building.		
Special Note	New timetable will be remaded on an agreement for those who can not participate. Questioning from students as needed. Feedback will be given in the last class.		
Course Plan	Number	Instructor	Contents
	1	Kumiko Karasawa(Professor and Head of division),Teiji Nishio (Visiting Professor)	Act on Prevention of Radiation Hazards I
	2	Kumiko Karasawa(Professor and Head of division),Teiji Nishio (Visiting Professor)	Act on Prevention of Radiation Hazards II
	3	Kumiko Karasawa(Professor and Head of division),Teiji Nishio (Visiting Professor)	Medical care act & enforcement regulation
	4	Kumiko Karasawa(Professor and Head of division),Teiji Nishio (Visiting Professor)	Industrial safety and health law & ordinance on prevention of ionizing radiation hazards
	5	Kumiko Karasawa(Professor and Head of division),Teiji Nishio (Visiting Professor)	Other relevent laws and regulations
	6	Kumiko Karasawa(Professor and Head of division),Teiji Nishio (Visiting Professor)	Recommendation & standard
	7	Kumiko Karasawa(Professor and Head of division),Teiji Nishio (Visiting Professor)	Medical ethics
	8	Kumiko Karasawa(Professor and Head of division),Teiji Nishio (Visiting Professor)	Research ethics

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	Radiation Oncology (Training)	
Instructor	Kumiko Karasawa (Professor and Head of division), Yaichiro Hashimoto (Associate Professor)	
Credit	1	
Type of Class	Lecture & Training	
Theme	Radiation oncology for medical physics	
Schedule	Friday 13:00-16:00	
Course Objective	<ol style="list-style-type: none"> 1. Obtaining the knowledges about the dose to cancer in a part of body and the dose constraint for each normal tissue throughout the practice. 2. Figuring out the proper dose to each patient with clinical information. 3. Optimizing the radiotherapy plan for practicing radiation oncology 	
Evaluation Methods	Attendance (50%) Submission of a report on lecture content (50%)	
Grading Scale	S, A, B, C are passing grade, D is not passing grade (S: 100-90%, A: 89-80%, B: 79-70%, C: 69-60%, D: 59-0%)	
Textbooks/References	Cancer•Radiotherapy2017 (Gakken Medical Shyubun Ltd.), Guidelines 2016 for Radiotherapy Treatment Planning (Japanese Society for Radiation Oncology) etc.	
Independent Study Outside of Class	Studying with Textbook&Reference above. Obtaining the latest information from studying by participating a conference	
Room	Radiation therapy planning room on the 3rd basement floor of the General Outpatient Center, Conference Room in the Education and Research Building.	
Special Note	The term and timetable will be decided on our discussions. Questioning from students as needed.	
Course Plan	Number	Contents
	1~2	Achievement of Goal 1
	3~5	Achievement of Goal 2
	6~10	Achievement of Goal 3

Radiation Oncology

(* = for medical doctor)

Syllabus Title	Introduction to Radiation Oncology		
Instructor	Kumiko Karasawa(Professor and Head of division)		
Credit	2		
Type of Class	Lecture & Training		
Theme	Acquire the basics of radiation oncology necessary for conducting research		
Schedule	Friday 9:00~10:30、10:40~12:10		
Course Objective	<ul style="list-style-type: none"> • Learn and understand a wide range of clinical practice from the basics of radiation oncology. • Acquire a wide range of knowledge about radiation oncology. • Acquire the ability to connect knowledge of radiation oncology to medical care and research. 		
Evaluation Methods	Attendance (50%) Submission of a report on lecture content (50%)		
Grading Scale	S (90 points to 100 points), A (80 points to less than 90 points), B (70 points to less than 80 points), C (60 points to less than 70 points), D (less than 60 points) There are five types, S, A, B, and C are accepted, and D is rejected.		
Textbooks/References	Radiation Oncology 2017 (Gakken Medical Shujunsha), Textbook of Radiation Oncology (Elsevier), Perez and Brady 's Principles and Practice of Radiation Oncology (Lippincott Williams & Wilkins), Radiotherapy Planning Guidelines 2016 (Japan Radiation Oncology Society), etc.□		
Independent Study Outside of Class	Read the above reference books and related literature.		
Room	Radiation therapy planning room on the 3rd basement floor of the General Outpatient Center, Conference Room in the Education and		
Special Note	Those who cannot participate in the above time will decide the timetable after consultation. Questions etc. are accepted at any time. Feedback will be given in the last class..		
Course Plan	Number	Instructor	Contents
	1	Kumiko Karasawa(Professor and Head of division)	History and characteristics of radiotherapy, basic philosophy
	2	Kumiko Karasawa(Professor and Head of division)	Radiotherapy facility structure and QC
	3	Kumiko Karasawa(Professor and Head of division)	Adverse effects of radiotherapy
	4	Kumiko Karasawa(Professor and Head of division)	Radiotherapy techniques and methods
	5	Yaichiro Hashimoto (Associate Professor)	Brain tumor
	6	Kumiko Karasawa(Professor and Head of division)	Head and Neck tumor
	7	Kumiko Karasawa(Professor and Head of division)	Respiratory tumor
	8	Kumiko Karasawa(Professor and Head of division)	Breast tumor
	9	Kumiko Karasawa(Professor and Head of division)	Digestive tumor
	10	Yaichiro Hashimoto (Associate Professor)	Urinary tumor
	11	Kumiko Karasawa(Professor and Head of division)	Gynecologic tumor
	12	Kumiko Karasawa(Professor and Head of division)	Bone and soft tissue tumor
	13	Yaichiro Hashimoto (Associate Professor)	Hematological tumor
	14	Kumiko Karasawa(Professor and Head of division)	Pediatric tumor
15	Kumiko Karasawa(Professor and Head of division)	Metastatic tumor, benign disease	

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	Radiation Biology (Training)	
Instructor	Kumiko Karasawa (Professor and Head of division), Fujita Mayumi (Assistant Professor)	
Credit	1	
Type of Class	Lecture & Training	
Theme	Radiation biology for radiation oncology	
Schedule	Wednesday 13:00-16:00	
Course Objective	<ol style="list-style-type: none"> 1. Obtaining the knowledges about the dose to cancer in a part of body and the dose constraint for each normal tissue with studying radiation biology in radiotherapy 2. Figuring out the proper dose to each patient with clinical information by studying the radiation biology 3. Optimizing the radiotherapy plan with the knowledge of radiation biology 	
Evaluation Methods	Attendance (50%) Submission of a report on lecture content (50%)	
Grading Scale	S, A, B, C are passing grade, D is not passing grade (S: 100-90%, A: 89-80%, B: 79-70%, C: 69-60%, D: 59-0%)	
Textbooks/References	Radiobiology for the Radiologist (Lippincott), Cancer Radiotherapy 2017 (Gakken Medical Shyubun Ltd.), Fundamentals of radiology (Kinpodo Ltd.), Textbook of Radiation Oncology (Elsevier), Perez and Brady's Principles and Practice of Radiation Oncology (Lippincott Williams & Wilkins) etc.	
Independent Study Outside of Class	Studying with Textbook & Reference above. Obtaining the latest information from studying by participating a conference	
Room	Radiation therapy planning room on the 3rd basement floor of the General Outpatient Center, Conference Room in the Education and Research Building.	
Special Note	The term and timetable will be decided on our discussions. Questioning from students as needed.	
Course Plan	Number	Contents
	1~2	Achievement of Goal 1
	3~5	Achievement of Goal 2
	6~10	Achievement of Goal 3

Radiation Oncology

(* = for medical doctor)

Syllabus Title	Radiation Biology		
Instructor	Kumiko Karasawa(Professor and Head of division), Mayumi Fujita(Part-time lecturer)		
Credit	2		
Type of Class	Lecture & Training		
Theme	Acquire the basics of radiobiology necessary for radiation oncology		
Schedule	Wednesday 9:00~10:30, 10:40~12:10		
Course Objective	<ul style="list-style-type: none"> • Learn and understand a wide range of topics from the basics of radiobiology to practical use. • Acquire a wide range of knowledge about radiobiology. • To acquire the ability to connect knowledge of radiobiology to radiation oncology research. 		
Evaluation Methods	Attendance (50%) Submission of a report on lecture content (50%)		
Grading Scale	S (90 points to 100 points), A (80 points to less than 90 points), B (70 points to less than 80 points), C (60 points to less than 70 points), D (less than 60 points) There are five types, S, A, B, and C are accepted, and D is rejected.		
Textbooks/References	Radiobiology for the Radiologist(Lippincott), Radiation Oncology 2017 (Gakken Medical Shujunsha), Basic Radiation Medicine (Kinshodo), Textbook of Radiation Oncology (Elsevier), Perez and Brady's Principles and Practice of Radiation Oncology (Lippincott Williams & Wilkins)		
Independent Study Outside of Class	Read the above reference books and related literature.		
Room	Radiation therapy planning room on the 3rd basement floor of the General Outpatient Center, Conference Room in the Education and		
Special Note	Those who cannot participate in the above time will decide the timetable after consultation. Questions etc. are accepted at any time. Feedback will be given in the last class..		
Course Plan	回数	Instructor	Contents
	1	Kumiko Karasawa(Professor and Head of division), Mayumi Fujita(Part-time lecturer)	Physical process of expression of biological action
	2	Kumiko Karasawa(Professor and Head of division), Mayumi Fujita(Part-time lecturer)	Chemical process of expression of biological action
	3	Kumiko Karasawa(Professor and Head of division), Mayumi Fujita(Part-time lecturer)	Expression of biological effects
	4	Kumiko Karasawa(Professor and Head of division), Mayumi Fujita(Part-time lecturer)	Action on DNA / chromosome
	5	Kumiko Karasawa(Professor and Head of division), Mayumi Fujita(Part-time lecturer)	Action on cells
	6	Kumiko Karasawa(Professor and Head of division), Mayumi Fujita(Part-time lecturer)	Radiation sensitivity, relative biological effectiveness
	7	Kumiko Karasawa(Professor and Head of division), Mayumi Fujita(Part-time lecturer)	Action on organs and tissues
	8	Kumiko Karasawa(Professor and Head of division), Mayumi Fujita(Part-time lecturer)	Action on individual level
	9	Kumiko Karasawa(Professor and Head of division), Mayumi Fujita(Part-time lecturer)	Radiation protection biology
	10	Kumiko Karasawa(Professor and Head of division), Mayumi Fujita(Part-time lecturer)	Radiation injury and recovery
	11	Kumiko Karasawa(Professor and Head of division), Mayumi Fujita(Part-time lecturer)	Action on tumors and normal tissues
	12	Kumiko Karasawa(Professor and Head of division), Mayumi Fujita(Part-time lecturer)	Radiation Sensitive Employment Physical Factors
	13	Kumiko Karasawa(Professor and Head of division), Mayumi Fujita(Part-time lecturer)	Combination therapy biology
	14	Kumiko Karasawa(Professor and Head of division), Mayumi Fujita(Part-time lecturer)	Applied Exercise 1
15	Kumiko Karasawa(Professor and Head of division), Mayumi Fujita(Part-time lecturer)	Applied Exercise 2	

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	Basic Medical Science		
Instructor	Kumiko Karasawa(Professor and Head of division), Yaichiro Hashimoto (Associate Professor)		
Credit	2		
Type of Class	Lecture & Training		
Theme	Fundamentals of the medical physics		
Schedule	Friday 13:00-14:30, 14:40-16:10		
Course Objective	<ul style="list-style-type: none"> •Reconfirming the missing part of your study in the undergraduate or master course comparing with the JBMP education guideline. •Obtaining the knowledge of the human anatomy for the medical physics •Obtaining the knowledge of the physiology for the medical physics •Obtaining the knowledge of the neoplastic pathology for the medical physics 		
Evaluation Methods	Attendance (50%) Submission of a report on lecture content (50%)		
Grading Scale	S (90 points to 100 points), A (80 points to less than 90 points), B (70 points to less than 80 points), C (60 points to less than 70 points), D (less than 60 points) There are five types, S, A, B, and C are accepted, and D is rejected.		
Textbooks/References	Anatomy (Igaku-shoin Ltd.), physiology (Igaku-shoin Ltd) , pathology (Igaku-shoin Ltd.) etc.		
Independent Study Outside of Class	Studying with Textbook&Reference above.		
Room	Radiation therapy planning room on the 3rd basement floor of the General Outpatient Center, Conference Room in the Education and Research Building.		
Special Note	New timetable will be remaded on an agreement for those who can not participate. Questioning from students as needed. Feedback will be given in the last class.		
Course Plan	Number	Instructor	Contents
	1	Kumiko Karasawa(Professor and Head of division), Yaichiro Hashimoto (Associate Professor)	Anatomy extra classe I
	2	Kumiko Karasawa(Professor and Head of division), Yaichiro Hashimoto (Associate Professor)	Anatomy extra classe II
	3	Kumiko Karasawa(Professor and Head of division), Yaichiro Hashimoto (Associate Professor)	Anatomy extra classe III
	4	Kumiko Karasawa(Professor and Head of division), Yaichiro Hashimoto (Associate Professor)	Anatomy extra classe IV
	5	Kumiko Karasawa(Professor and Head of division), Yaichiro Hashimoto (Associate Professor)	Anatomy extra classe V
	6	Kumiko Karasawa(Professor and Head of division), Yaichiro Hashimoto (Associate Professor)	Physiology extra classe I
	7	Kumiko Karasawa(Professor and Head of division), Yaichiro Hashimoto (Associate Professor)	Physiology extra classe II
	8	Kumiko Karasawa(Professor and Head of division), Yaichiro Hashimoto (Associate Professor)	Physiology extra classe III
	9	Kumiko Karasawa(Professor and Head of division), Yaichiro Hashimoto (Associate Professor)	Physiology extra classe IV
	10	Kumiko Karasawa(Professor and Head of division), Yaichiro Hashimoto (Associate Professor)	Physiology extra classe V
	11	Kumiko Karasawa(Professor and Head of division), Yaichiro Hashimoto (Associate Professor)	Neoplastic pathology extra classe I
	12	Kumiko Karasawa(Professor and Head of division), Yaichiro Hashimoto (Associate Professor)	Neoplastic pathology extra classe II
	13	Kumiko Karasawa(Professor and Head of division), Yaichiro Hashimoto (Associate Professor)	Neoplastic pathology extra classe III
	14	Kumiko Karasawa(Professor and Head of division), Yaichiro Hashimoto (Associate Professor)	Neoplastic pathology extra classe IV
15	Kumiko Karasawa(Professor and Head of division), Yaichiro Hashimoto (Associate Professor)	Neoplastic pathology extra classe V	

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	English for Science		
Instructor	Chie Toramatsu(Assistant Professor), Kiwoo Lee(Assistant Professor)		
Credit	1		
Type of Class	Lecture & Training		
Theme	English expression, presentation sturcture, writing english paper, english presentation with your research results		
Schedule	Wednesday 9:00-10:30, 10:40-12:10		
Course Objective	<ul style="list-style-type: none"> •Presenting your research subject, plan, results in english •Presentation and discussion with your work in international conference •Writing and submitting the english paper with your work on the research •Corresponding with a comment from the reviewer on your paper submitted 		
Evaluation Methods	Attendance (50%) Submission of a report on lecture content (50%)		
Grading Scale	S (90 points to 100 points), A (80 points to less than 90 points), B (70 points to less than 80 points), C (60 points to less than 70 points), D (less than 60 points) There are five types, S, A, B, and C are accepted, and D is rejected.		
Textbooks/References	Original paper and review on your research		
Independent Study Outside of Class	Studying with Textbook&Reference above.		
Room	Radiation therapy planning room on the 3rd basement floor of the General Outpatient Center, Conference Room in the Education and Research Building.		
Special Note	New timetable will be remaded on an agreement for those who can not participate. Questioning from students as needed. Feedback will be given in the last class.		
Course Plan	Number	Instructor	Contents
	1	Kiwoo Lee(Assistant Professor)	English expression I
	2	Kiwoo Lee(Assistant Professor)	English expression II
	3	Chie Toramatsu(Assistant Professor)	Presentation sturcture I
	4	Chie Toramatsu(Assistant Professor)	Presentation sturcture II
	5	Chie Toramatsu(Assistant Professor)	Writing english paper I
	6	Chie Toramatsu(Assistant Professor)	Writing english paper II
	7	Chie Toramatsu(Assistant Professor)	English presentation with the research results I
	8	Chie Toramatsu(Assistant Professor)	English presentation with the research results II

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	Medical Physicist Clinical Training	
Instructor	Chie Toramatsu(Assistant Professor), Yuichiro Narita(Assistant Professor)	
Credit	4	
Type of Class	Lecture & Training	
Theme	Dose measurement, dose calculation, plan optimization, QA/QC of the dose and a machine, conference	
Schedule	Wednesday 16:00-19:00	
Course Objective	<ol style="list-style-type: none"> 1. Measuring the dose with various dosimetric equipments 2. Dose calculation with raw data from equipment 3. Radiotherapy plan optimization 4. QA/QC of the radiation dose and geometric values 5. Discussing QA/QC of the radiation dose and treatment plan in the conference 	
Evaluation Methods	Attendance (50%) Submission of a report on lecture content (50%)	
Grading Scale	S, A, B, C are passing grade, D is not passing grade (S: 100-90%, A: 89-80%, B: 79-70%, C: 69-60%, D: 59-0%)	
Textbooks/References	Radiotherapy physics (Kokusai Bunken Ltd.), Cancer Radiotherapy 2017 (Gakken Medical Shyubun Ltd.), The standard measurement method of the water absorbed dose for external radiotherapy (Japan society of medical physics), Guidelines 2016 for Radiotherapy Treatment Planning (Japanese Society for Radiation Oncology) etc.	
Independent Study Outside of Class	Studying with Textbook&Reference above. Obtaining the latest information from studying by participating a conference	
Room	Radiation therapy planning room on the 3rd basement floor of the General Outpatient Center, Conference Room in the Education and Research Building.	
Special Note	The term and timetable will be decided on our discussions. Questioning from students as needed.	
Course Plan	Number	Contents
	1~33	Achievement of Goal 1~5

Diagnostic Imaging and Nuclear Medicine

I Education policy

The imaging and nuclear medicine fields are responsible for diagnostic imaging and nuclear medicine within diagnostic imaging, nuclear medicine, and radiotherapy, which are the three mainstays of radiology. The target organ also covers the whole body, and the clinical research based on the abundant case by the latest imaging equipment is mainly centered. Topics of recent research are advanced image processing and clinical applications of fused images, as well as molecular imaging. Molecular imaging is a method to visualize the movement of molecules in a living body that could not be imaged until now, and uses a compound called a "molecular probe" as a tool for visualization. Initially, Positron Emission Tomography (PET) was mainly developed, but at present, the development of special contrast media as molecular probes is being started even in MRI. In the future, we wish to continue to expand our research area to the field of molecular imaging. It also interacts with companies and engineering researchers, and it is possible to collaborate with these researchers. I welcome young doctors who are interested in diagnostic imaging and nuclear medicine and who are extravasated with their willingness to study.

II Target to achieve

- Understanding the imaging principles of diagnostic imaging devices and exploring their potential for clinical application.
- Nuclear medicine understands the combination of tracers and testing instruments that can be adapted by disease.
- Understanding the meaning of functional and anatomical images and the alignment theory of fused images.
- Understanding basic image processing using workstations and practicing disease-specific applications.
- Understanding the current status of molecular imaging as well as clinical applications in the future.
- Research findings can be presented at international societies and ultimately cultural.
- To become of broad interest and discussed not only for itself but also for the study of others in advanced medical treatment.

III Research adviser/research theme

(* = For Physician Licensing)

Name of teacher	Research topic
Professor Sakai	A Study on Advanced Imaging Processing of CT/MRI Using Workstations. Currently, quantitative assessment of diseases and methods for predicting treatment efficacy required for diagnostic imaging are learned, and in particular, new diagnostic methods for respiratory diseases using computed tomography, magnetic resonance imaging, and FDG-PET are developed and studied. Therefore, advanced image processing such as computer-aided diagnosis using the technique of fusion image and artificial intelligence is acquired.
Associate Professor Nagao	Developing Noninvasive Imaging Biomarkers Using Cardiac CT/MRI/PET. New analytical methods and imaging biomarkers for coronary artery function, cardiovascular dynamics, and myocardial metabolism are developed using 320-row CT and 3-Tesla MRI, semi-conductor PET-devices.
Lecturer Abe	Advanced brain MR images; MRI provides not only morphological brain images but also various advanced brain images including cerebral flow analysis, MR spectroscopy, functional MRI, and so on. You will learn the basics of these analysis methods and how to apply for clinical use.
Lecturer Morita	A Study on IVR and Image Analysis of the Abdominopelvic Region. Preoperative image analysis is key in performing various IVRs of the abdominopelvic region. To appropriately analyze the pre-and postoperative images obtained by 320-row CT and 3T MRI, and to investigate whether this will lead to improved outcomes and safety of IVR-treatment.
Lecturer Suzuki	Learning imaging diagnostic and imaging techniques including CT and MRI of the central nervous system. Especially for ischemic stroke and hemorrhagic stroke, we focus on the treatment strategies based on image findings.

Lecturer Kaneko	<p>Research on the Application of Nuclear Medicine Fusion Images to Therapeutic Strategies in Oncologic Diseases.</p> <p>To analyze PET/CT and SPECT/CT of neoplastic diseases and to study their applications in various treatments (surgical, medical treatment and radiotherapy including RI-medical therapy). In particular, FDG-kinetic analysis in each tumor is performed by Parametric imaging using a semi-conductor PET/CT, with the aim of predicting the malignancy and activity of the tumor in advance and helping in therapeutic strategies.</p>
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IV Syllabus

(* = Physician Licensing Subject)

Item	Teaching faculty	Unit	Theme
Introduction to Diagnostic Imaging	Professor Sakai	1	Practical clinical application of various tests
Special theory of chest imaging	Professor Sakai	1	Advanced Image Processing and State-of-the-Art Diagnostic Theory for Respiratory and Mediastinal Diseases.
Introduction to Nuclear Medicine	Golden lecturer	1	Medical use of radionuclides
Application Special Issue of Nuclear Medicine Fusion Images.	Associate Professor Nagao	1	Clinical Application of Nuclear Medicine Fusion Imaging in Diagnosis and Quantification.
Special theory of cardiovascular imaging	Associate Professor Nagao	1	Multimodality Diagnosis of Cardiovascular Diseases.
Experimental and practical training (subject research)	Professor Sakai, Associate Professor Nagao, Lecturer Abe, Lecturer Morita, Lecturer Suzuki	10	Implementation of task study and article development.
Total		15	

Diagnostic Imaging and Nuclear Medicine Syllabus

(* = Physician Licensing Subject)

Syllabus item	Introduction to Diagnostic Imaging		
Syllabus item name (English)	Overview of Diagnostic Imaging		
Name of teacher	Shuji Sakai		
Number of units	1		
Class form	Lecture		
Theme	Practical clinical application of various tests		
Day of the week, time	Thursday 13:00-14:30		
Target to be achieved	<ol style="list-style-type: none"> 1. The principle and application of the X-ray photographing equipment can be understood. 2. Principles of MDCT and the use of basic image processing of three-dimensional images can be understood. 3. One can understand the imaging principles and application methods of diffusion-weighted imaging of MRI. 4. High-speed imaging methods for next-generation MRI can be applied in the clinic. 5. A network linkage of various imaging studies can be designed. 		
Object of evaluation	Report submission (50%) Verbal questioning (50%)		
Evaluation criteria	Five types S (90 points or more to 100 points), A (80 points or more to less than 90 points), B (70 points or more to less than 80 points), C (60 points or more to less than 70 points), and D (less than 60 points), and S, A, B, and C pass and D fail.		
Learning Instructions Reference documents, etc.	Standard Radiology (Medical School), Practice of MR-From Basic to Reading-(Medical Science Co.), MDCT Fundamentals-Power Test-(MDESI)		
With preparatory learning Out-of-class learning methods	Referring to the above textbook, the items related to radiography, CT, MRI, and IT should be understood.		
Venue	Ambulatory Center Ground Floor 1 Image Browsing Room		
Remarks	If the Employee is unable to participate in the above-mentioned time, the time schedule shall be determined after due consultation. Acceptance of questions, etc. at any time. Feedback is provided in the final round.		
Lesson plan	Unit	Faculty in charge	Class content
	1	Shuji Sakai	X-Ray Photography 1: Principle of a Planar Detector and Its Application to Videos
	2	Shuji Sakai	Radiography 2: Applied radiography of tomosyntheses, Dual energy subtraction, Slot scan, etc.
	3	Shuji Sakai	Image processing and display of CT1: 3D-CT
	4	Shuji Sakai	CT2: Creating fused images by nonlinear alignment
	5	Shuji Sakai	MRI1: Application of Diffusion-Weighted Imaging in Tumor Detection.
	6	Shuji Sakai	State-of-the-art high-speed imaging techniques such as MRI2: Compressed sensing and Mult-Bar
	7	Shuji Sakai	Application of IT: Computer-aided diagnosis using remote imaging and AI
8	Shuji Sakai	Overview and Verbal Examination	

Diagnostic Imaging and Nuclear Medicine Syllabus

(* = For Physician Licensing)

Syllabus item	Special Theory of Chest Imaging		
Syllabus item name (English)	Advanced Course of Thoracic Imaging		
Name of teacher	Shuji Sakai		
Number of units	1		
Class form	Lecture		
Theme	Advanced image processing and state-of-the-art diagnostic theory for respiratory and mediastinal diseases.		
Day of the week, time period, etc.	Monday 13:00-14:30		
Targets to achieve	<ol style="list-style-type: none"> 1. The T factor diagnosis of lung cancer can be accurately carried out. 2. In order to diagnose the stage of lung cancer, the test instrument can be used accurately and separately. 3. It is possible to efficiently carry out the differentiation method of the mediastinal lesion using the examination equipment. 4. A method for differentiation of diffuse lung disease using high-resolution CT can be practiced. 5. Understanding and practicing the role of imaging in infectious diseases. 		
Object of evaluation	Report submission (50%) Verbal questioning (50%)		
Evaluation criteria	Five types S (90 points or more to 100 points), A (80 points or more to less than 90 points), B (70 points or more to less than 80 points), C (60 points or more to less than 70 points), and D (less than 60 points), and S, A, B, and C pass and D fail.		
Learning Instructions Reference documents, etc.	Computed tomography (MEDSI) of the chest, pulmonary HRCT (Maruzen), and surgical pathology (Bunkodo).		
With preparatory learning Out-of-class learning methods	Read the above texts and papers standard in thoracic diseases, and wish to learn.		
Venue	Ambulatory Center Ground 1 Floor Image Browsing Room		
Remarks	If the Employee is unable to participate in the above-mentioned time, the time schedule shall be determined after due consultation. Acceptance of questions, etc. at any time. Feedback is provided in the final round.		
Lesson plan	Unit	Faculty in charge	Class content
	1	Shuji Sakai	Lung Cancer 1: High-Resolution CT Applicability Theory for T-Factor Diagnosis
	2	Shuji Sakai	Lung Cancer 2: Multimodality Diagnosis for Diagnosing N/M Factors
	3	Shuji Sakai	Mediastinal 1: Differential Diagnostics of Anterior Mediastinal Neoplasms Using CT/MRI.
	4	Shuji Sakai	Mediastinum 2: Clinical applications of MRI diffusion-weighted imaging and dynamic MRI
	5	Shuji Sakai	Diffuse Lung Disease 1: Classification and Diagnosis of Interstitial Pneumonia
	6	Shuji Sakai	Diffuse Lung Disease 2: Diagnostics of Collagen Disease-Related Lung Disease and Smoking-Related Lung Disease
	7	Shuji Sakai	Pulmonary Infections: Diagnostics of Community-Acquired and Nosocomial Pneumonia
	8	Shuji Sakai	Overview and Verbal Examination

Diagnostic Imaging and Nuclear Medicine Syllabus

(* = Physician Licensing Subject)

Name of syllabus item	Application Special Issue of Nuclear Medicine Fusion Images.		
Syllabus item name (English)	Clinical Application of Fusion Images by using PET and SPECT		
Name of teacher	Michinobu Nagao		
Number of units	1		
Class form	Lecture		
Theme	Clinical application of nuclear medicine fusion imaging in diagnosis and quantification.		
Day of the week, time period, etc.	Tuesday 13:00-14:30		
Targets to achieve	<ol style="list-style-type: none"> 1. Structural and fused imaging principles of PET/CT and SPECT/CT machinery can be described. 2. Implications for the clinic of PET/CT and SPECT/CT imaging can be given. 3. Understanding the role of fusion imaging in nuclear medicine treatment. 4. Understanding the role of fusion imaging in the diagnosis of various diseases. 		
Object of evaluation	Report submission (50%) Verbal questioning (50%)		
Evaluation criteria	Five types S (90 points or more to 100 points), A (80 points or more to less than 90 points), B (70 points or more to less than 80 points), C (60 points or more to less than 70 points), and D (less than 60 points), and S, A, B, and C pass and D fail.		
Learning Instructions Reference documents, etc.	Nuclear Medicine Laboratory Technologies (Nanshando)		
With preparatory learning Out-of-class learning methods	Read the above references and relevant literature.		
Venue	Outpatient Center Ground Floor 1 Nuclear Medicine PET Laboratory		
Remarks	If the Employee is unable to participate in the above-mentioned time, the time schedule shall be determined after due consultation. Acceptance of questions, etc. at any time. Feedback is provided in the final round.		
Lesson plan	Unit	Faculty in charge	Class content
	1	Michinobu Nagao	Principles of PET/CT
	2	Michinobu Nagao	Principles of SPECT/CT
	3	Michinobu Nagao	Clinically Applied General of PET/CT
	4	Michinobu Nagao	Clinically Applied General of SPECT/CT
	5	Michinobu Nagao	Specific Applications of Nuclear Medicine Fusion Images in the Respiratory Area.
	6	Michinobu Nagao	Specific Applications of Nuclear Medicine Fusion Images in Higher Brain Dysfunction.
	7	Michinobu Nagao	Myocardial blood flow quantification by myocardial SPECT/PET.
	8	Michinobu Nagao	Overview and Verbal Examination

Diagnostic Imaging and Nuclear Medicine Syllabus

(* = For Physician Licensing)

Name of syllabus item	Introduction to Nuclear Medicine		
Syllabus item name (English)	Nuclear Medicine Overview		
Name of teacher	Koichiro Kaneko		
Number of units	1		
Class form	Lecture		
Theme	Medical use of radionuclides		
Day of the week, time period, etc.	Tuesday 10:00-12:00		
Targets to achieve	<ol style="list-style-type: none"> 1. Definitions, classification, and clinical applications of nuclear medicine can be outlined. 2. Nuclear medicine treatment can be explained. 3. Nuclear Medicine Examinations can be explained. 		
Object of evaluation	Attendance (60%) Practice (10%) Test (30%)		
Evaluation criteria	Five types S (90 points or more to 100 points), A (80 points or more to less than 90 points), B (70 points or more to less than 80 points), C (60 points or more to less than 70 points), and D (less than 60 points), and S, A, B, and C pass and D fail.		
Learning Instructions Reference documents, etc.	Latest clinical nuclear medicine (Kanehara Publishing), nuclear medicine examination engineering (Nanyamado) and nuclear medicine notebook (Kanehara Publishing)		
With preparatory learning Out-of-class learning methods	Read the above references and relevant literature.		
Venue	Outpatient Center Ground Floor 1 Nuclear Medicine PET Laboratory		
Remarks	If the Employee is unable to participate in the above-mentioned time, the time schedule shall be determined after due consultation. Acceptance of questions, etc. at any time. Feedback is provided in the final round.		
Lesson plan	Unit	Faculty in charge	Class content
	1	Koichiro Kaneko	General Nuclear Medicine: Principles of Common Tracers and Testing Instruments
	2	Koichiro Kaneko	Tumor Nuclear Medicine 1: Schematic of Validated SPECT by Tumor Type
	3	Koichiro Kaneko	Oncology Nuclear Medicine 2: Current Status and Future of FDG-PET/CT and Amino Acid PET
	4	Koichiro Kaneko	Cardiac Nuclear Medicine 1: Diagnosing Thallium, Fatty Acid Metabolism, and Sympathetic Im
	5	Koichiro Kaneko	Cardiac Nuclear Medicine 2: Current Status of FDG-PET and Ammonia-PET
	6	Koichiro Kaneko	Neuronuclear Medicine: Applications of PETs in Cerebral Blood Flow SPECT and Dementia
	7	Koichiro Kaneko	Nuclear Medicine Therapy: Types and Clinical Indications of Nuclear Medicine Therapies
	8	Koichiro Kaneko	Overview and Verbal Examination

Diagnostic Imaging and Nuclear Medicine Syllabus

(* = Physician Licensing Subject)

Name of syllabus item	Special Theory of Cardiovascular Imaging		
Syllabus item name (English)	Cardiovascular Imaging		
Name of teacher	Michinobu Nagao		
Number of units	1		
Class form	Lecture		
Theme	Multimodality diagnosis of cardiovascular diseases.		
Day of the week, time period, etc.	Friday 13:00-14:30		
Targets to achieve	<ol style="list-style-type: none"> 1. Understand the normal anatomy of the heart, including the coronary arteries, heart valves, atria, and ventricles. 2. Understand morphological coronary stenosis diagnosis by coronary CT. 3. Understand the morphology, anatomical features, and hemodynamics of congenital heart defects and diagnose them from CT/MRI. 4. Differential diagnosis of cardiomyopathy can be made from delayed contrast-enhanced MRI findings. 5. The existence and seriousness of the ischemia can be diagnosed from the myocardial scintigraphy findings. 		
Object of evaluation	Report submission (50%) Verbal questioning (50%)		
Evaluation criteria	Five types S (90 points or more to 100 points), A (80 points or more to less than 90 points), B (70 points or more to less than 80 points), C (60 points or more to less than 70 points), and D (less than 60 points), and S, A, B, and C pass and D fail.		
Learning Instructions Reference documents, etc.	Diagnostic Imaging Book KEYBOOK Series-This Only Should Be Known Imaging of Cardiovascular Diseases, and the Adult Congenital Heart Disease Perfect Guide		
With preparatory learning Out-of-class learning methods	Read the above references and relevant literature.		
Venue	Outpatient Center Ground Floor 1 Nuclear Medicine PET Laboratory		
Remarks	If the Employee is unable to participate in the above-mentioned time, the time schedule shall be determined after due consultation. Acceptance of questions, etc. at any time. Feedback is provided in the final round.		
Lesson plan	Unit	Faculty in charge	Class content
	1	Michinobu Nagao	Coronary Artery CT1: Coronary Artery Anatomy and Morphology
	2	Michinobu Nagao	Coronary Artery CT2: Myocardial Perfusion and FFR-CT
	3	Michinobu Nagao	Cardiac MRI1: Cardiac Function and Flow Analysis of Congenital Heart Diseases
	4	Michinobu Nagao	Cardiac MRI2: Differentiation of Cardiomyopathy by Delayed Contrast-Enhanced MRIs
	5	Michinobu Nagao	Myocardial SPECT: Ischemic Diagnostics and Risk-Stratification
	6	Michinobu Nagao	Myocardial PET: Myocardial blood flow assessment of ammonia
	7	Michinobu Nagao	Comprehensive Multi-Modality Diagnosis of Cardiovascular Diseases.
	8	Michinobu Nagao	Overview and Verbal Examination

Diagnostic Imaging and Nuclear Medicine Syllabus

(* = Physician Licensing Subject)

Name of syllabus item	Experimental and Practical Training (Subject Research)	
Names of teachers	Professor Sakai, Associate Professor Nagao, Lecturer Abe, Lecturer Morita, Lecturer Suzuki, Lecturer Kaneko	
Number of units	10	
Class form	Experimental and practical training (subject research)	
Theme	Implementation of task study and article development.	
Day of the week, time period, etc.	Month to Friday 9:00-12:00, 13:00-17:00	
Targets to achieve	<ol style="list-style-type: none"> 1.To be able to grasp where the research content given as a theme lies globally. 2.The research implications of the latest conference presentations and papers related to the research can be discussed. 3.The experimental content and data can be correctly recorded and stored. 4.Experimental results can be appropriately summarized in figures and tables. 5.Self-research content can be presented and discussed at international and national societies. 6.It is possible to understand the form of a general article and to describe it in line with it. 7.Response sentences can be prepared after posting papers in conjunction with mentoring faculty to opinions from reviewers. 	
Object of evaluation	Experimental note and research report (60%) Tabulation (10%) Research publication and discussion (10%) Articles preparation (20%)	
Evaluation criteria	Five types S (90 points or more to 100 points), A (80 points or more to less than 90 points), B (70 points or more to less than 80 points), C (60 points or more to less than 70 points), and D (less than 60 points), and S, A, B, and C pass and D fail.	
Learning Instructions Reference documents, etc.	Relevant English-language journals include Radiology, AJR, European Radiology, EJR, Radiographics, JVIR, JNM, EJNMMI, and other journals for relevant studies.	
With preparatory learning Out-of-class learning methods	Participate in and present related academic societies, etc., and gather information and hold discussions.	
Venue	Educational and research wards, outpatient ward Ground Floor 1, image viewing rooms, nuclear medicine and PET examination rooms, central ward Floor 1 reading rooms, etc.	
Remarks	If the Employee is unable to participate in the above-mentioned time, the time schedule shall be determined after due consultation. Acceptance of questions, etc. at any time. Feedback is provided at any time.	
Lesson plan	Unit	Class content
	1	Achievement of target 1-2
	~	
	90	
	91	Achievement of target 3-4
	~	
	120	
	121	Achievement of target 5-7
~		
150		

Surgical Pathology

I Educational Policy

We are working on not only in the field of diagnostic pathology but we also focus on the topic of molecular biological aspects in various human neoplasms including cancers (especially, kidney), neurological, nephrologic and cardiovascular diseases. Research groups are tentatively subdivided into the followings in our department ; cancer, neurological, nephrological and cardiovascular groups.

II Goals

We are focusing on the clinicopathological features of cancers (especially, kidney), neurological, nephrologic and cardiovascular diseases. Each study aims to obtain reliable biomarkers predicting the clinical outcome and feasible therapeutic targets.

III Supervisor*Research theme

(* = for doctor's license holders)

Name and position	Research theme
<p>Yoji Nagashima, Professor and Head (of division)</p>	<ol style="list-style-type: none"> 1. Clinicopathological study of renal neoplasm: Translocation-associated, enzyme-deficient and dialysis-associated renal neoplasms 2. Tumor cell biology: Mechanism of cancer invasion and metastasis, abnormality of cell polarity 3. Various collaborations are ongoing with the other basic and clinical departments.
<p>Tomoko Yamamoto, Associate Professor</p>	<ol style="list-style-type: none"> 1. Neuromuscular disorders: Studies on fukutin, a responsible gene of Fukuyama type muscular dystrophy, and morphology and molecular pathology on neurodegenerative diseases 2. Various collaborations are ongoing with the other basic and clinical departments.
<p>Sekiko Taneda, Associate Professor</p>	<ol style="list-style-type: none"> 1. Studies on glomerular diseases: Clinicopathological studies on various glomerular diseases using biopsied specimens, including materials after renal transplantation. 2. Various collaborations are ongoing with the other basic and clinical departments.
<p>Saeko Yoshizawa, Associate Professor</p>	<ol style="list-style-type: none"> 1. . Studies on cardiovascular diseases: Pathogenic mechanism of cardiomyopathy using animal model and human biopsy and autopsy tissue samples 2. Various collaborations are ongoing with the other basic and clinical departments.

Naoko Ito, Associate Professor	<p>1. Studies on glomerular diseases: Clinicopathological studies on various glomerular diseases using biopsied specimens, including materials after renal transplantation.</p> <p>2. Various collaborations are ongoing with the other basic and clinical departments.</p>
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IV Syllabus

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Title	Instructor	Credit	Theme
New Findings of Pathological Research	Yoji Nagashima, Tomoko Yamamoto, Sekiko Taneda, Saeko Yoshizawa, Naoko Ito	2	Understand the basic features of human pathology
Research Seminar	Yoji Nagashima, Tomoko Yamamoto, Sekiko Taneda, Saeko Yoshizawa, Naoko Ito	2	Read research articles of interest and present the principle contents
Present and Discussion of Ongoing Research	Yoji Nagashima, Tomoko Yamamoto, Sekiko Taneda, Saeko Yoshizawa, Naoko Ito	1	Make presentation of ongoing research project and discuss with the faculties
Research Project	Yoji Nagashima, Tomoko Yamamoto, Sekiko Taneda, Saeko Yoshizawa, Naoko Ito	10	<ol style="list-style-type: none"> 1. Exactly perform experimental procedures according to the design. 2. Collect and accumulate the obtained data. 3. Correctly present the data in illustrations and tables. 4. Present and discuss the results in academic meetings and seminar. 5. Prepare manuscripts of the research, submit to and publish in journals with peer-review.
Total credits		15	

Surgical Pathology Syllabus(1)

Syllabus Title	New Findings in Pathological Research		
Instructor	Yoji Nagashima, Tomoko Yamamoto, Sekiko Taneda, Saeko Yoshizawa, Naoko Ito		
Credit	2		
Type of Class	Lecture and Seminar		
Theme	Pathology (Especially Oncological, Cardiovascular, and Nephrological Pathology)		
Schedule	Tuesday, 13:00~14:00		
Course Objective	Understand the basic features of human pathology		
Evaluation Methods	Attending (50%), Discussion (50%)		
Grading Scale	S(Score 90~100), A(80~89), B(70~79), C(60~69); D(less than 60):A-C Pass, D Failure		
Textbooks/References	Robbins Basic Pathology, 10th ed: English articles presented by the lecturers		
Independent Study Outside of Class	Read th above textbook and articles by oneself and understand the contents.		
Room	Seminar room, Department of Surgical Pathology		
Special Note	In case that the lecture time is inconvinient, adjustment is possible.		
Course Plan	Number	Instructor	Contents
	1	Professor Nagashima and Dr. Tomoko Yamamoto	Introduction
	2	Professor Nagashima	General Pathology
	3	Professor Nagashima	Cell Injury and Cell Death
	4	Professor Nagashima	Oncology
	5	Professor Nagashima	Inflammation
	6	Professor Nagashima	Metabolic disorders
	7	Professor Nagashima	Circulatory disorders
	8	Professor Nagashima	Pediatric Pathology
	9	Dr. Yoshizawa	Cardiovascular Pathology (1)
	10	Dr. Yoshizawa	Cardiovascular Pathology (2)
	11	Dr. Yoshizawa	Experimental animal moderls of cardiovascular diseases
	12	Drs. Taneda and Ito	Renal diseases (1): Glomerulonephriis
	13	Drs. Taneda and Ito	Renal diseases: (2) Secondary renal diseases
	14	Drs. Taneda and Ito	Renal diseases(3): Ganimal experimental models
15	Professor Nagashima	Summary	

Surgical Pathology Syllabus(2)

Syllabus Title	Research Seminar		
Instructor	Present and Discussion of Ongoing Research		
Credit	2		
Type of Class	Lecture and Seminar		
Theme	Read the current publication of pathology and present the contents and make discussion		
Schedule	Tuesday, 9:00~10:00		
Course Objective	Read the current publication of pathology and present the contents and make discussion		
Evaluation Methods	Attending (50%), Presentation (40%); Discussion (10%)		
Grading Scale	S(Score 90~100), A(80~89), B(70~79), C(60~69); D(less than 60);A-C Pass, D Failure		
Textbooks/References	Robbins Basic Pathology, 10th ed: English articles presented by the lecturers		
Independent Study Outside of Class	Read the articles and make a critical review.		
Room	Seminar room, Department of Surgical Pathology		
Special Note	In case that the lecture time is inconvenient, adjustment is possible.		
Course Plan	Number	Instructor	Contents
	1	All faculties	Journal Club
	2	All faculties	Journal Club
	3	All faculties	Journal Club
	4	All faculties	Journal Club
	5	All faculties	Journal Club
	6	All faculties	Journal Club
	7	All faculties	Journal Club
	8	All faculties	Journal Club
	9	All faculties	Journal Club
	10	All faculties	Journal Club
	11	All faculties	Journal Club
	12	All faculties	Journal Club
	13	All faculties	Journal Club
	14	All faculties	Journal Club
	15	All faculties	Journal Club

Surgical Pathology Syllabus(3)

Syllabus Title	Presentation and Discussion on Pathological Research		
Instructor	Present and Discussion of Ongoing Research		
Credit	1		
Type of Class	Lecture and Discussion		
Theme	Presentation and Discussion on Pathological Research		
Schedule	Based on adjustment with the lecturers		
Course Objective	Upgrade the skill of discussion in pathological research		
Evaluation Methods	Attending (50%), Presentation (30%); Discussion (20%)		
Grading Scale	S(Score 90~100), A(80~89), B(70~79), C(60~69); D(less than 60);A-C Pass, D Failure		
Textbooks/References	Articles relating the students' own researches		
Independent Study Outside of Class	Read the articles and make a critical review.		
Room	Seminar room, Department of Surgical Pathology		
Special Note	In case that the lecture time is inconvenient, adjustment is possible.		
Course Plan	Number	Instructor	Contents
	1	All faculties	Presentation and Discussion
	2	All faculties	Presentation and Discussion
	3	All faculties	Presentation and Discussion
	4	All faculties	Presentation and Discussion
	5	All faculties	Presentation and Discussion
	6	All faculties	Presentation and Discussion
	7	All faculties	Presentation and Discussion
	8	All faculties	Presentation and Discussion
	9	All faculties	Presentation and Discussion
	10	All faculties	Presentation and Discussion
	11	All faculties	Presentation and Discussion
	12	All faculties	Presentation and Discussion
	13	All faculties	Presentation and Discussion
	14	All faculties	Presentation and Discussion
15	All faculties	Presentation and Discussion	

Surgical Pathology Syllabus(4)

Syllabus Title	Research Project		
Instructor	Present and Discussion of Ongoing Research		
Credit	10		
Type of Class	Experiments and Laboratory Works		
Theme	Research and preparation of research articles		
Schedule	Monday~Friday, 9:00~12:00・13:00~17:00		
Course Objective	1.Perform experiments according to the design and protocols 2.Acquire and store the data correctly 3.Evaluate the results and make discussion 4.Present the obtained data in academic meetings 5.Prepare research articles		
Evaluation Methods	Research Reports and Laboratory notebook (50%), Presentation slides (10%), Presentation (10%), Publication (10%)		
Grading Scale	S(Score 90~100), A(80~89), B(70~79), C(60~69); D(less than 60);A-C Pass, D Failure		
Textbooks/References	Articles relating to the research		
Independent Study Outside of Class	Upgrading the reserch ability via presentation and preparation of articles		
Room	Seminar room, Department of Surgical Pathology		
Special Note	In case that the lecture time is inconvenient, adjustment is possible.		
Course Plan	Number	Instructor	Contents
	1	All faculties	Objectives 1~3
	~		
	90		
	91	All faculties	Objectives 3~4
	~		
	120		
121	All faculties	Objectives 5	
~			
150			

Rehabilitation

I Educational Policy

The Department of Rehabilitation Science aims to train clinical researchers who can conduct clinical research and write English papers, using their own clinical questions related to rehabilitation medicine. In rehabilitation, a wide variety of functional decline and disability are targeted. In terms of research design, it is possible to conduct not only quantitative studies such as randomized controlled trials, cohort studies, case-control studies, cross-sectional studies, and systematic reviews and meta-analyses, but also qualitative studies and mixed research methods. Recent research topics include rehabilitation nutrition and clinical nutrition, sarcopenia, frailty, and cachexia, feeding and sarcopenic dysphagia, rehabilitation pharmacotherapy, and medical and dental collaboration. Rehabilitation nutrition is a concept that maximizes patients' function and QOL by approaching both rehabilitation and nutrition. We would also like to create opportunities to write not only original papers but also letters and case reports. We welcome young doctors who are interested in rehabilitation medicine and have a strong desire for research.

II Goals

- To acquire a wide range of knowledge and advanced skills by conducting clinical research with an optimal research design and writing papers after thoroughly examining research questions, and to further improve the clinical quality of rehabilitation medicine.
- To acquire the ability and research philosophy to lead advanced and original research in rehabilitation science.
- To be able to present the results of research at international conferences and finally to write English papers.
- To be able to contribute to the development of rehabilitation medicine education and research with a rich humanity and high sense of ethics.
- To be able to take a broad interest in and discuss not only their own research, but also the research of others in the field of advanced rehabilitation medicine.

III Supervisor*Research theme (* = for doctor's license holders)

Name and position	Research theme
Professor Wakabayashi	Research on rehabilitation nutrition and clinical nutrition, sarcopenia, frailty and cachexia, sarcopenic dysphagia, rehabilitation pharmacotherapy, and medical and dental collaboration. Observational studies using a multicenter database are being conducted.
Professor Furiya	We have been conducting clinical research on the prevention of various neurodegenerative diseases, dementia, and lifestyle-related diseases using biochemical biomarkers. We will conduct clinical research on the evaluation of physical functions and cognitive changes associated with aging and countermeasures against them from the perspective of neurology and rehabilitation science.

IV Syllabus

(* = for doctor's license holders)

Title	Instructor	Credit	Theme
Overview of Rehabilitation Medicine	Professor Wakabayashi	1	Concept, Practice and Research of Rehabilitation
Advanced Course of Rehabilitation Nutrition	Professor Wakabayashi	1	Concept, Practice and Research of Rehabilitation Nutrition
Advanced Course of Rehabilitation Pharmacotherapy	Professor Wakabayashi	1	Concept, Practice and Research of Rehabilitation Pharmacotherapy
Advanced Course of Dementia / Cognitive Rehabilitation	Professor Furiya	1	Concept, Practice and Research of Dementia / Cognitive Rehabilitation
Clinical research and academic writing	Professor Wakabayashi	1	Clinical Research Design and Academic Writing
Experiments and practical training (research projects)	Professor Wakabayashi, Professor Furiya	10	Conducting research projects and writing papers
計		15	

Rehabilitation Syllabus

(* = for doctor's license holders)

Syllabus Title	Overview of Rehabilitation Medicine		
Instructor	Hidetaka Wakabayashi		
Credit	1		
Type of Class	Lecture & Seminar		
Theme	Concept, Practice and Research of Rehabilitation		
Schedule	Monday 15:00~16:30		
Course Objective	<ol style="list-style-type: none"> 1. Understand the concept of rehabilitation. 2. Understand the evaluation of life functions based on the International Classification of Functioning, Disability and Health 3. Understand the various approaches to rehabilitation. 4. Understand rehabilitation for various diseases. 		
Evaluation Methods	Report submission (50%) Attendance (50%)		
Grading Scale	There are five categories: S (90 points or more to 100 points), A (80 points or more to less than 90 points), B (70 points or more to less than 80 points), C (60 points or more to less than 70 points), and D (less than 60 points). S, A, B, and C are passed, and D is failed.		
Textbooks/References	Standard Rehabilitation Medicine (Igaku Shoin), That Patient Needs Rehabilitation (Yodosha)		
Independent Study Outside of Class	Understand matters related to rehabilitation medicine by referring to the above textbook.		
Room	Ward 1, 1st floor, Rehabilitation Room, Examination Room 1		
Special Note	For those who cannot participate in the above time, the time schedule will be decided after consultation. Questions will be accepted at any time. Feedback will be given at the final session.		
Course Plan	Number	Instructor	Contents
	1	Hidetaka Wakabayashi	The Concept and History of Rehabilitation
	2	Hidetaka Wakabayashi	Disability Science
	3	Hidetaka Wakabayashi	Diagnosis and Evaluation of Rehabilitation
	4	Hidetaka Wakabayashi	Various approaches to rehabilitation
	5	Hidetaka Wakabayashi	Various disorders and their approaches
	6	Hidetaka Wakabayashi	Rehabilitation for various diseases 1
	7	Hidetaka Wakabayashi	Rehabilitation for various diseases 2
8	Hidetaka Wakabayashi	Rehabilitation for various disease 3	

Rehabilitation Syllabus

(* = for doctor's license holders)

Syllabus Title	Advanced Course of Rehabilitation Nutrition		
Instructor	Hidetaka Wakabayashi		
Credit	1		
Type of Class	Lecture & Seminar		
Theme	Concept, Practice and Research of Rehabilitation Nutrition		
Schedule	Monday 15:00~16:30		
Course Objective	<ol style="list-style-type: none"> 1. Understand the concept of rehabilitation nutrition. 2. Understand the assessment and response to sarcopenia and frailty. 3. Understand the rehabilitation nutrition care process. 4. Understand rehabilitation nutrition for sarcopenic dysphagia and other diseases. 		
Evaluation Methods	Report submission (50%) Attendance (50%)		
Grading Scale	There are five categories: S (90 points or more to 100 points), A (80 points or more to less than 90 points), B (70 points or more to less than 80 points), C (60 points or more to less than 70 points), and D (less than 60 points). S, A, B, and C are passed, and D is failed.		
Textbooks/References	Rehabilitation Nutrition Pocket Manual (Ishiyaku Shuppan), Rehabilitation Nutrition for PTs, OTs, and STs, 3rd Edition (Ishiyaku Shuppan)		
Independent Study Outside of Class	Understand matters related to rehabilitation nutrition by referring to the above textbook.		
Room	Ward 1, 1st floor, Rehabilitation Room, Examination Room 1		
Special Note	For those who cannot participate in the above time, the time schedule will be decided after consultation. Questions will be accepted at any time. Feedback will be given at the final session.		
Course Plan	Number	Instructor	Contents
	1	Hidetaka Wakabayashi	Basics of Rehabilitation Nutrition
	2	Hidetaka Wakabayashi	Basics of Nutrients
	3	Hidetaka Wakabayashi	Sarcopenia
	4	Hidetaka Wakabayashi	Frailty
	5	Hidetaka Wakabayashi	Rehabilitation nutrition care process.
	6	Hidetaka Wakabayashi	Sarcopenic dysphagia and presbyphagia
	7	Hidetaka Wakabayashi	Rehabilitation Nutrition for Major Diseases and Disorders 1
8	Hidetaka Wakabayashi	Rehabilitation Nutrition for Major Diseases and Disorders 2	

Rehabilitation Syllabus

(* = for doctor's license holders)

Syllabus Title	Advanced Course of Rehabilitation Pharmacotherapy		
Instructor	Hidetaka Wakabayashi		
Credit	1		
Type of Class	Lecture & Seminar		
Theme	Concept, Practice and Research of Rehabilitation Pharmacotherapy		
Schedule	Wednesday 15:00~16:30		
Course Objective	1. Understand the concept of rehabilitation pharmacotherapy 2. Understand rehabilitation pharmacotherapy management. 3. Understand the drugs related to drug-induced geriatric syndrome.		
Evaluation Methods	Report submission (50%) Attendance (50%)		
Grading Scale	There are five categories: S (90 points or more to 100 points), A (80 points or more to less than 90 points), B (70 points or more to less than 80 points), C (60 points or more to less than 70 points), and D (less than 60 points). S, A, B, and C are passed, and D is failed.		
Textbooks/References	Rehabilitation Pharmacotherapy Management (Nanzan-do), Rehabilitation Pharmacotherapy to Enhance Function, Activity, Participation and QOL (Jiho)		
Independent Study Outside of Class	Understand matters related to rehabilitation pharmacotherapy by referring to the above textbook.		
Room	Ward 1, 1st floor, Rehabilitation Room, Examination Room 1		
Special Note	For those who cannot participate in the above time, the time schedule will be decided after consultation. Questions will be accepted at any time. Feedback will be given at the final session.		
Course Plan	回数	担当教員	授業内容
	1	Hidetaka Wakabayashi	Concept of Rehabilitation Pharmacotherapy
	2	Hidetaka Wakabayashi	Rehabilitation Pharmacotherapy Management
	3	Hidetaka Wakabayashi	Drugs related to drug-induced geriatric syndrome 1
	4	Hidetaka Wakabayashi	Drugs related to drug-induced geriatric syndrome 2
	5	Hidetaka Wakabayashi	Rehabilitation Pharmacotherapy Management by setting 1
	6	Hidetaka Wakabayashi	Rehabilitation Pharmacotherapy Management by setting 2
	7	Hidetaka Wakabayashi	Case Report of Rehabilitation Pharmacotherapy Management 1
8	Hidetaka Wakabayashi	Case Report of Rehabilitation Pharmacotherapy Management 2	

Rehabilitation Syllabus

(* = for doctor's license holders)

Syllabus Title	Advanced Course of Dementia / Cognitive Rehabilitation		
Instructor	Yoshiko Furiya		
Credit	1		
Type of Class	Lecture & Seminar		
Theme	Concept, Practice and Research of Dementia / Cognitive Rehabilitation		
Schedule	Friday 15:00~16:30		
Course Objective	1. Understand Alzheimer's disease and other dementia-related diseases. 2. Understand the overview of higher brain dysfunction. 3. Understand the overview of rehabilitation for higher brain dysfunction.		
Evaluation Methods	Report submission (50%) Attendance (50%)		
Grading Scale	There are five categories: S (90 points or more to 100 points), A (80 points or more to less than 90 points), B (70 points or more to less than 80 points), C (60 points or more to less than 70 points), and D (less than 60 points). S, A, B, and C are passed, and D is failed.		
Textbooks/References	CR BOOKS Rehabilitation of Higher Brain Dysfunction Ver.3 book collection Katsuhiko Takeda (Editor), Masaru Mimura (Editor), Osamu Watanabe (Editor)		
Independent Study Outside of Class	Understand the issues related to dementia and higher brain dysfunction by referring to the handouts and the textbook above.		
Room	Rehabilitation Room, 3rd Floor, Tokyo Women's Medical University Adachi Medical Center		
Special Note	For those who cannot participate in the above time, the time schedule will be decided after consultation. Questions will be accepted at any time. Feedback will be given at the final session.		
Course Plan	回数	担当教員	授業内容
	1	Yoshiko Furiya	Diagnosis and treatment of Alzheimer's disease and other dementia disorders (1)
	2	Yoshiko Furiya	Diagnosis and treatment of Alzheimer's disease and other dementia disorders (2)
	3	Yoshiko Furiya	Rehabilitation of Alzheimer's dementia and other dementia disorders
	4	Yoshiko Furiya	Basics of higher brain dysfunction
	5	Yoshiko Furiya	Rehabilitation of higher brain dysfunction (1)
	6	Yoshiko Furiya	Rehabilitation of higher brain dysfunction (2)
	7	Yoshiko Furiya	Rehabilitation of higher brain dysfunction (3)
	8	Yoshiko Furiya	Case Report on Higher Brain Dysfunction

Rehabilitation Syllabus

(* = for doctor's license holders)

Syllabus Title	Clinical research and academic writing		
Instructor	Hidetaka Wakabayashi		
Credit	1		
Type of Class	Lecture & Seminar		
Theme	Clinical Research Design and Academic Writing		
Schedule	Wednesday 15:00~16:30		
Course Objective	1. Understand the basics of how to read clinical research papers. 2. Understand the basics of clinical research design. 3. Understand the basics of academic writing.		
Evaluation Methods	Report submission (50%) Attendance (50%)		
Grading Scale	There are five categories: S (90 points or more to 100 points), A (80 points or more to less than 90 points), B (70 points or more to less than 80 points), C (60 points or more to less than 70 points), and D (less than 60 points). S, A, B, and C are passed, and D is failed.		
Textbooks/References	Tips for Clinical Research and Writing Papers (Tokyo Igaku-sha), Tips for Writing Good Case Reports (Tokyo Igaku-sha)		
Independent Study Outside of Class	Understand matters related to clinical research and writing papers, referring to the above textbook.		
Room	Ward 1, 1st floor, Rehabilitation Room, Examination Room 1		
Special Note	For those who cannot participate in the above time, the time schedule will be decided after consultation. Questions will be accepted at any time. Feedback will be given at the final session.		
Course Plan	回数	担当教員	授業内容
	1	Hidetaka Wakabayashi	Reading papers and EBM
	2	Hidetaka Wakabayashi	Clinical Research Design 1
	3	Hidetaka Wakabayashi	Clinical Research Design 2
	4	Hidetaka Wakabayashi	Statistical methods
	5	Hidetaka Wakabayashi	Academic Writing 1
	6	Hidetaka Wakabayashi	Academic Writing 2
	7	Hidetaka Wakabayashi	Academic Writing 3
8	Hidetaka Wakabayashi	Academic Writing 4	

Rehabilitation Syllabus

(* = for doctor's license holders)

Syllabus Title	Experiments and practical training (research projects)	
Instructor	Hidetaka Wakabayashi, Yoshiko Furiya	
Credit	10	
Type of Class	Experiments and practical training (research projects)	
Theme	Conducting research projects and writing papers	
Schedule	Monday to Friday 9:00–12:00, 13:00–17:00	
Course Objective	<ol style="list-style-type: none"> 1. Understand the global position of the given research topic. 2. Discuss the research significance of the latest papers related to the research topic. 3. Understand the research design and be able to prepare an appropriate research proposal. 4. Present and discuss the contents of one's own research at international and domestic conferences. 5. Understand the format and writing style of original papers and case report papers, and be able to write accordingly. 6. Write a response to the opinions of reviewers after submission of a paper, in collaboration with the faculty advisor. 	
Evaluation Methods	Research plan (50%), Research presentation/discussion (10%), Paper writing (40%)	
Grading Scale	There are five categories: S (90 points or more to 100 points), A (80 points or more to less than 90 points), B (70 points or more to less than 80 points), C (60 points or more to less than 70 points), and D (less than 60 points). S, A, B, and C are passed, and D is failed.	
Textbooks/References	Original papers and review articles related to the proposed research	
Independent Study Outside of Class	Actively participate in and present at relevant academic conferences in Japan and abroad to gather information and engage in discussions.	
Room	Education and research buildings, rehabilitation rooms, etc.	
Special Note	For those who cannot participate in the above time, the time schedule will be decided after consultation. Questions will be accepted at any time. Feedback will be given at the final session.	
Course Plan	回数	授業内容
	1	Achievement of Objectives 1 and 2
	~	
	90	
	91	Achievement of Objectives 3 and 4
	~	
	120	
	121	Achievement of Objectives 5 and 6
	~	
150		

Thoracic Surgery

I Educational Policy

Department of Thoracic Surgery performs surgical treatment as the center of the department's policy. Surgeries performed in the department cover various thoracic diseases, and the annual numbers of thoracic surgeries are approximately 100–110 primary lung cancer cases, 50–60 metastatic lung tumor cases, 30 benign and malignant mediastinal tumor cases, and 50 pneumothorax cases, indicating that the number of total surgeries is 250–300 cases annually. Almost all surgeries are performed by thoracoscopic procedures, and specially for mediastinal tumor case and lobectomy/segmentectomy for lung malignant tumors, robot-assisted thoracoscopic surgery (RATS) is used with a da Vinci® Surgical System™. By referring three-dimensional anatomical images, which are created from the numerical data of chest computed tomographic images by home-made software, segmentectomy and sub-segmentectomy are also performed under* by thoracoscopic procedure. Laser treatment or stent placement for airway stenosis such as a lung cancer, vascular embolization for hemoptysis and arteriovenous fistulae, and others are also performed. Department of Thoracic Surgery trains thoracic surgeons who can give patient beneficial treatments by learning various therapeutic techniques including surgical procedures in the field of respiratory medicine.

II Goals

1. With “至誠 (Shisei) と愛 (Ai)” (sincerity and compassion), which is the fundamental philosophy of Tokyo Women's Medical University (TWMU), the graduate students will be required to perform research, which will give beneficial impacts to the world.
2. By understanding the physiology and anatomy of the respiratory organ, the students will obtain the wide range of knowledge about thoracic diseases.
3. The students will be required to understand the regenerative medicine and biomaterials relating to thoracic surgery, and to obtain knowledge and techniques relating to the medicine and materials.
4. The students will be educated to have a wide range of scientific view points and highly skillful communication ability, and a selection ability to find out the most adequate therapeutic procedure from the plural number of techniques.
5. The students will be trained to have abilities that allow them to plan and perform leading-edge research projects scientifically and ethically, and to present the results of the investigations.
6. The students will be educated to be widely concerned with various research projects, which are proceeded by not only the students themselves but also other investigators in the field of thoracic surgery, and to discuss these research projects and others.
7. The students will be trained to cultivate investigators as well as educators, who are experts in the field of thoracic surgery.

III Supervisor・Research theme

(* = for doctor's license holders)

Name and position	Research theme
<p>Masato Kanzaki, Professor and Head and Takako Matsumoto, Assistant Professor</p>	<p>1. Improvements of the simulation and navigation at the level of the sub-segment of lung in thoracic surgery For knowing the configurations of pulmonary vessels and bronchi before thoracic surgery, various three-dimensionally (3D) anatomical images of the lungs are attempted to be established. Polygonal lung 3D images that are created by thoracic surgeons are known to give a highly accessibility to the targets and a clear vividness of the targets. Although these 3D images are used for mainly segmentectomy and sub-segmentectomy in the department, there are several points that should be improved from medical and engineering viewpoints. As research themes, the supervisors and the students will find out problems in individual cases and solve them by medical and engineering techniques.</p>
<p>Masato Kanzaki, Professor and Head and Takako Matsumoto, Assistant Professor</p>	<p>2. Genetic analysis and molecular biological investigations of pneumothorax The highly recurrence rate of pneumothorax after surgery is an issue for thoracic surgeons. In the secondary pneumothorax cases, characteristically pathological findings are found in the pulmonary cysts, and familial pneumothorax with genetic abnormality is also found. In the cases of pneumothorax surgery, the supervisors and the students will select familial and the secondary pneumothorax cases, investigate the cases immunohistochemically, genetically, and molecular biologically, and attempt to find the emergence mechanism of pneumothorax.</p>

Masato Kanzaki, Professor and Head and Tamami Isaka, Associate Professor	3. Investigation of artificial tracheae having tracheal and bronchial epithelium For maintaining the differentiation abilities of tracheal and bronchial epithelial cells, extracellular matrix (ECM) and cell growth factors are known to be essential. The supervisors and the students will attempt to establish adequate techniques by combining the matrix and the growth factors. After finding the adequate techniques, for making blood vessel systems on tracheae, tracheal and bronchial epithelial cells will be induced on the inner surface of artificial tracheae with vascular growth factors and others. By applying ECM as scaffold with the factors, the supervisors and the students will attempt to establish an adequate technique, which allow pre-incubated tracheal and bronchial epithelial cells to adhere and proliferate on the surface of artificial trachea for the application of clinical practice.
Masato Kanzaki, Professor and Head and Tamami Isaka, Associate Professor	4. Regenerative medicine of the respiratory organ Despite the progress of regenerative research for various organs, no remarkable advancements are found in organs such as the lung and kidney, which have a complex 3D-structure and functions. Specially, the lungs are composed of the respiratory tract, pulmonary alveolus, and blood vessel systems, and interstitial tissue, and more than 40 different kinds of constituent cells are found in the lungs. The immunoreactivity of the lungs is known to be quite high, and unlike other organs, the metabolic of pulmonary cells is aerobic and contain highly energetic molecules including reactive oxygen species (ROS). Lung regenerative medicine has a potential that provides fundamental treatments for emphysema and pulmonary fibrosis. The supervisors and the students will attempt to regenerate the lung tissues in vitro and in vivo with pulmonary cell sheets recovered from temperature-responsive culture dishes.
Masato Kanzaki, Professor and Head and Tamami Isaka, Associate Professor	5. Pulmonary surgical treatments with biomaterials For preventing lung air-leak, which is a characteristic complication during thoracic surgery, the quick decision, which allows the surgeons to perform wound-healing treatment on the pleura, is known to be important. Conventional procedures using polyglycolic acid sheets and oxidized regenerated cellulose sheets are performed reluctantly because of the poor biocompatibility, inflammatory suppressing ability, adhesion-preventing ability, and mechanical flexibility of the materials, demanding the newly development of tissue restoration materials. The supervisors and the students will investigate clinically applicable medical-devices with various bio-absorbable materials and cell sheets, and quest a possibility that these materials will be applied to clinical practice.

IV Syllabus

(* = for doctor's license holders)

Title	Instructor	Credit	Theme
General thoracic surgery	Masato Kanzaki, Tamami Isaka, and Takako Matsumoto	2	Advancements of diagnosis and treatment for pulmonary diseases cured by thoracic surgery
General thoracic malignancy	Masato Kanzaki, Tamami Isaka, and Takako Matsumoto	2	Factors indicating the surgical treatment of lung cancer
Regenerative medicine for thoracic surgery	Masato Kanzaki, Tamami Isaka, and Takako Matsumoto	1	Thoracic surgical treatment with biomaterials
Experiment and practice (theme-oriented research)	Masato Kanzaki, Tamami Isaka, Takako Matsumoto, and Hiroe Aoshima	10	Performing theme-oriented research and preparing research paper
Total credits		15	

(Thoracic Surgery) Syllabus (1)

Syllabus Title	General Thoracic surgery		
Instructor	Masato Kanzaki, Tamami Isaka, and Takako Matsumoto		
Credit	2		
Type of Class	Lecture and Practicum		
Theme	Lecture and practicum for thoracic surgery		
Schedule	Monday, Tuesday, and Friday at 9:00~12:00 and 13:00~17:00 Group discussion: Wednesday and Thursday at 8:00~9:10 and 16:00~17:10		
Course Objective	Understanding of the structure of the lungs and thoracic diseases Obtaining a wide range of knowledge of diagnostic and treatment procedures for thoracic diseases, and an ability to select the most suitable surgical method. Obtaining basic surgical techniques		
Evaluation Methods	Attendance rate and the reports regarding to the contents of the lectures will be evaluated at 50% and 50% weight, respectively.		
Grading Scale	Evaluation grades are following five grades. Grade S will be given by 90~100 points; A, 80~90 points; B, 70~80 points; C, 60~70 point; D, less than 60 points. Students obtaining grade S to C will be evaluated to complete the course and given the credits, and those obtaining grade D will be evaluated to incomplete the course and given no credit.		
Textbooks/References	“Textbook of Chest Surgery”, Nanzando, 2016 (In Japanese) “Kokyukigekagaku, 4th Ed.” Nanzando, 2009 (In Japanese) “Bronchoscope-Diagnostic imaging and its techniques for clinicians, 2nd Ed.”, Igaku-Shoin, 2008 (In Japanese)		
Independent Study Outside of Class	Students are asked to read references and search original articles relating to the subjects of lesson.		
Room	Seminar room at the 1st floor in Education and Research Building, and the operation rooms at the 2nd floor in Central ward.		
Special Note	Those who are unable to attend the class at the scheduled time must discuss with the supervisors, and the new schedule will be made. Students can ask questions for the supervisors, regardless of the class schedule. Supervisors will answer the questions not only at the sites but also explain the answers at the last class if necessary.		
Course Plan	Number	Instructor	Contents
	1	Masato Kanzaki or others	Anatomy and physiology of diseased respiratory organs
	2	Masato Kanzaki or others	Dysfunction of pulmonary circulation
	3	Masato Kanzaki or others	Congenital pulmonary diseases
	4	Masato Kanzaki or others	Diagnostic procedures for lung cancers with a bronchoscope, mediastinoscope, and thoracoscope, and the categorizing method of the stage of the cancer
	5	Masato Kanzaki or others	Surgical tolerances of patients underwent pulmonary surgery
	6	Masato Kanzaki or others	Application of thoracic surgeries and their surgical procedures including thoracotomy and thoracoscopic surgery
	7	Masato Kanzaki or others	Perioperative management in thoracic surgery
	8	Masato Kanzaki or others	Multidisciplinary treatments including surgery, chemotherapy, radiation therapy, and palliative care for patients with lung cancers
	9	Masato Kanzaki or others	General mediastinum diseases
	10	Masato Kanzaki or others	Treatments for pneumothorax, and cystic and infectious pulmonary diseases
	11	Masato Kanzaki or others	Intervention treatments including bronchoscopic treatment and the embolization of bronchial
	12	Masato Kanzaki or others	Treatments for patients with thoracic injury and trauma and foreign substances
	13	Masato Kanzaki or others	Advancement found in the field of thoracic surgery
	14	Masato Kanzaki or others	Group discussion No. 1
	15	Masato Kanzaki or others	Group discussion No. 2
16	Masato Kanzaki or others	Over review of General Thoracic Surgery	

(Thoracic Surgery) Syllabus (2)

Syllabus Title	General remarks of thoracic surgical oncology		
Instructor	Masato Kanzaki, Tamami Isaka, Takako Matsumoto, and Hiroe Aoshima		
Credit	2		
Type of Class	Lecture and Practicum		
Theme	Factors allowing surgical treatments to be adequate for chest malignant cancers		
Schedule	Monday, Tuesday, and Friday at 9:00~12:00 and 13:00~17:00 Group discussion: Wednesday and Thursday at 8:30~9:00 and 16:00~17:00		
Course Objective	Understanding of the pathology of lung cancers and their characteristics, and acquiring thoracic-surgery techniques and treatments enhancing the wound-healing. Obtaining an ability to select the most suitable surgical procedure depend on the kind and stage of lung cancers Obtaining an ability to select not only surgical treatment but also other various treatments including medical and radiation therapies Obtaining an ability to present the results of case reports and to answer the questions adequately in scientific conferences		
Evaluation Methods	Attendance rate and the reports regarding to the contents of the lectures will be evaluated at 50% and 50% weight, respectively.		
Grading Scale	Evaluation grades are following five grades. Grade S will be given by 90~100 points; A, 80~90 points; B, 70~80 points; C, 60~70 point; D, less than 60 points. Students obtaining grade S to C will be evaluated to complete the course and given the credits, and those obtaining grade D will be evaluated to incomplete the course and given no credit.		
Textbooks/References	"Textbook of Chest Surgery", Nanzando, 2016 (In Japanese) "Kokyukigekagaku, 4th Ed." Nanzando, 2009 (In Japanese) "ESTC Textbook of Thoracic Surgery", Medycyna Praktyczna, Kraków, Poland, 2014		
Independent Study Outside of Class	Students are asked to read references described above and search original articles relating to the subjects of lesson.		
Room	Seminar room at the 1st floor in Education and Research Building, and the operation rooms at the 2nd floor in Central ward.		
Special Note	Those who are unable to attend the class at the scheduled time must discuss with the supervisors, and the new schedule will be made. Students can ask questions for the supervisors, regardless of the class schedule. Supervisors will answer the questions not only at the sites but also explain the answers at the last class if necessary.		
Course Plan	Number	Instructor	Contents
	1	Masato Kanzaki or others	Outline of pulmonary malignant tumors No. 1
	2	Masato Kanzaki or others	Outline of pulmonary malignant tumors No. 2
	3	Masato Kanzaki or others	Specific discussion on lung cancers No. 1
	4	Masato Kanzaki or others	Specific discussion on lung cancers No. 2
	5	Masato Kanzaki or others	Metastatic lung tumors
	6	Masato Kanzaki or others	Specific discussion on mediastinal tumors
	7	Masato Kanzaki or others	Other malignant thoracic diseases No. 1
	8	Masato Kanzaki or others	Other malignant thoracic diseases No. 2
	9	Masato Kanzaki or others	Specific discussion on surgical procedures
	10	Masato Kanzaki or others	Actual situation of postoperative complications
	11	Masato Kanzaki or others	Actual situation of perioperative managements
	12	Masato Kanzaki or others	Thoracoscopic surgery and robot-assisted thoracoscopic surgery
	13	Masato Kanzaki or others	Anatomy of lungs and preparation of 3D-images for simulation
	14	Masato Kanzaki or others	Pulmonary three-dimensional navigation and thoracoscopic surgery
	15	Masato Kanzaki or others	Group discussion
16	Masato Kanzaki or others	Over review of General Thoracic Surgery	

(Thoracic Surgery) Syllabus (3)

Syllabus Title	Regenerative medicine of respiratory organs with tissue-engineering techniques		
Instructor	Masato Kanzaki and Tamami Isaka		
Credit	1		
Type of Class	Lecture and Practicum		
Theme	Surgical treatment of respiratory organ with biomaterials		
Schedule	Thursday at 9:00-12:00		
Course Objective	Obtaining a wide range of knowledge of tissue engineering Understanding of regenerative medicine in the field of respiratory organ and acquiring the specific knowledge allowing the students to discuss various subjects with others.		
Evaluation Methods	Attendance rate and the reports regarding to the contents of the lectures will be evaluated at 50% and 50% weight, respectively.		
Grading Scale	Evaluation grades are following five grades. Grade S will be given by 90~100 points; A, 80~90 points; B, 70~80 points; C, 60~70 point; D, less than 60 points. Students obtaining grade S to C will be evaluated to complete the course and given the credits, and those obtaining grade D will be evaluated to incomplete the course and given no credit.		
Textbooks/References	Saiseiryosho, Asakura-shoten, Tokyo, Japan, 2012 (In Japanese) Biomedical Engineering Nyumon, Newton Press, Tokyo, Japan, 1999 (In Japanese)		
Independent Study Outside of Class	Students are asked to read references and search original articles relating to the subjects of lesson. Students are also recommended to attend conferences and obtain a wide range of knowledge including the research results obtained by other researchers.		
Room	Seminar room at the 1st floor in Education and Research Building		
Special Note	Those who are unable to attend the class at the scheduled time must discuss with the supervisors, and the new schedule will be made. Students can ask questions for the supervisors, regardless of the class schedule. Supervisors will answer the questions not only at the sites but also explain the answers at the last class if necessary.		
Course Plan	Number	Instructor	Contents
	1	Masato Kanzaki or others	Surgical regenerative-medicine of respiratory organ No. 1
	2	Masato Kanzaki or others	Surgical regenerative-medicine of respiratory organ No. 2
	3	Masato Kanzaki or others	Surgical regenerative-medicine of respiratory organ No. 3
	4	Masato Kanzaki or others	Surgical regenerative-medicine of respiratory organ No. 4
	5	Masato Kanzaki or others	Tissues in the respiratory organ and pulmonary cystic diseases
	6	Masato Kanzaki or others	Actual application of cell-sheets in thoracic surgery No. 1
	7	Masato Kanzaki or others	Actual application of cell-sheets in thoracic surgery No. 2
8	Masato Kanzaki or others	Artificial tracheae lined with tracheal and bronchial epithelial cells	

(Thoracic Surgery) Syllabus (4)

Syllabus Title	Experiment and practice (theme-oriented research)		
Instructor	Masato Kanzaki, Tamami Isaka, Takako Matsumoto, and Hiroe Aoshima		
Credit	10		
Type of Class	Experiment and practice (theme-oriented research)		
Theme	Performing theme-oriented research and preparing the manuscript of research article		
Schedule	Wednesday and Thursday at 9:30-12:00 and 13:00-17:00		
Course Objective	<ol style="list-style-type: none"> 1. Students will learn necessary experimental techniques along the planned research proposal and obtain an ability to perform the research. 2. Students will be asked to record the contents and experimental data of the research, and store the items adequately. 3. Students will be able to make the tables and graphs of the results of the experiment. 4. Students will obtain an ability to present the results of the research at various scientific conferences outside of the graduate school and discuss the content of the results with scientists who attend the conferences. 5. Students will be asked to prepare the manuscript describing the content of research and send it to an adequate scientific journal. If the 		
Evaluation Methods	Content of the research report will be evaluated at 60%; interview with the supervisors, 10%; presentation and discussion at a seminar, 10%; the preparation of manuscript for the publication of research results, 20%.		
Grading Scale	Evaluation grades are following five grades. Grade S will be given by 90~100 points; A, 80~90 points; B, 70~80 points; C, 60~70 point; D, less than 60 points. Students obtaining grade S to C will be evaluated to complete the course and given the credits, and those obtaining grade D will be evaluated to incomplete the course and given no credit.		
Textbooks/References	Review and original articles relating to the theme-oriented research		
Independent Study Outside of Class	Students will recommend to attend scientific conferences for presenting the results of the research, discuss with other investigators, and collect necessary information relating to the theme-oriented research.		
Room	Seminar room at the 1st floor in Education and Research Building, and the operation rooms at the 2nd floor in Central ward.		
Special Note	Those who are unable to attend the class at the scheduled time must discuss with the supervisors, and the new schedule will be made. Students can ask questions for the supervisors, regardless of the class schedule. Supervisors will answer the questions not only at the sites but also explain the answers at the last class if necessary.		
Course Plan	Number	Instructor	Contents
	1		
	~	Masato Kanzaki, Tamami Isaka, Takako Matsumoto, and Hiroe Aoshima	Achieving the attainment target No. 1 and 2
	90		
	91		
	~	Masato Kanzaki, Tamami Isaka, Takako Matsumoto, and Hiroe Aoshima	Achieving the attainment target No. 3 and 4
	120		
	121		
	~	Masato Kanzaki, Tamami Isaka, Takako Matsumoto, and Hiroe Aoshima	Achieving the attainment target No. 5
150			

Breast Surgery

I Educational Policy

This course will help:

- Students acquire a wide range of knowledge and skills in the field of breast surgery.
- Nurture students' capability to plan cutting-edge research on subjects that are scientifically important and ethically sound, to conduct research and give presentations on their findings.
- Foster researchers and educators with thorough knowledge in the field of breast surgery who are highly ethical and responsible physicians who can, thereby, contribute greatly to society.

II Goals

Students will acquire the following abilities:

- A wide range of knowledge and a high level of research skills, philosophy, and ethics.
- To plan and conduct unique, cutting-edge research on breast surgery.
- To play an active domestic and international role with a broad vision and communication skills.
- To contribute to the development of breast surgery.

III Supervisor • Research theme (* = for doctor's license holders)

Name and position	Research theme
Professor (Special Appointment) Kamio	(1) Study on the application of liquid biopsy in breast cancer patients for diagnosis and treatment. The liquid biopsy technique enables physicians to detect and analyze tumor-related molecules in the blood stream, e.g., cell-free DNA, circulating tumor cells, microRNA, etc. The aim is to study the technique's usefulness for cancer screening and early detection, prognosis prediction, determination of drug resistance, and assessment of therapeutic efficacy.
Professor (Special Appointment) Takako Kamio Assistant professor Eiichirou Noguchi	(2) Study the assessment of breast cancer patients' QOL. These patients undergo various treatments, e.g., the initial treatment after diagnosis, therapy for recurrent lesions, and palliative care. Research questions that require clarification, include analyzing outcomes of these interventions and following up QOL. The quantitative research method is used to assess and analyze QOL.

IV Syllabus

(* = for doctor's license holders)

Title	Instructor	Credit	Theme
General Remarks on Breast Surgery	Professor (Special Appointment) Takako Kamio	1	Breast oncology
Details of Breast Surgery 1	Professor (Special Appointment) Takako Kamio teaching staff	2	Diagnosis of breast cancer
Details of Breast Surgery 2	Professor (Special Appointment) Takako Kamio teaching staff	2	Treatment of breast cancer
Experiment / Practice	Professor (Special Appointment) Takako Kamio teaching staff	10	Conducting research on a subject and writing a research paper
Total credits		15	

Breast Surgery

Syllabus Title	General Remarks on Breast Surgery		
Instructor	Professor (Special Appointment) Takako Kamio		
Credit	1 credit		
Type of Class	Lecture / Practice		
Theme	Breast oncology		
Schedule	Monday afternoon, 70 minutes		
Course Objective	<p>Students will be able to:</p> <ul style="list-style-type: none"> · Explain the histology of a normal mammary gland, the anatomy of the axillary area, and the effects of physiology and hormones on the mammary gland. · Explain types of mammary tumors and their pathological images. · Understand the biology of breast cancer, cancer-related genes, and liquid biopsy, etc. · Understand the epidemiology of breast cancer. · Understand the current trends of diagnoses and treatments of breast cancer. 		
Evaluation Methods	Attendance (50%), discussion participation during lectures and/or practice (40%), report (10%)		
Grading Scale	There are 5 grades: S (≥ 90), A (80 – 89), B (70 – 79), C (60 – 69), D (≤ 59). S, A, B, and C are passing; D is failing.		
Textbooks/References	Breast oncology (edited by the Japanese Breast Cancer Society), etc.		
Independent Study Outside of Class	Students are required to read designated literature prior to attending courses and practices.		
Room	The TWU education and research building, second floor, conference room		
Special Note	For students who cannot attend at the scheduled time, a schedule may be assigned by consultation. Questions are encouraged. Feedback will be provided at the final lecture.		
Course Plan	Number	Professor (Special Appointment)	Contents
	1	Professor (Special Appointment) Takako Kamio	Lecture (1)
	2	Professor (Special Appointment) Takako Kamio	Lecture (2)
	3	Professor (Special Appointment) Takako Kamio	Lecture (3)
	4	Professor (Special Appointment) Takako Kamio	Lecture (4)
	5	Professor (Special Appointment) Takako Kamio	Lecture (5)
	6	Professor (Special Appointment) Takako Kamio	Lecture (6)
	7	Professor (Special Appointment) Takako Kamio	Lecture (7)
	8	Professor (Special Appointment) Takako Kamio	Lecture (8)

Breast Surgery

Syllabus Title	Details of Breast Surgery 1	
Instructor	Professor (Special Appointment) Takako Kamio; Assistant Professor Eiichirou Noguchi; Assistant Professor Hiroko Tsukjada	
Credit	2 credits	
Type of Class	Lecture / Practice	
Theme	Diagnosis of breast cancer	
Schedule	Monday afternoon, 70 minutes	
Course Objective	Students are required to understand and learn how to diagnose breast cancer.	
Evaluation Methods	Attendance (50%), discussion participation during lectures and/or practice (40%), report (10%)	
Grading Scale	There are 5 grades: S (≥ 90), A (80 – 89), B (70 – 79), C (60 – 69), D (≤ 59). S, A, B, and C are passing; D is failure.	
Textbooks/References	Breast oncology (edited by the Japanese Breast Cancer Society), Mammography guidelines, The guidelines for breast ultrasound diagnosis, etc.	
Independent Study Outside of Class	Students are required to read designated literature prior to attending courses and practices.	
Room	The TWU education and research building, second floor, conference room	
Special Note	For students who cannot attend at the scheduled times, a schedule may be assigned by consultation. Questions are encouraged. Feedback will be provided at the final lecture.	
Course Plan	Number	Contents
	1	Professor (Special Appointment) Takako Kamio, teaching staff Diagnosis of breast cancer: lecture / practice (1)
	2	Professor (Special Appointment) Takako Kamio, teaching staff Diagnosis of breast cancer: lecture / practice (2)
	3	Professor (Special Appointment) Takako Kamio, teaching staff Diagnosis of breast cancer: lecture / practice (3)
	4	Professor (Special Appointment) Takako Kamio, teaching staff Diagnosis of breast cancer: lecture / practice (4)
	5	Professor (Special Appointment) Takako Kamio, teaching staff Diagnosis of breast cancer: lecture / practice (5)
	6	Professor (Special Appointment) Takako Kamio, teaching staff Diagnosis of breast cancer: lecture / practice (6)
	7	Professor (Special Appointment) Takako Kamio, teaching staff Diagnosis of breast cancer: lecture / practice (7)
	8	Professor (Special Appointment) Takako Kamio, teaching staff Diagnosis of breast cancer: lecture / practice (8)
	9	Professor (Special Appointment) Takako Kamio, teaching staff Diagnosis of breast cancer: lecture / practice (9)
	10	Professor (Special Appointment) Takako Kamio, teaching staff Diagnosis of breast cancer: lecture / practice (10)
	11	Professor (Special Appointment) Takako Kamio, teaching staff Diagnosis of breast cancer: lecture / practice (11)
	12	Professor (Special Appointment) Takako Kamio, teaching staff Diagnosis of breast cancer: lecture / practice (12)
	13	Professor (Special Appointment) Takako Kamio, teaching staff Diagnosis of breast cancer: lecture / practice (13)
	14	Professor (Special Appointment) Takako Kamio, teaching staff Diagnosis of breast cancer: lecture / practice (14)
15	Professor (Special Appointment) Takako Kamio, teaching staff Diagnosis of breast cancer: lecture / practice (15)	

Breast Surgery

Syllabus Title	Details of Breast Surgery 2		
Instructor	Professor (Special Appointment) Takako Kamio; Assistant Professor Eiichirou Noguchi; Assistant Professor Hiroko Tsukada		
Credit	2 credits		
Type of Class	Lecture / Practice		
Theme	Treatment of breast cancer		
Schedule	Monday afternoon, 70 minutes		
Course Objective	Students are required to understand and learn how to diagnose and treat breast cancer.		
Evaluation Methods	Attendance (50%), discussion participation during lectures and/or practice (40%), report (10%)		
Grading Scale	There are 5 grades: S (≥ 90), A (80 – 89), B (70 – 79), C (60 – 69), D (≤ 59). S, A, B, and C are passing; D is failing.		
Textbooks/References	Breast oncology (edited by the Japanese Breast Cancer Society), etc.		
Independent Study Outside of Class	Students are required to read designated literature prior to attending courses and practices.		
Room	The TWU education and research building, second floor, conference room		
Special Note	For students who cannot attend at the scheduled time, a schedule may be assigned by consultation. Questions are encouraged. Feedback will be provided at the final lecture.		
Course Plan	Number	Instructor	Contents
	1	Professor (Special Appointment) Takako Kamio, teaching staff	Treatment of breast cancer: lecture / practice (1)
	2	Professor (Special Appointment) Takako Kamio, teaching staff	Treatment of breast cancer: lecture / practice (2)
	3	Professor (Special Appointment) Takako Kamio, teaching staff	Treatment of breast cancer: lecture / practice (3)
	4	Professor (Special Appointment) Takako Kamio, teaching staff	Treatment of breast cancer: lecture / practice (4)
	5	Professor (Special Appointment) Takako Kamio, teaching staff	Treatment of breast cancer: lecture / practice (5)
	6	Professor (Special Appointment) Takako Kamio, teaching staff	Treatment of breast cancer: lecture / practice (6)
	7	Professor (Special Appointment) Takako Kamio, teaching staff	Treatment of breast cancer: lecture / practice (7)
	8	Professor (Special Appointment) Takako Kamio, teaching staff	Treatment of breast cancer: lecture / practice (8)
	9	Professor (Special Appointment) Takako Kamio, teaching staff	Treatment of breast cancer: lecture / practice (9)
	10	Professor (Special Appointment) Takako Kamio, teaching staff	Treatment of breast cancer: lecture / practice (10)
	11	Professor (Special Appointment) Takako Kamio, teaching staff	Treatment of breast cancer: lecture / practice (11)
	12	Professor (Special Appointment) Takako Kamio, teaching staff	Treatment of breast cancer: lecture / practice (12)
	13	Professor (Special Appointment) Takako Kamio, teaching staff	Treatment of breast cancer: lecture / practice (13)
	14	Professor (Special Appointment) Takako Kamio, teaching staff	Treatment of breast cancer: lecture / practice (14)
15	Professor (Special Appointment) Takako Kamio, teaching staff	Treatment of breast cancer: lecture / practice (15)	

Breast Surgery

Syllabus Title	Experiment / Practice (Research subject)		
Instructor	Professor (Special Appointment) Takako Kamio; Assistant Professor Eiichirou Noguchi; Assistant Professor Hiroko Tsukada		
Credit	10 credits		
Type of Class	Experiment / Practice (research subject)		
Theme	Conducting research on a subject and writing a paper		
Schedule	Monday afternoon, 70 minutes		
Course Objective	<p>Students will be able to:</p> <ol style="list-style-type: none"> 1. Conduct research according to a planned research program by acquiring and implementing the necessary techniques. 2. Correctly record the experimental content and data, and store them. 3. Properly draw figures and make tables from the research results. 4. Make a presentation on their research findings in academic conferences and/or research meetings in Japan and in other countries and participate in discussions on its contents. 5. Write a report by compiling research findings to submit to a journal, properly deal with the comments from reviewers, and accomplish a successful article publication. 6. Teach younger students from their own knowledge and skills in research. 		
Evaluation Methods	Research reports (60%), make figures and tables (10%), presentation/discussion (10%), and a written report (20%)		
Grading Scale	There are 5 grades: S (≥ 90), A (80 – 89), B (70 – 79), C (60 – 69), D (≤ 59). S, A, B, and C are passing; D is failing.		
Textbooks/References	Original papers and related review articles		
Independent Study Outside of Class	Students are required to actively attend relevant academic conferences and research meetings and make a presentation, collect information, and participate in discussions on its contents.		
Room	On site and the TWMU education and research building, second floor, conference room		
Special Note	For students who cannot attend classes at the scheduled times, a schedule may be assigned by consultation. Questions are encouraged. Feedback will be provided at the final lecture.		
Course Plan	Number	Instructor	Contents
	1-90	Professor (Special Appointment) Takako Kamio, teaching staff	Attainment of goals 1-2
	91-120	Professor (Special Appointment) Takako Kamio, teaching staff	Attainment of goals 3-4
	121-150	Professor (Special Appointment) Takako Kamio, teaching staff	Attainment of goals 5-6

Lower Gastrointestinal Surgery

I Educational Policy

The Digestive Disease Center was established in 1965 by Honorary professor Komei Nakayama and has been a driving force in the treatment of digestive diseases in Japan. In the field of colorectal surgery, minimally invasive surgery has been progressing, and laparoscopic surgery and robot-assisted surgery are used in the majority of surgeries. In the graduate school, we focus on the exploration of specialized fields and advanced medical research, and our themes include the introduction of AI to recognize the images of minimally invasive surgery, remote system and AI-based evaluation in laparoscopic surgery education, and advanced advanced medical research such as regenerative medicine and gene therapy. Colorectal cancer has become the most common cancer in Japan, and recently, the results of radiation and chemotherapy have been remarkable. We need to work on new clinical research incorporating these treatments other than surgery. We train future colorectal surgeons who can understand treatment strategies from a broad perspective as well as improve surgical techniques.

II Goals

1. to have the ability to set up a research design and consider its feasibility and limitations
2. to acquire advanced knowledge and the ability to evaluate and critique original papers
3. to acquire the knowledge and skills necessary for research
4. to have the ability to mentor young researchers
5. to understand high ethical standards and have a passion for contributing to medical education and research

III Supervisor・Research theme

(* = for doctor's license holders)

Name and position	Research theme
Prof. Yamaguchi Associate prof. Inoue Assistant prof. Banba	(1) AI-based technical evaluation of laparoscopic surgery Since laparoscopic surgery can be recorded in digital images, it is expected that AI will be able to recognize forceps, and furthermore, to evaluate the operation technique in surgery based on the movement of the forceps and the operation time. In addition, it is suggested that the recognition of bleeding and the operation of the part where progress is obstructed may lead to the improvement of surgical techniques. Furthermore, it may lead to a fair evaluation tool in the technical certification examination, and the progress of this field is greatly awaited.
Prof. Yamaguchi Associate prof. Inoue Assistant prof. Kumamoto	(2) Introduction of Robotic Surgery for colorectal cancer surgery*. Unlike conventional laparoscopic surgery, surgery using the da Vinci surgical robot can be performed more elaborately with its multi-joint function, anti-shake and stereoscopic effects. In rectal surgery, the use of a surgical-assist robot is expected to improve the accuracy of dissection transfer and surgery aiming at function preservation. We will understand the features of robotic surgery and discuss effective and safe operation methods considering pitfalls as well as how to take advantage of its advantages.
Prof. Yamaguchi Assistant prof. Banba Assistant prof. Kumamoto	(3) Effects of distance education on laparoscopic surgery The development of communication technology has made it possible to transmit high-resolution images. In this study, we will discuss the feasibility and cost of remote surgical education using VR and 5G.
Prof. Yamaguchi Associate prof. Inoue Assistant prof. Banba Assistant prof. Kumamoto	(4) Investigation of highly effective adjuvant rectal cancer treatment*. The efficacy of adjuvant therapy for rectal cancer has been remarkably improved, and nonoperative curative methods such as watch-and-wait or total neoadjuvant therapy have been proposed. However, the drugs and methods used, as well as the methods of radiotherapy, are still in the exploratory phase, and more effective methods may yet be found. We will discuss the possibility of modification of the current methods to achieve a more effective treatment.

IV Syllabus

(* = for doctor's license holders)

Title	Instructor	Credit	Theme
General statement of colorectal surgery	Prof. Yamaguchi Associate prof. Inoue Assistant prof. Banba	1	Learn the general overview of colorectal surgery through clinical conference and journal club
Diagnostic imaging of colorectal surgery	Prof. Yamaguchi Associate prof. Inoue Assistant prof. Kumamoto	2	Accurately diagnose tumor extension including lymph node metastasis and relationship with adjacent organs from CT and MRI images
Artificial Intelligence of gastrointestinal surgery	Prof. Yamaguchi Assistant prof. Banba Assistant prof. Kumamoto	2	Learn about the use of AI in gastrointestinal surgery, especially in relation to surgery
Research task(Problem-based Research)	Prof. Yamaguchi Associate prof. Inoue Assistant prof. Banba Assistant prof. Kumamoto	10	Conducting research on an issue and writing a research paper
Total credits		15	

Lower Gastrointestinal Surgery Syllabus (1)

Syllabus Title	General statement of colorectal surgery		
Instructor	Prof. Yamaguchi, Associate prof. Inoue, Assistant prof. Banba, Assistant prof. Kumamoto		
Credit	1		
Type of Class	Lecture, clinical conference		
Theme	indication of surgery, image diagnosis, surgical procedure		
Schedule	Monday to Friday 9:00 – 12:00, Tuesday and Thursday 7:30 – 8:30		
Course Objective	comprehension of anatomy, function and pathophysiology of colon and rectum, colorectal diagnostic imaging, planning surgery, The acquisition of the basic operative technique		
Evaluation Methods	attendance (50%), report (50%)		
Grading Scale	S (90–100 points), A (80–89), B (70–79), C (60–69), D (0–59). S, A, B, C are passing and D is failed		
Textbooks/References	The ASCRS Textbook of Colon and Rectal Surgery, Springer 2016		
Independent Study Outside of Class	The patients are grasped to participate clinical conferene., Perioperative management and diagnostic imaging are learnd by discussing doctors		
Room	West ward A 2F conference room, Operating room		
Special Note	If it is impossible to participate at the time, arrangement is necessary. Do not hesitate to ask question. The feedback is performed at the final time.		
Course Plan	Number	Instructor	Contents
	1	S. Yamaguchi, etc.	Anatomy and function of the colon and rectum
	2	S. Yamaguchi, etc.	Pathophysiology of the colon and rectum
	3	S. Yamaguchi, etc.	Pathology of colorectal malignancy
	4	S. Yamaguchi, etc.	Diagnostic imaging of colorectal diseases
	5	S. Yamaguchi, etc.	Multimodal therapy of colorectal malignancy
	6	S. Yamaguchi, etc.	Perioperative managemint of colorectal surgery
	7	S. Yamaguchi, etc.	Operative planning of colorectal surgery
	8	S. Yamaguchi, etc.	Group discussion
9	S. Yamaguchi, etc.	Summarization	

Lower Gastrointestinal Surgery Syllabus (2)

Syllabus Title	Diagnostic imaging of colorectal surgery		
Instructor	Prof. Yamaguchi, Associate prof. Inoue, Assistant prof. Banba, Assistant prof. Kumamoto		
Credit	2		
Type of Class	Lecture, practice		
Theme	learning diagnostic imaging of colorectal diseases		
Schedule	Monday 7:45–9:30 Tuesday 7:30–17:00 Wednesday 8:30–13:00 Thursday 7:30–17:00 Friday 7:45–17:00		
Course Objective	comprehension of diagnostic imaging of colorectal diseases, understanding to images to make planning surgery		
Evaluation Methods	attendance (50%), report (50%)		
Grading Scale	S (90–100 points), A (80–89), B (70–79), C (60–69), D (0–59). S, A, B, C are passing and D is failed		
Textbooks/References	The ASCRS Textbook of Colon and Rectal Surgery, Springer 2016		
Independent Study Outside of Class	The patients are grasped to participate clinical conferene., Perioperative management and diagnostic imaging are learned by discussing doctors		
Room	West ward A 2F conference room, Operating room		
Special Note	If it is impossible to participate at the time, arrangement is necessary. Do not hesitate to ask question. The feedback is performed at the final time.		
Course Plan	Number	Instructor	Contents
	1	S. Yamaguchi, etc.	Diagnostic imaging of CT
	2	S. Yamaguchi, etc.	Diagnostic imaging of MRI
	3	S. Yamaguchi, etc.	Diagnostic imaging of colonoscopy
	4	S. Yamaguchi, etc.	Diagnostic imaging of PET-CT
	5	S. Yamaguchi, etc.	Diagnostic imaging of barium enema
	6	S. Yamaguchi, etc.	Practice of resection area of colorectal diseases
	7	S. Yamaguchi, etc.	Observation of the operating room
	8	S. Yamaguchi, etc.	Group discussion
9	S. Yamaguchi, etc.	Summarization	

Lower Gastrointestinal Surgery Syllabus (3)

Syllabus Title	Artificial Inteligence of gastrointstinal surgery		
Instructor	Prof. Yamaguchi, Assistant prof. Banba		
Credit	2		
Type of Class	Lecture, practice		
Theme	Artificial interigence using operative images		
Schedule	Friday 9:00 – 12:00		
Course Objective	comprehension of basic technique of AI assessment using surgical images		
Evaluation Methods	attendance (50%), report (50%)		
Grading Scale	S (90–100 points), A (80–89), B (70–79), C (60–69), D (0–59). S, A, B, C are passing and D is failed		
Textbooks/Referenc es			
Independent Study Outside of Class	Observing OR, assessing clinical problem and planning AI usage		
Room	West ward A Gastroenrelogy center, Operating room		
Special Note	If it is impossible to participate at the time, arrangement is necessary. Do not hesitate to ask question. The feedback is performed at the final time.		
Course Plan	Number	Instructor	Contents
	1	S. Yamaguchi, etc.	Outline of AI for gastrointestinal surgery
	2	S. Yamaguchi, etc.	Details of AI for gastrointestinal surgery 1 (recognition of the devices)
	3	S. Yamaguchi, etc.	Details of AI for gastrointestinal surgery 2 (recognition of the instruments)
	4	S. Yamaguchi, etc.	Details of AI for gastrointestinal surgery 3 (recognition of bleeding 1)
	5	S. Yamaguchi, etc.	Details of AI for gastrointestinal surgery 4 (recognition of bleeding 2)
	6	S. Yamaguchi, etc.	Details of AI for gastrointestinal surgery 5 (recognition of motion 1)
	7	S. Yamaguchi, etc.	Details of AI for gastrointestinal surgery 6 (recognition of motion 2)
	8	S. Yamaguchi, etc.	Details of AI for gastrointestinal surgery 7 (laparoscopic surgery 1)
	9	S. Yamaguchi, etc.	Details of AI for gastrointestinal surgery 8 (laparoscopic surgery 2)
	10	S. Yamaguchi, etc.	General statement of AI for gastrointestinal surgery
	11	S. Yamaguchi, etc.	Group discussion
12	S. Yamaguchi, etc.	Summarization	

Lower Gastrointestinal Surgery Syllabus (4)

Syllabus Title	Research task(Problem-based Research)		
Instructor	Prof. Yamaguchi, Associate prof. Inoue, Assistant prof. Banba, Assistant prof. Kumamoto		
Credit	10		
Type of Class	Research task		
Theme	Research task and making article		
Schedule	Thursday 9:00—12:00, Tuesday and Thursday 7:00-8:30		
Course Objective	<ol style="list-style-type: none"> 1. to be able to set up a research design and consider its feasibility and limitations 2. acquisition of advanced knowledge and the ability to evaluate and critique original papers 3. to acquire the knowledge and skills necessary for research 4. summarize the research results and report them at external conference and congress 5. discuss the results of the research and write a article 6. reply appropriately to reviewers' comments 		
Evaluation Methods	research report (60%), research presentation (10%), research article(30%)		
Grading Scale	S (90-100 points), A (80-89), B (70-79), C (60-69), D (0-59). S, A, B, C are passing and D is failed		
Textbooks/References	manuscript rearding research task		
Independent Study Outside of Class	participation of related congress, participation of clinical conference		
Room	West ward A 2F conference room, Operating room		
Special Note	If it is impossible to participate at the time, arrangement is necessary. Do not hesitate to ask question. The feedback is performed at the final time.		
Course Plan	Number	Instructor	Contents
	1	S. Yamaguchi, etc.	Achievement of Course objective 1 and 2
	~		
	90		
	91	S. Yamaguchi, etc.	Achievement of Course objective 3
	~		
	120		
	121	S. Yamaguchi, etc.	Achievement of Course objective 4 and 5
	~		
150			

Inflammatory Bowel Disease Surgery

I Educational Policy

Inflammatory bowel disease (IBD) is a disease in which physicians, pediatricians and surgeons must work together to continue treatment. Although there are some options for medical treatment, there are a certain rate of patients who require surgery. Even if treatment does not improve the condition, surgical treatment allows patient to spend school and social life comfortably without repeated hospitalizations. Recently, we have been actively performing minimally invasive laparoscopic surgery, and it is now possible to perform surgery with small wounds as before. Surgery is not done due to failure of medical treatment. Currently, medical treatment and surgery are being performed according to the severity of each patient.

However, surgery for IBD is difficult and requires specialized knowledge and skill. Department of IBD Surgery was established with the aim of providing high-quality treatment to patients with IBD and training IBD surgeon. We train specialists who can provide high-quality and reliable treatment.

II Goals

1. Have the ability to set up a study design and consider its feasibility and limitations.
2. Acquire advanced knowledge and have the ability to evaluate and criticize the original paper.
3. Acquire the knowledge and skill necessary for research.
4. Have the ability to guide young researchers.
5. Have high ethics and a passion to contribute to medical education and research.

III Supervisor・Research theme

(* = for doctor's license holders)

Name and position	Research theme
Michio Itabashi (Professor and Head) Shimpei Ogawa (Associate Professor) Yoshiko Bamba (Assistant Professor) Kimitaka Tani (Assistant Professor)	(1) Analysis of onset and risk factors for postoperative complications of ulcerative colitis Surgery of ulcerative colitis is known to cause frequent postoperative complications due to various immunomodulator drug and the general condition of the patient. We will analyze the data of cases in our department, extract risk factors that can be acquired before surgery, and verify the usefulness of the conventionally proposed classification (mGPS, onodera's prognostic nutritional index, age-adjusted Charlson Comorbidity Index, etc.). In addition, we will create a nomogram and conduct research that can be fed back to actual clinical site. Furthermore, as an external validity verification, the validity will be verified using data of another Japanese cooperation facilities.
Michio Itabashi (Professor and Head) Shimpei Ogawa (Associate Professor) Yoshiko Bamba (Assistant Professor) Kimitaka Tani (Assistant Professor)	(2) Clinicopathological study of risk factors for reoperation of Crohn's disease Crohn's disease is a disease in which recurrence and relapse are repeated mainly in the vicinity of the anastomotic site, and stenosis and abscess are exhibited, so that reoperation is required at a certain probability. It has been known that the lesion relapses early after surgery, and it is recommended to strengthen treatment from an early stage. Recently, the number of cases in which biological drug is introduced and remission can be maintained is increasing, but there are many cases in which surgery is required. We aim to provide feedback to actual clinical site by conducting risk analysis that takes into account the findings of new biomarkers (LRG: Leucine-rich $\alpha 2$ glycoprotein, etc.) and resected specimens in addition to clinicopathological factors.
Michio Itabashi (Professor and Head) Shimpei Ogawa (Associate Professor) Yoshiko Bamba (Assistant Professor) Kimitaka Tani (Assistant Professor)	(3) Study of the validity of minimally invasive surgery for inflammatory bowel disease * Patients of inflammatory bowel disease is often young, and it is important to examine the validity of laparoscopic surgery over time with a focus on the life cycle. In order to conduct research, it is necessary to become proficient in laparoscopic surgery, and we will study not only inflammatory bowel disease but also the role of laparoscopic surgery in colorectal cancer for every aspect. This graduate student aims to become a surgeon with advanced surgical skill, who is certified by the Japan Society of Endoscopic Surgery.

<p>Michio Itabashi (Professor and Head) Shimpei Ogawa (Associate Professor) Yoshiko Bamba (Assistant Professor) Kimitaka Tani (Assistant Professor)</p>	<p>(4) Risk factors for colitis associated cancer and improved prognosis At present, the mechanism of inflammatory carcinogenesis has not been fully elucidated. It has been reported that the risk of carcinogenesis generally increases 10 years after illness. In ulcerative colitis, cancer occurs frequently from the sigmoid colon to the rectum and is accompanied by dysplasia. In addition, Crohn's disease is characterized by the complication of anal canal cancer. We will analyze the characteristics of cases of colitis associated cancer in our department and clarify their characteristics by comparing with cases without cancer.</p>
<p>Michio Itabashi (Professor and Head) Shimpei Ogawa (Associate Professor) Yoshiko Bamba (Assistant Professor) Kimitaka Tani (Assistant Professor)</p>	<p>(5) Development of tools for diagnosis of stoma complications and supporting selection of orthotic device using Artificial intelligent Machine learning is performed using Artificial intelligent (AI), and the situation of skin disorders is objectively evaluated from still images of the stoma. In addition, we will evaluate the conditions of the stoma and the skin around the stoma, and develop a system that can select an appropriate orthotic device based on the evaluation. Furthermore, the system can be installed in mobile terminals for the purpose of encouraging the construction of a support system for practicing doctors.</p>
<p>Michio Itabashi (Professor and Head) Takeshi Ohki (Associate Professor) Shimpei Ogawa (Associate Professor) Yoshiko Bamba (Assistant Professor) Kimitaka Tani (Assistant Professor)</p>	<p>(6) Introduction of Robotic Surgery for Inflammatory Bowel Disease* Unlike the conventional laparoscopic surgery, the surgery with the surgical support robot "da Vinci surgical system" has multi-joint function and stereoscopic effect, and it is possible to perform surgery for high difficult cases with minimal invasive. By using "da Vinci surgical system", excision and anastomosis can be improved, and function-preserving surgery can be possible. Graduate students aim to become a surgeon with advanced surgical skill to perform robotic surgery while acquiring a certification of the Japan Society of Endoscopic Surgery.</p>

IV Syllabus

(* = for doctor's license holders)

Title	Instructor	Credit	Theme
General inflammatory bowel disease surgery	Michio Itabashi (Professor and Head)	1	Learn general on inflammatory bowel disease surgery through case review meetings and gathering to read and discuss papers.
Therapeutic strategy and staged surgery in ulcerative colitis	Michio Itabashi (Professor and Head) Shimpei Ogawa (Associate Professor)	2	Learn the theory of the intestinal tract reaching to anastomosis, creating the ileal pouch, anastomosis method, and observe the surgical procedure in ulcerative colitis.
Presevation of bowel function and short bowel syndrome in Crohn's disease	Michio Itabashi (Professor and Head) Yoshiko Bamba (Assistant Professor)	2	Learn the theory of dealing with skip lesions and preventing short bowel syndrome, and observe the surgical procedure in crohn's disease.
Experiment / Practice (assignment research)	Michio Itabashi (Professor and Head) Shimpei Ogawa (Associate Professor) Yoshiko Bamba (Assistant Professor)	10	Implementation of assignment research and create a paper
Total credits		15	

Inflammatory Bowel Disease Syllabus (1)

Syllabus Title	General inflammatory bowel disease surgery		
Instructor	Michio Itabashi (Professor and Head), Shimpei Ogawa (Associate Professor), Kimitaka Tani (Assistant Professor)		
Credit	1		
Type of Class	Lecture, Case review meeting		
Theme	Indications for surgery, Diagnosis of images, Examination of surgical procedures		
Schedule	Monday–Friday 9:00–12:00 Tuesday/Thursday 7:30–8:30		
Course Objective	Understanding the structure, function, and pathophysiology of the gastrointestinal tract, diagnosis of images for inflammatory bowel disease, surgical planning, acquisition of basic surgical techniques		
Evaluation Methods	Attendance (50%)、Submission of report (50%)		
Grading Scale	S(≤100, ≥90 points)、A(<90, ≥80 points)、B(<80, ≥70 points)、C(<70, ≥60 points)、D(<60) S, A, B, C are passed, and D is rejected.		
Textbooks/References	Surgical Strategy for Inflammatory Bowel Disease MEDICAL VIEW CO.,LTD 2013 Tokyo		
Independent Study Outside of Class	Participate in a case review meeting and understand the patient's condition. Learn perioperative management and diagnostic imaging by discussing with the instructor.		
Room	West Ward A–2F Conference Room, Central Operating Room		
Special Note	If you cannot participate in the above schedule, the timetable will be decided after consultation. Questions etc. are accepted at any time. We will look back on the training in the final round.		
Course Plan	Number	Instructor	Contents
	1	Michio Itabashi and other Instructor	Structure and function of the gastrointestinal tract
	2	Michio Itabashi and other Instructor	Pathophysiology of inflammatory bowel disease
	3	Michio Itabashi and other Instructor	Pathology of malignant tumor with inflammatory bowel disease
	4	Michio Itabashi and other Instructor	Diagnosis of images for inflammatory bowel disease
	5	Michio Itabashi and other Instructor	Team medical care for inflammatory bowel disease
	6	Michio Itabashi and other Instructor	Perioperative management of inflammatory bowel disease
	7	Michio Itabashi and other Instructor	Surgical plan for inflammatory bowel disease
	8	Michio Itabashi and other Instructor	Group discussion
9	Michio Itabashi and other Instructor	Summary	

Inflammatory Bowel Disease Syllabus (2)

Syllabus Title	Therapeutic strategy and staged surgery in ulcerative colitis		
Instructor	Michio Itabashi (Professor and Head), Shimpei Ogawa (Associate Professor), Kimitaka Tani (Assistant Professor)		
Credit	2		
Type of Class	Lecture, Exercise		
Theme	Learn about the indications for staged surgery in ulcerative colitis, its judgment and treatment strategy.		
Schedule	Monday 8:30-9:30 Tuesday 7:30-18:00 Wednesday 8:30-13:00 Thursday 7:30-18:00 Friday 8:30-18:00 Saturday 8:30-13:00		
Course Objective	Understanding the characteristics of medical treatment for refractory ulcerative colitis. Understanding the safety and invasion of staged surgery.		
Evaluation Methods	Attendance (50%)、Submission of report (50%)		
Grading Scale	S(≤ 100 , ≥ 90 points)、A(< 90 , ≥ 80 points)、B(< 80 , ≥ 70 points)、C(< 70 , ≥ 60 points)、D(< 60) S, A, B, C are passed, and D is rejected.		
Textbooks/References	Surgical Strategy for Inflammatory Bowel Disease MEDICAL VIEW CO.,LTD 2013 Tokyo		
Independent Study Outside of Class	Participate in a case review meeting and understand the patient's condition. Learn perioperative management and diagnostic imaging by discussing with the instructor.		
Room	West Ward A-2F Conference Room, Central Operating Room, Endoscopy Room		
Special Note	If you cannot participate in the above schedule, the timetable will be decided after consultation. Questions etc. are accepted at any time. We will look back on the training in the final round.		
Course Plan	Number	Instructor	Contents
	1	Michio Itabashi and other Instructor	Diagnosis of severity of ulcerative colitis
	2	Michio Itabashi and other Instructor	Pathophysiology of toxic megacolon
	3	Michio Itabashi and other Instructor	Incidences and risk factors for postoperative complications
	4	Michio Itabashi and other Instructor	Indications for laparoscopic surgery
	5	Michio Itabashi and other Instructor	Postoperative long-term complications and conditions
	6	Michio Itabashi and other Instructor	Postoperative QOL
	7	Michio Itabashi and other Instructor	Observe the surgical procedure
	8	Michio Itabashi and other Instructor	Group discussion
9	Michio Itabashi and other Instructor	Summary	

Inflammatory Bowel Disease Syllabus (3)

Syllabus Title	Presevation of bowel function and short bowel syndrome in Crohn's disease		
Instructor	Michio Itabashi (Professor and Head), Shimpei Ogawa (Associate Professor), Kimitaka Tani (Assistant Professor)		
Credit	2		
Type of Class	Lecture, Exercise		
Theme	Learn the peculiarities of intestinal resection and the basics of intestinal preservation in Crohn's disease surgery		
Schedule	Friday 9:00-12:00		
Course Objective	Learn the peculiarities of intestinal resection in Crohn's disease surgery and the basics of various anastomosis methods, strictureplasty, and intestinal preservation.		
Evaluation Methods	Attendance (50%)、Submission of report (50%)		
Grading Scale	S(≤100, ≥90 points)、A(<90, ≥80 points)、B(<80, ≥70 points)、C(<70, ≥60 points)、D(<60) S, A, B, C are passed, and D is rejected.		
Textbooks/References	Surgical Strategy for Inflammatory Bowel Disease MEDICAL VIEW CO.,LTD 2013 Tokyo		
Independent Study Outside of Class	Participate in surgery and endoscopic treatment to understand clinical problems and get ideas		
Room	West Ward A-2F Conference Room, Central Operating Room, Endoscopy Room		
Special Note	If you cannot participate in the above schedule, the timetable will be decided after consultation. Questions etc. are accepted at any time. We will look back on the training in the final round.		
Course Plan	Number	Instructor	Contents
	1	Michio Itabashi and other Instructor	Introduction to the pathophysiology of Crohn's disease.
	2	Michio Itabashi and other Instructor	Diagnosis of intestinal lesions of Crohn's disease
	3	Michio Itabashi and other Instructor	Anal lesions of Crohn's disease
	4	Michio Itabashi and other Instructor	Malignant tumor associated with Crohn's disease
	5	Michio Itabashi and other Instructor	Laparoscopic surgery for Crohn's disease
	6	Michio Itabashi and other Instructor	Prevention of postoperative recurrence of Crohn's disease
	7	Michio Itabashi and other Instructor	Team medical care for Crohn's disease
	8	Michio Itabashi and other Instructor	Group discussion
9	Michio Itabashi and other Instructor	Summary	

Inflammatory Bowel Disease Syllabus (4)

Syllabus Title	Experiment / Practice (assignment research)		
Instructor	Michio Itabashi (Professor and Head), Shimpei Ogawa (Associate Professor), Kimitaka Tani (Assistant Professor)		
Credit	10		
Type of Class	Experiment / Practice (assignment research)		
Theme	Implementation of assignment research and create a research paper		
Schedule	Thursday 9:00—12:00 Tuesday/Thursday 7:00—8:30		
Course Objective	<ol style="list-style-type: none"> 1. Have the ability to set up a study design and consider its feasibility and limitations. 2. Acquire advanced knowledge and have the ability to evaluate and criticize the original paper. 3. Acquire the knowledge and skills necessary for research. 4. Summarize the study results, and present at study groups and academic societies. 5. Consider the study results and create a research paper. 6. Appropriately reply to reviewer comments. 		
Evaluation Methods	Research report (60%)、Research presentation (10%)、Research paper (30%)		
Grading Scale	S (≤100, ≥90 points)、A (<90, ≥80 points)、B (<80, ≥70 points)、C (<70, ≥60 points)、D (<60) S, A, B, C are passed, and D is rejected.		
Textbooks/References	Research-related paper		
Independent Study Outside of Class	Participation in related academic societies and in gastrointestinal surgery case review meeting		
Room	West Ward A-2F Conference Room, Central Operating Room, etc.		
Special Note	If you cannot participate in the above schedule, the timetable will be decided after consultation. Questions etc. are accepted at any time. We will look back on the training at any time.		
Course Plan	Number	Instructor	Contents
	1		
	~		Achieving goal 1-2
	90		
	91		
	~		Achieving goal 3
	120		
	121		
	~		Achieving goal 4-5
150			

Neurosurgery

I Educational Policy

The Department of Neurosurgery, Tokyo Women's Medical University has top-class number of cases and clinical results in Japan in all neurosurgical diseases such as brain tumors, cerebrovascular diseases, functional neurological disorders, spinal cord diseases, pediatric neurosurgery, and head trauma. We have 30 clinical subspecialties, and multiple specialists are engaged in each field. In each field, we have achieved the world's leading clinical results by safe and reliable neurosurgery using the latest technology and equipment. The number of operations in 2020 reached 1000, and when gamma knife treatment was added, more than 1200 cases were treated, which is the largest number of treatments in Japan. In addition to surgery, multimodal therapies such as chemotherapy and other radiotherapy are used to deal with all diseases in the field of neurosurgery at a high level. Not only standard craniotomy, but also minimally invasive surgery that minimizes the patient's damage, stereotactic treatment methods, neuroendoscopy, endovascular treatment, etc. are introduced, and also intraoperative monitoring are used for preserve patient's neurological function.

Regarding education, we are focusing on student education and postgraduate education, and the neurosurgeon specialist education program, which is our core hospital, produces excellent neurosurgeons every year. Currently, there are 250 neurosurgeons from our Department and they are active in various related facilities nationwide. Excellent and abundant human resources are a great asset of our Department. We will continue to develop international human resources who have both technology and humanity. As part of this education, we are also focusing on graduate school education and doctoral degree acquisition, and it is possible to respond in a wide range of neurosurgery fields.

Regarding research, basic research and clinical research are conducted in neurosurgery fields, and graduate students play a central role in basic research. In addition, we also have the Institute of Advanced Biomedical Engineering and Science in our university, and we are promoting advanced research on regenerative medicine and surgical treatment strategies in collaboration with the institute.

Incorporating cutting-edge technology and innovative values while inheriting good traditions, we will further develop our department. As an important responsibility as a university hospital / educational institution, we will do our utmost to engage in education and research.

II Goals

- Acquire knowledge of the necessary anatomy and physiology in the field of neurosurgery, and understand the pathophysiology and treatment of neurosurgery diseases.
- Acquire a wide range of clinical abilities for neurosurgery and understand various surgical techniques.
- Set a research theme in the field of neurosurgery, make an experimental plan, and carry out research according to the plan.
- To be able to have a wide range of interests and discussions in the research of others regarding neurosurgery.
- Appropriately chart the experimental results and make it possible to present the contents.
- Make the research results into a scientific paper.
- Develop the ability and research philosophy to guide advanced and original research.
- Has a broad perspective and abundant communication skills, and has motivation to play an active role internationally.

III Supervisor*Research theme

(* = for doctor's license holders)

Name and position	Research theme
Professor Kawamata	(1) Research on treatment of neurological dysfunction using neurotrophic factors Although the mortality rate of stroke has decreased in recent years, on the other hand, the number of patients who survive and have neurological dysfunction such as paralysis has increased remarkably, which is an extremely serious social problem. In this study, we introduce a neurotrophic factor as a completely new treatment method for neurological dysfunction such as after cerebral ischemia, and examine it for clinical application. We will investigate the basic mechanism in relation to apoptosis-suppressing factors.
Professor Kawamata	(2) Studies on changes in blood flow and functional recovery in ischemic cerebrovascular diseases. For ischemic cerebrovascular accidents, MRI (including echo planner images) and dynamic CT are used to analyze images over time from the early stage after onset, and changes in local cerebral blood flow, degree of cerebral edema, and resumption of blood flow. The purpose of this study is to examine the relationship between blood flow and bleeding in the infarct lesion and to use it for selecting an appropriate treatment method.

<p>Professor Kawamata Associate Professor Hayashi Assistant Professor Eguchi</p>	<p>(3) Relationship between recurrence of meningioma and proliferative capacity Meningioma is a benign tumor, but when it occurs in the skull base, it cannot be completely removed and may recur. In recent years, local radiotherapy is occasionally performed with the introduction of gamma knife, and it is necessary to examine its proliferative capacity of the tumor. We will examine factors of tumor recurrence.</p>
<p>Professor Kawamata Senior Lecturer Saito Assistant Professor Nitta</p>	<p>(4) Research on the pathophysiology and treatment of malignant gliomas. Malignant gliomas have an extremely poor prognosis, and their pathophysiology is largely unknown. Molecular biological searches are performed from surgical specimens based on the pathological and immunohistochemical searches of this tumor to determine what tumors of the astral cell lineage are resistant to treatment and individually. The purpose of this study is to investigate what is a treatment resistance factor in tumors of the disease and to contribute to the treatment. From this, basic research methods in tumor research can be learned.</p>
<p>Professor Kawamata Senior Lecturer Saito Assistant Professor Nitta</p>	<p>5) Studies on glioma growth, infiltration and angiogenic factors Glioma is a highly invasive tumor, and it has been pointed out that it is related to angiogenic factors. The degree of infiltration in glioma images is evaluated and surgical specimens are used to examine tumor angiogenesis, tumor cell infiltration, and neuronal morphology in the cortex. These findings will be useful for surgical strategy and adjuvant therapy for glioma.</p>
<p>Professor Kawamata Senior Lecturer Amano</p>	<p>(6) Research on the secretory and proliferative capacity of pituitary tumors In recent years, it has been found that the majority of pituitary adenomas have the ability to secrete hormones. We will investigate the hormone secretory capacity in pituitary adenomas with a confocal laser scanning microscope, and the proliferative capacity of each of these will be evaluated. These results will contribute to the selection of postoperative treatment for residual tumors.</p>
<p>Professor Kawamata Senior Lecturer Amano</p>	<p>(7) Examination of hormone-producing ability and hormone reserve for improving QOL in pituitary adenoma The standard treatment for pituitary adenomas is surgical removal, and the prognosis is generally good. In recent years, research on the ability to secrete hormones in pituitary adenomas has been active. It has been found that most non-functional pituitary adenomas also have some hormone secretory capacity. The hormone secretory capacity of surgically resected specimens is searched by immunohistochemical and molecular biology techniques. Furthermore, we will clinically search for hormone reserves before and after surgery for this tumor case in detail, establish appropriate replacement therapy, and improve QOL.</p>
<p>Professor Kawamata Associate Professor Aihara Associate Professor Akagawa</p>	<p>(8) Genetic study of cerebrovascular disease Research on the genetic background of cerebral aneurysm and moyamoya disease is actively conducted, but the genetic mechanism is still largely unknown. We will elucidate of the pathogenic mechanism of cerebral aneurysm and moyamoya disease at the genetic level in familial cases.</p>
<p>Professor Kawamata Assistant Professor Ishikawa</p>	<p>(9) Development of new cerebral aneurysm embolic coil and embolic substance Currently, endovascular surgery is one of the major treatment methods for cerebral aneurysms. Basic research with animal experiments will be conducted for clinical application with the aim of developing coils and embolic substances used for these treatments.</p>

Associate Professor Aihara	<p>(10) Studies on cell death and neuronal differentiation in medulloblastoma</p> <p>We have shown that the introduction of the nerve growth factor (NGF) receptor (Trk) and the addition of NGF leads to cell death and neuronal differentiation in medulloblastoma cells.</p> <p>We will determine the factor responsible for the differentiation and cell death. We will also investigate changes of various factors including tumor suppressor genes such as Rb and p53, apoptosis-related proteins such as ICE family and Fas, and gcm after NFG addition.</p>
Associate Professor Aihara Professor Kubota	<p>(11) Basic and clinical research on the treatment of epilepsy</p> <p>We will examine the pathophysiology of epilepsy physiologically and nuclear medicine, create an experimental epilepsy model, compare the pathology with the clinical feature using biochemical and physiological methods, and link these results to treatment for epilepsy.</p>
Associate Professor Aihara Professor Kubota	<p>(12) Elucidation of the function of the limbic system in epilepsy patients</p> <p>Investigate the source of event-related potential P300 by deep EEG and subdural electrodes in patients with temporal lobe epilepsy. We will examine the memory and the laterality of the hippocampus using the brain-laboratory antonym test during hippocampal stimulation. Investigate the role and laterality of the amygdala in emotions using GSR.</p>
Assistant Professor Horisawa	<p>(13) Endoscopic selective dorsal rhizotomy (SDR) for equinus patients with cerebral palsy</p> <p>In most cases, the operator cannot confirm the nerve root level in SDR, and it depends on the operator's experience how much to remove which nerve root.</p> <p>We confirm the nerve root level to some extent by using a neuroendoscope (flexible endoscope) during surgery. We aim to create a new endoscopic device to confirm the radiculopathy more quickly and accurately for SDR surgery.</p>
Assistant Professor Miura	<p>(14) Study on prediction of postoperative complications by radiculopathy after surgery for spinal cord schwannoma</p> <p>Spinal cord schwannoma is the most common spinal cord tumor, but it has been reported that paralysis due to tumor removal is about 10–15%. This may be related to the difference in the origin of the tumor and the tumorigenesis of the ganglia due to the dumbbell-type tumor. We will evaluate whether preoperative CISS MRI and intraoperative radiculopathy can preserve nerve roots after the surgery.</p>
Assistant Professor Miura	<p>(15) Study on less-invasive intracerebral intervention treatment with convergent ultrasound and gamma knife</p> <p>For Essential tremor and dystonia for which medical treatment is inadequate, we will conduct less-invasive intracranial thalamotomy using focused ultrasound and gamma knife and examine the pathophysiology and therapeutic effect.</p>

IV Syllabus

(* = for doctor's license holders)

Title	Instructor	Credit	Theme
Introduction to Neurosurgery (Lecture)	Professor Kawamata	1	Lecture on the general content of neurosurgery and the outline of each specialty
Brain tumor / cerebrovascular disease (lecture)	Prof. Kawamata, Associate Prof. Aihara, Senior Lecturer Amano, Senior Lecturer Yamaguchi, Senior Lecturer Saito, Assistant Prof. Nitta and Assistant Prof. Ishikawa	2	Specialized lectures on brain tumors and cerebrovascular accidents, which are typical neurosurgical diseases
Functional neurological disorders and epilepsy / advanced treatment (lecture)	Associate Prof. Hayashi, Associate Prof. Aihara, Senior Lecturer Yamaguchi, Senior Lecturer Saito, Assistant Prof. Nitta, Assistant Prof. Ishikawa and Assistant Prof. Horisawa	2	Lectures on functional diseases and epilepsy as well as advanced therapies including gamma knife and endovascular treatment
Experiment / Practice (Problem Research)	Prof. Kawamata, Associate Prof. Hayashi, Associate Prof. Aihara, Senior Lecturer Amano, Senior Lecturer Yamaguchi, Senior Lecturer Saito, Assistant Prof. Nitta and Assistant Prof. Ishikawa	10	Implementation of research papers and preparation of research papers
Total credits		15	

(Neurosurgery) Syllabus (1)

Syllabus Title	Introduction to Neurosurgery (Lecture)		
Instructor	Professor Kawamata		
Credit	1		
Type of Class	Lecture		
Theme	Lecture on the general content of neurosurgery and the outline of each subspecialty		
Schedule	Thursday 17: 00-18: 10		
Course Objective	<ul style="list-style-type: none"> •To acquire knowledge about neurosurgery in general. •To understand what is done and how it is done in the cutting-edge medical field of each specialty. 		
Evaluation Methods	Attendance (50%), submission of report on lecture content (50%)		
Grading Scale	There are five grades. S (90 to 100 points), A (80 to less than 90 points), B (70 to less than 80 points), C (60 to less than 70 points), D (less than 60 points). S, A, B, and C are accepted, and D is rejected.		
Textbooks/References	"Noshinkeigekagaku" Revised 12th Edition (Kinpodo)		
Independent Study Outside of Class	To read the above reference books and related literature. To interested in related boundary areas and acquire a wide range of knowledge.		
Room	Conference room of the neurosurgery medical office on the 4th floor of the South Building		
Special Note	Those who cannot participate in the above time will decide the timetable after consultation. Questions etc. are accepted at any time. Give feedback in the final round.		
Course Plan	Number	Instructor	Contents
	1	Takakazu Kawamata	Introduction to Neurosurgery
	2	Takakazu Kawamata	Diagnostic of emergency diseases in neurosurgery
	3	Takakazu Kawamata	Neurophysiological test
	4	Takakazu Kawamata	Diagnostic of neuroimaging
	5	Takakazu Kawamata	Diagnostic of brain tumors
	6	Takakazu Kawamata	State-of-the-art therapeutics in neurosurgery
	7	Takakazu Kawamata	Diagnostic and therapeutic of trauma in neurosurgery and brain death
	8	Takakazu Kawamata	Diagnostic and therapeutic of cerebrovascular disease

(Neurosurgery) Syllabus (2)

Syllabus Title	Brain tumor/Cerebrovascular disease (Lecture)		
Instructor	Professor: Kawamata, Associate Professor: Aihara, Senior Lecturer: Amano, Yamaguchi, Saito, Assistant Professor: Nitta, Ishikawa		
Credit	2		
Type of Class	Lecture		
Theme	Specialized lectures on brain tumors and cerebrovascular diseases, which are typical neurosurgical diseases		
Schedule	Monday 9:00-10:10, Tuesday 9:00-10:10, Wednesday 9:00-10:10		
Course Objective	<ul style="list-style-type: none"> • To acquire specialized knowledge about brain tumors and cerebrovascular diseases. • To learn the pathophysiology of diseases in each specialty of brain tumors and cerebrovascular diseases, and to understand their treatment, especially surgery. <p style="text-align: right;">• To be able to have discussions in these fields.</p>		
Evaluation Methods	Attendance (50%), submission of report on lecture content (50%)		
Grading Scale	There are five grades. S (90 to 100 points), A (80 to less than 90 points), B (70 to less than 80 points), C (60 to less than 70 points), D (less than 60 points). S, A, B, and C are accepted, and D is rejected.		
Textbooks/References	"Noshinkeigekagaku" Revised 12th Edition (Kinpodo)		
Independent Study Outside of Class	Read the above reference books and related literature. To interested in related boundary areas and acquire a wide range of knowledge.		
Room	Conference room of the neurosurgery medical office on the 4th floor of the South Building		
Special Note	For those who cannot participate in the above time, the time schedule will be decided after consultation. Questions will be accepted at any time. Feedback will be given at the final session.		
Course Plan	Number	Instructor	Contents
	1	Takakazu Kawamata	Diagnosis and treatment of benign brain tumors
	2	Taiichi Saito	Diagnosis of malignant brain tumors
	3	Takakazu Kawamata	Diagnosis of brain tumors
	4	Yasuo Aihara	Diagnosis of pediatric brain tumors
	5	Kosaku Amano	Pituitary tumor
	6	Taiichi Saito	Advanced therapy for brain tumor
	7	Yasuo Aihara	Therapy for pediatric brain tumor
	8	Takakazu Kawamata	Brain tumor surgery
	9	Takakazu Kawamata	Overview of cerebrovascular disease
	10	Takakazu Kawamata	Diagnosis and treatment of hemorrhagic vascular lesions (aneurysm, cerebral hemorrhage)
	11	Takakazu Kawamata	Diagnosis and treatment of hemorrhagic vascular lesions (AVM, AVF)
	12	Koji Yamaguchi	Diagnosis and treatment of occlusive cerebrovascular lesions (extracranial lesions)
	13	Koji Yamaguchi	Diagnosis and treatment of occlusive cerebrovascular lesions (intracranial lesions)
	14	Takakazu Kawamata	Risk factors and genetic relationships for cerebrovascular diseases
15	Takakazu Kawamata	Preventive measures against cerebrovascular diseases (brain check, etc.)	

(Neurosurgery) Syllabus (3)

Syllabus Title	Functional Neurological Disorders and Epilepsy, Advanced Therapy (Lecture)		
Instructor	Associate Professor Hayashi, Associate Professor Aihara, Lecturer Yamaguchi, Lecturer Saito, Assistant Professor Niita, Assistant Professor Ishikawa, Assistant Professor Horisawa		
Credit	2		
Type of Class	Lecture		
Theme	Lectures on functional neurological diseases, epilepsy and advanced therapies including gamma knife and endovascular therapy		
Schedule	Monday 9:00–10:10, Tuesday 9:00–10:10, Wednesday 9:00–10:10		
Course Objective	To acquire expert knowledge of functional neurological diseases, epilepsy, and advanced therapies including gamma knife and endovascular therapy. To learn the pathophysiology of functional neurological diseases and epilepsy, and to understand their treatment, especially surgery. To be able to have discussions in these fields. To acquire knowledge and understanding of advanced therapies such as gamma knife and endovascular therapy.		
Evaluation Methods	Attendance (50%), Report on lecture content (50%)		
Grading Scale	There are five grades. S (90 to 100 points), A (80 to less than 90 points), B (70 to less than 80 points), C (60 to less than 70 points), D (less than 60 points), S, A, B, and C are accepted, and D is rejected.		
Textbooks/References	"Noshinkeigekagaku" Revised 12th Edition (Kinpodo)		
Independent Study Outside of Class	Read the above reference books and related literature. Acquire a broad knowledge with an interest in related boundary areas.		
Room	Neurosurgery Conference Room, 4th floor, South Ward		
Special Note	For those who cannot participate in the above time, the time schedule will be decided after consultation. Questions will be accepted at any time. Feedback will be given at the final session.		
Course Plan	Number	Instructor	Contents
	1	Shiro Horisawa	Introduction to Functional Neurosurgery
	2	Shiro Horisawa	Functional neurosurgical diseases and treatment I
	3	Shiro Horisawa	Functional neurosurgical diseases and treatment II
	4	Shiro Horisawa	Neurosurgical management for intractable pain
	5	Taichi Saito, Masayuki Nitta	Introduction to Epilepsy Surgery
	6	Yasuo Aihara	Development of the central nervous system and congenital malformations
	7	Yasuo Aihara	Surgical treatment of congenital malformations of the central nervous system
	8	Motohiro Hayashi	Introduction to stereotactic radiotherapy
	9	Motohiro Hayashi	Stereotactic Radiotherapy for Brain Tumors
	10	Motohiro Hayashi	Stereotactic Radiotherapy for Vascular Diseases
	11	Motohiro Hayashi	Stereotactic Radiotherapy for Functional Neurological Diseases
	12	Koji Yamaguchi, Tatsuya Ishikawa	Comprehensive Review of Endovascular Therapy
	13	Koji Yamaguchi, Tatsuya Ishikawa	Endovascular treatment of cerebral aneurysm
	14	Koji Yamaguchi, Tatsuya Ishikawa	Endovascular treatment of carotid artery lesions
15	Koji Yamaguchi, Tatsuya Ishikawa	Endovascular treatment of cerebral arteriovenous malformation and brain tumor	

(Neurosurgery) Syllabus (4)

Syllabus Title	Laboratory experiments (research projects)	
Instructor	Professor Kawamata, Associate Professor Hayashi, Associate Professor Aihara, Lecturer Amano, Lecturer Yamaguchi, Lecturer Saito, Assistant Professor Nitta, Assistant Professor Ishikawa	
Credit	10	
Type of Class	Laboratory experiments (research projects)	
Theme	Conducting research projects and writing research papers	
Schedule	Tuesday 4:00 – 6:00 pm, Wednesday 4:00 – 6:00 pm, Friday 2:00 – 4:00 pm	
Course Objective	<ol style="list-style-type: none"> 1. Acquire the necessary experimental techniques and conduct research according to the research plan that has been designed. 2. Record and storage experimental contents and data correctly. 3. Summarize the results in appropriate figures and tables. 4. Present the research at external conferences and research meetings, and to discuss the contents appropriately. 5. Write and submit research papers. Respond appropriately to reviewers' comments and achieve publication. 	
Evaluation Methods	Experimental notes and research report (60%), Preparation of figures and tables (10%), Research presentation and discussion (10%), Writing a paper (20%)	
Grading Scale	There are five grades. S (90 to 100 points), A (80 to less than 90 points), B (70 to less than 80 points), C (60 to less than 70 points), D (less than 60 points), S, A, B, and C are accepted, and D is rejected.	
Textbooks/References	Review articles and original papers related to the research project. How to write your Laboratory Notebook (Yodosha)	
Independent Study Outside of Class	Participate in and present at related academic conferences to gather information and engage in discussions actively.	
Room	Neurosurgery Conference Room, 4th Floor, South Ward, Central Operating Room, Operating Room, 1st Ward.	
Special Note	For those who cannot participate in the above time, the time schedule will be decided after consultation. Questions, etc. will be accepted as needed. Feedback will be given as needed.	
Course Plan	Number	Contents
	1	Achievement of Objectives 1 and 2.
	~	
	90	
	91	Achievement of Objectives 3 and 4.
	~	
	120	
	121	Achievement of Objectives 5.
~		
150		

Orthopaedic Surgery

I Educational policy

Orthopaedic surgery treats musculoskeletal disorders that involve the bones, joints, muscles, and nerves, and give pains and functional disorder to the arms, legs, and trunk, and impair the quality of life (QOL). The numbers of these diseases increase in an aging society. In Japan, the highest complaining rate are locomotive diseases such as, the first is backache, the second is stiff neck, and the third is the joint pains in the arms and legs. Among elderly people over 65 years, these complaining rates clearly increase. In clinical practice, the department treat a number of these diseases including spinal disease, osteoporosis, various metabolic bone diseases, osteoarthritis, and bone and joint diseases due to injury and rheumatism, and performs research projects relating to these diseases.

II Attainment targets

1. Graduate students will be required to acquire (1) the wide range of knowledge about the present statuses of locomotive diseases, their treatment measures, and arising issues, and (2) a strong insight-ability to selected issues.
2. The students will learn investigating methods for collecting clinical data and analyzing the data, and medical ethics as an investigator.
3. The students will be trained to find clinically unsolved issues, and to make and perform research plans for solving them.
4. The students will also learn methods how to make graphs and tables for showing the analyzed results to other investigators in the department as well as scientific conferences.
5. The students will be asked to obtain skills how to compile the data and write manuscripts, which will be hopefully sent to medical journals.
6. The students will be asked to educate themselves to widely concern leading-edge research projects performed by not only themselves but also other investigators and obtain a sufficient skill to discuss the subjects with other researchers.

III Research supervisors and research themes

*: Students having medical licenses

Name of research supervisor	Research themes
Prof. Okazaki	<p>(1) Multiple-institutional and comparative investigation for assessing the outcomes of various surgical procedures for treating knee osteoarthritis</p> <p>For treating knee osteoarthritis, replacement arthroplasty or osteotomy is performed. Although the degree of joint deformities, the age of patient, and the degree of patient's activity are considered as a criterion for selecting the surgical procedure, in real clinical practice, there are many cases where both surgical procedures are performed. In multiple-institutions, the demographic data of patients and scores before and after surgery are recorded prospectively by employing the common scales into a University Hospital Medical Information Network (UMIN) server, and the data described above is used for analyzing differences among the outcomes obtained from multiple institutions by the propensity score matching method.</p>

Prof. Okazaki	<p>(2) Preparations of animal models with ruptured anterior cruciate ligaments and the development of implantable tendons</p> <p>Rats, rabbits, and sheep with ruptured anterior cruciate ligaments are prepared, and decellularized tendons are implanted into the ruptured ligaments in the animal models. At a specific time period after implantation, the transplanted ligaments or tendons are taken from the animals, and by measuring the mechanical strength of removed ligament or tendon and by observing the residual ridge of the site of animal histologically, the efficacies of transplanted ligaments or tendons are investigated. This research project is performed in collaboration with Prof. Iwasaki in Tokyo Women's Medical University-Waseda University Joint Institution for Advanced Biomedical Sciences (TWINS), and mainly investigated sample is denude ligament, which is expected to be most clinically applicable in the reconstruction surgery of damaged ligaments found from acute phase to chronic phase.</p>
Prof. Okazaki	<p>(3) Application of an automatic bone-tissue morphology measuring system for diagnosing and treating metabolic bone diseases</p> <p>Experiment: Experimental models with various metabolic bone-diseases are prepared, and the bone-tissue morphology of the removed tibiae and ilia is analyzed with the automatic bone-tissue morphology measuring system.</p> <p>Clinical application: The biopsy ilia of patients with metabolic bone diseases are analyzed with the morphology measuring system, and the results of bone-tissue morphology measurement are attempted to be compared with those of bone images, the measurements of various bone-metabolic makers. All obtained data including the measurement data described above and clinical data are comprehensively analyzed.</p>
Specially-appointed Prof. Ikari	<p>(4) By using the clinical data and gene information accumulated in Institute of Rheumatology, Tokyo Women's Medical University, factors affecting the pathology of rheumatoid arthritis and the efficacy of treatment are analyzed. Compiled surgical data of the hands and legs, and the extracted data taken from the disease database are consolidated and analyzed, phenomena affecting the outcomes of rheumatoid arthritis surgery are investigated.</p>
Prof. Okazaki	<p>(5) Biomechanical investigation of the applications of internally fixing materials for bone fracture and osteotomy</p> <p>From the bone-models of patients and the computer-aided design (CAD) models of internally fixing materials, biomechanical models are prepared, stresses applied to the intraosseous site and the internally fixing materials are measured, and necessary factors for performing safe bone surgery are investigated.</p>
Prof. Okazaki	<p>(6) Biomechanical and clinical investigations for spinal fusion surgery</p> <p>For establishing safe spinal fusion surgery for spinal deformity due to osteoporosis, biomechanical models are prepared by referring the computer tomographic (CT) data of patients, and differences among stresses caused by the spinal fixation procedures are investigated. The adequacy of the biomechanical models is also by analyzing the clinical data.</p>

IV Syllabus

*: Students having medical licenses

Subject☒	Supervisor	Credit	テーマ
Fundamental orthopedics treatments	Ken Okazaki Katsunori Ikari Nahoko Iwakura	1	Outline of fundamental orthopedics treatments
Clinical practices of the treatments of spinal locomotive diseases	Ken Okazaki	2	Current statuses of the spinal and joint diseases, and the discovery of their relating issues
Leading-edge treatment of rheumatoid arthritis	Ken Okazaki Katsunori Ikari	2	Discovery of present issues relating to the treatments of rheumatoid arthritis and the investigation of improving treatments
Experiment and practice (theme-oriented research)	Ken Okazaki Katsunori Ikari	10	Performing theme-oriented research and preparing research paper
	Total credits	15	

Orthopaedic Surgery Syllabus

*: Students having medical licenses

Name of course	Basic orthopaedic surgical treatments		
Supervisor	Prof. Ken Okazaki, Sp. App. Prof. Katsunori Ikari, and Inst. Nahoko Iwakura		
Credit	1		
Course type	Lecture and Practicum		
Theme	Understanding basic orthopedic surgical treatments		
Day and time	Monday at 15:15-16:2		
Attainment targets	Understanding basic orthopedic surgical treatments		
Evaluation object	Attendance rate and the oral examination regarding to the contents of the lectures will be evaluated at 50% and 50% weight, respectively.		
Evaluation criteria	Evaluation grades are following five grades. Grade S will be given by 90~100 points; A, 80~90 points; B, 70~80 points; C, 60~70 point; D, less than 60 points. Students obtaining grade S to C will be evaluated to complete the course and given the credits, and those obtaining grade D will be evaluated to incomplete the course and given no credit.		
Recommend references and further readings	<p>“Standard textbook of Orthopedic Surgery”, Igaku-Shoin, 2020 (In Japanese)</p> <p>“Medical Journals” relating to orthopedic surgery</p>		
Preparation before class and learning methods after class	Students are asked to read references and search original articles relating to the subjects of lesson.		
Implementation site	Seminar room at the 3rd floor in Education and Research Building		
Note	<p>Those who are unable to attend the class at the scheduled time must discuss with the supervisors, and the new schedule will be made.</p> <p>Students can ask questions for the supervisors, regardless of the class schedule. Supervisors will answer the questions not only at the sites but also explain the answers at the last class if necessary.</p>		
Syllabus plans	Lesson No.	Lecturers	Lesson contents
	1	Ken Okazaki	Basic orthopedic surgery and knee joint diseases
	2	Ken Okazaki	Spinal diseases
	3	Katsunori Ikari	Rheumatoid arthritis and its related diseases
	4	Nahoko Iwakura	Upper limb diseases
	5	Koichiro Yano	Foot and ankle diseases
	6	Masafumi Ito	Bone fractures and injury
	7	Yutarou Munakata	Hip joint diseases

Orthopaedic Surgery Syllabus

*: Students having medical licenses

Name of course	Treatment options for musculoskeletal disorders		
Supervisor	Prof. Ken Okazaki		
Credit	2		
Course type	Case discussion		
Theme	Actual practices of diagnosis and treatments for spine and locomotive diseases☒		
Day and time	Monday at 9:00-10:10		
Attainment targets	Obtaining (1) a wide range of knowledge about the diagnosis and treatments for spine and locomotor diseases, and (2) an ability to select the most suitable treatments from the various options☒		
Evaluation object	Attendance rate to the lecture will be evaluated at 50% weight, and the attendance rates to clinical practice and group discussion will be evaluated at 25% and 25% weight, respectively.		
Evaluation criteria	Evaluation grades are following five grades. Grade S will be given by 90~100 points; A, 80~90 points; B, 70~80 points; C, 60~70 point; D, less than 60 points. Students obtaining grade S to C will be evaluated to complete the course and given the credits, and those obtaining grade D will be evaluated to incomplete the course and given no credit.		
Recommend references and further readings	<p>“Standard textbook of Orthopedic Surgery”, Igaku-Shoin, 2020 (In Japanese)</p> <p>“Medical Journals” relating to orthopedic surgery</p> <p>Monthly books for orthopedics</p>		
Preparation before class and learning methods after class	Students are asked to learn various subjects relating to orthopedic surgery by reading medical articles in medical journals and medical books, and the students are also strongly recommended to attend medical conferences and seminars for obtaining newly discovered achievements in orthopedics.		
Implementation site	A room at the 7th floor in the central ward of the hospital☒		
Note	<p>Those who are unable to attend the class at the scheduled time must discuss with the supervisors, and the new schedule will be made.</p> <p>Students can ask questions for the supervisors, regardless of the class schedule. Supervisors will answer the questions not only at the sites but also explain the answers at the last class if necessary.</p>		
Syllabus plans	Lesson No.	Lecturers	Lesson contents
	1	Ken Okazaki	Case reports discussed in the weekly clinical conference of the department of orthopedic surgery
	2	Ken Okazaki	Case reports discussed in the weekly clinical conference of the department of orthopedic surgery
	3	Ken Okazaki	Case reports discussed in the weekly clinical conference of the department of orthopedic surgery
	4	Ken Okazaki	Case reports discussed in the weekly clinical conference of the department of orthopedic surgery
	5	Ken Okazaki	Case reports discussed in the weekly clinical conference of the department of orthopedic surgery
	6	Ken Okazaki	Case reports discussed in the weekly clinical conference of the department of orthopedic surgery
	7	Ken Okazaki	Case reports discussed in the weekly clinical conference of the department of orthopedic surgery
	8	Ken Okazaki	Case reports discussed in the weekly clinical conference of the department of orthopedic surgery
	9	Ken Okazaki	Case reports discussed in the weekly clinical conference of the department of orthopedic surgery
	10	Ken Okazaki	Case reports discussed in the weekly clinical conference of the department of orthopedic surgery
	11	Ken Okazaki	Case reports discussed in the weekly clinical conference of the department of orthopedic surgery
	12	Ken Okazaki	Case reports discussed in the weekly clinical conference of the department of orthopedic surgery
	13	Ken Okazaki	Case reports discussed in the weekly clinical conference of the department of orthopedic surgery
	14	Ken Okazaki	Case reports discussed in the weekly clinical conference of the department of orthopedic surgery
	15	Ken Okazaki	Case reports discussed in the weekly clinical conference of the department of orthopedic surgery
	16	Ken Okazaki	Case reports discussed in the weekly clinical conference of the department of orthopedic surgery
	17	Ken Okazaki	Case reports discussed in the weekly clinical conference of the department of orthopedic surgery
18	Ken Okazaki	Case reports discussed in the weekly clinical conference of the department of orthopedic surgery	

Orthopaedic Surgery Syllabus

*: Students having medical licenses

Name of course	Leading-edge treatments for rheumatoid arthritis		
Supervisor	Prof. Ken Okazaki and Sp. App. Prof. Katsunori Ikari		
Credit	2		
Course type	Research seminar and discussion		
Theme	Present status of the treatments for rheumatoid arthritis and reliable solutions for the issues arising from the treatments		
Day and time	Thursday at 15:15-16:25		
Attainment targets	<p>Understanding the present statuses of rheumatoid arthritis treatments and appeared issues</p> <p>Obtaining a capability in making adequate answers to questions found in clinical practice by the students without the help of supervisors☒</p>		
Evaluation object	Attendance rate and the degree of the progress of the research project will be evaluated at 50% and 50% weight, respectively.		
Evaluation criteria	Evaluation grades are following five grades. Grade S will be given by 90~100 points; A, 80~90 points; B, 70~80 points; C, 60~70 point; D, less than 60 points. Students obtaining grade S to C will be evaluated to complete the course and given the credits, and those obtaining grade D will be evaluated to incomplete the course and given no credit.		
Recommend references and further readings	Annals of Rheumatic Diseases, Arthritis and Rheumatology, Modern Rheumatology		
Preparation before class and learning methods after class	Graduate students are strongly recommended to read the following medical journals; Annals of Rheumatic Diseases, Arthritis and Rheumatology, and Modern Rheumatology, which are available in the library of Tokyo Women's Medical University.		
Implementation site	Conference room in Institute of Rheumatology, Tokyo Women's Medical University		
Note	<p>Those who are unable to attend the class at the scheduled time must discuss with the supervisors, and the new schedule will be made.</p> <p>Students can ask questions for the supervisors. regardless of the class schedule. Supervisors will answer the questions not only at the sites but also explain the answers at the last class if necessary.</p>		
Syllabus plans	Lesson No.	Lecturers	Lesson contents
	1	Ken Okazaki and Katsunori Ikari	Rheumatology seminar and research conferences
	2	Ken Okazaki and Katsunori Ikari	Rheumatology seminar and research conferences
	3	Ken Okazaki and Katsunori Ikari	Rheumatology seminar and research conferences
	4	Ken Okazaki and Katsunori Ikari	Rheumatology seminar and research conferences
	5	Ken Okazaki and Katsunori Ikari	Rheumatology seminar and research conferences
	6	Ken Okazaki and Katsunori Ikari	Rheumatology seminar and research conferences
	7	Ken Okazaki and Katsunori Ikari	Rheumatology seminar and research conferences
	8	Ken Okazaki and Katsunori Ikari	Rheumatology seminar and research conferences
	9	Ken Okazaki and Katsunori Ikari	Rheumatology seminar and research conferences
	10	Ken Okazaki and Katsunori Ikari	Rheumatology seminar and research conferences
	11	Ken Okazaki and Katsunori Ikari	Rheumatology seminar and research conferences
	12	Ken Okazaki and Katsunori Ikari	Rheumatology seminar and research conferences
	13	Ken Okazaki and Katsunori Ikari	Rheumatology seminar and research conferences
	14	Ken Okazaki and Katsunori Ikari	Rheumatology seminar and research conferences
	15	Ken Okazaki and Katsunori Ikari	Rheumatology seminar and research conferences
	16	Ken Okazaki and Katsunori Ikari	Rheumatology seminar and research conferences
	17	Ken Okazaki and Katsunori Ikari	Rheumatology seminar and research conferences
18	Ken Okazaki and Katsunori Ikari	Rheumatology seminar and research conferences	

Orthopaedic Surgery Syllabus

*: Students having medical licenses

Name of course	Experiment and practice (theme-oriented research)	
Supervisor	Prof. Ken Okazaki and Sp. App. Prof. Katsunori Ikari	
Credit	10	
Course type	Experiment and practice (theme-oriented research)	
Theme	Performing theme-oriented research and preparing the manuscript of research article	
Day and time	Monday at 17:00-19:00	
Attainment targets	<ol style="list-style-type: none"> 1. Students will learn necessary experimental techniques along the planned research proposal and obtain an ability to perform the research. 2. Students will be asked to record the contents and experimental data of the research, and store the items adequately. 3. Students will be able to make the tables and graphs of the results of the experiment. 4. Students will obtain an ability to present the results of the research at various scientific conferences outside of the graduate school and discuss the content of the results with scientists who attend the conferences. 5. Students will be asked to prepare the manuscript describing the content of research and send it to an adequate scientific journal. If the editors will ask him/her to revise the manuscript, he/she will do so, and achieve the publication of manuscript. 	
Evaluation object	Content of the research report will be evaluated at 60%; interview with the supervisors, 10%; presentation and discussion at a seminar, 10%; the preparation of manuscript for the publication of research results, 20%.	
Evaluation criteria	Evaluation grades are following five grades. Grade S will be given by 90~100 points; A, 80~90 points; B, 70~80 points; C, 60~70 point; D, less than 60 points. Students obtaining grade S to C will be evaluated to complete the course and given the credits, and those obtaining grade D will be evaluated to incomplete the course and given no credit.	
Recommend references and further readings	Review and original articles relating to the theme-oriented research	
Preparation before class and learning methods after class	Students will recommend to attend scientific conferences for presenting the results of the research, discuss with other investigators, and collect necessary information relating to the theme-oriented research.	
Implementation site	The sites will be announced before classes, because necessary equipment and tools will vary by the research projects.	
Note	Those who are unable to attend the class at the scheduled time must discuss with the supervisors, and the new schedule will be made. Students can ask questions for the supervisors. regardless of the class schedule. Supervisors will answer the questions not only at the sites but also explain the answers at the last class if necessary.	
Syllabus plans	Lesson No.	Lesson contents
	1	Achieving the attainment target No. 1 and 2
	~	
	90	
	91	Achieving the attainment target No. 3 and 4
	~	
	120	
	121	Achieving the attainment target No. 5
~		
150		

Ophthalmology

I Educational Policy

Vision is said to account for more than 80% of the information we receive from the outside world. Based on the information received, emotions and thoughts, including joy, anger, sorrow, and pleasure, as well as actions and risk-avoidance behaviors based on the information, are expressed. When vision is lost, the collection of information is reduced or absent, and humans experience a reduction in the quality and quantity of their emotions, thoughts, actions and deeds. This leads to a decrease in quality of life. Ophthalmology is the specialized field of preventing vision loss and restoring the function of vision once it has been lost. In medical school education, you should have absorbed a wide range of knowledge about the pathogenesis, treatment, and prognosis of diseases. In the graduate school, based on this knowledge, we will further investigate the pathogenesis of diseases that cause visual impairment, and the major theme will be preventive medicine to control the onset and progression of diseases. The Department of Ophthalmology at the University of Tokyo is conducting world-class research in a variety of fields, including vitreoretinal diseases including age-related macular degeneration, corneal diseases, uveal diseases, and strabismus and amblyopia. Graduate students will follow a supervising researcher who has a wealth of knowledge and experience to conduct clinically relevant research on blindness prevention.

II Objectives

1. To be able to carry out research by learning the necessary laboratory techniques according to the research plan that has been formulated.
2. Able to correctly record and store clinical findings and data.
3. Able to summarize clinical test results in appropriate charts and graphs.
4. To be able to present the contents of research appropriately at external conferences and meetings, and to discuss the contents.
5. Write a paper on your research and submit it for publication. Respond appropriately to reviewers' comments and achieve publication.

III Research advisor and research theme

(* = For those who have obtained a medical license)

Faculty name	Research Theme
	<p>(1) Cell biology of vitreoretinal diseases*.</p> <p>① Research on the prevention of blindness due to diabetic retinopathy: The pathogenesis and progression of diabetic retinopathy, the leading cause of visual impairment in adults. This research focuses on the pathogenesis and progression of diabetic retinopathy, the number one cause of visual impairment in adults. In particular, we have focused on the involvement of cytokines and microvascular hemodynamics. In addition, our research focuses on the pathogenesis and development of diabetic retinopathy, which is the number one cause of diabetic retinopathy.</p> <p>Based on the results of these studies, new treatment methods are being developed, and research is being conducted to establish precise treatment methods. In addition to elucidating the pathogenesis and developing medical technologies, we are also conducting quasi-epidemiological research on efforts to prevent blindness due to diabetic eye complications from the patient's perspective, taking into account the current state of medical care in Japan. The research results have been published in academic journals not only in Japan, but also in Europe and the United States, and have been highly evaluated.</p>

<p>Professor Iida Maruko Lecturer</p>	<p>(1) Cell biology of vitreoretinal diseases*. ②Age-related macular degeneration: the leading cause of blindness in people aged 60 years and older. This disease is the number one cause of blindness in people aged 60 years and older, and we are investigating the causes and developing treatments for it. As no preventive treatment has yet been found for this disease, prevention of progression and improvement or restoration of lost function are the main targets of research. Our goal is to develop surgical treatment methods using the world's most advanced treatment equipment and surgical techniques. On the other hand, it is known that damage to the retinal pigment epithelium, which constitutes the outermost layer of the retina, is one of the reasons for the poor prognosis of this disease, and we are developing technology to transplant the damaged retinal pigment epithelium. This retinal transplantation is currently the field of research that is attracting the most attention from ophthalmologists around the world, and we have begun joint research with the Institute for Advanced Biomedical Research at Tohoku University, and the results are greatly anticipated.</p>
	<p>(1) Cell biology of vitreoretinal diseases*. ③Vitreoretinal Interface Syndrome: Retinal diseases caused by the vitreous body such as macular hole and epiretinal membrane retinal diseases such as macular hole and epiretinal membrane. We are conducting clinical research on retinal diseases caused by the vitreous body such as macular hole and epiretinal membrane. We are conducting detailed image analysis of each disease and comparing the results before and after vitrectomy to elucidate the pathogenesis and improve visual function to a higher level. Most of the currently available laser image analysis equipment has been installed in the Department of Ophthalmology. Most of the currently available laser image analysis equipment has been installed in our ophthalmology department, and we are well-equipped to handle any research theme based on clinical materials.</p>
	<p>(1) Cell biology of vitreoretinal diseases*. ④Retinopathy of prematurity: The development of medical techniques by pediatricians has greatly improved the prognosis of life in very small premature infants. Retinopathy of prematurity. Retinopathy of prematurity, an ocular complication of prematurity, is an unfortunate complication that strikes premature infants who successfully survive, and is a disease whose etiology and treatment were first identified in Japan. The University's Maternal and Child Center is Japan's foremost intensive care facility for premature infants, and joint ophthalmology and pediatrics efforts are underway to prevent blindness caused by retinopathy of prematurity. Clinical studies are being conducted to provide minimally invasive treatments to prevent blindness.</p>
<p>Professor Iida Maruko Lecturer</p>	<p>(2) Research on anti-TNF-α antibody therapy in the pathogenesis of Behcet's disease*. The proinflammatory cytokine TNF-α is strongly involved in the pathogenesis of Behcet's disease. It is known that the inflammatory cytokine TNF Therefore, anti-TNF-α antibodies produced by genetic engineering We have found that administration of anti-TNF-α antibodies produced by genetic engineering dramatically improves the ocular lesions of this disease. We will study the kinetics of TNF-α on neutrophils, which play a major role in the pathogenesis of this disease, and investigate appropriate anti-TNF-α antibody therapy for this disease.</p>

Assistant Professor Hasegawa	<p>(3) Clinical study on the treatment of severe allergic conjunctival disease In severe allergic conjunctival diseases such as spring catarrh and atopic keratoconjunctivitis, infiltration of activated eosinophils and stimulation of fibroblasts by various cytokines from T-lymphocytes in the local conjunctiva are involved in severe diseases such as corneal damage and proliferative changes in the conjunctiva. In addition to antiallergic eye drops and steroid eye drops, two types of immunosuppressive eye drops (0.1% cyclosporine and 0.1% tacrolimus) can be used for treatment in Japan. The purpose of this study is to classify the clinical type and severity of allergic conjunctival diseases based on allergic test findings, pore light microscopy, and tear fluid findings, and to elucidate useful treatment methods for severe cases.</p>
Assistant Professor Hasegawa	<p>(4) Image analysis of factors affecting the stability of the tear fluid layer in dry eye*. In dry eye, the stability of the tear layer on the cornea has also become more important. A tear fluid oil layer observation system (DR1 α) has been developed, making it possible to observe the dynamics of the tear fluid oil layer on the corneal surface, and is expected to be applied to analyzing the causes of tear fluid layer instability. The relationship between tear fluid volume, corneal conjunctival epithelial damage, and blink of an eye, which affect the dynamics of the tear oil layer, and We also analyzed the changes in the mybome glands using noninvasive mybography and the images obtained with a tear oil layer observation system. In addition, we analyzed images obtained with a non-invasive mybography system and a tear oil layer observation system to infer the causes of tear layer instability. The purpose of this study is to infer the cause of tear layer instability from the observation of the tear oil layer and to enable appropriate tear layer treatment.</p>

IV Syllabus

(* = For those who have obtained a medical license)

Item	Supervisor	Unit	Theme
General Ophthalmology	Professor Iida	1	Eye Function, Visual transmission and information processing
Diagnostic Ophthalmology	Maruko Lecturer	1	Functional and organic abnormalities
Comprehensive Ophthalmology	Professor Iida, Maruko Lecturer	1	Topical ocular therapy and progressive treatment
Ocular Infections	Assistant Professor Hasegawa	1	Diagnosis and Treatment of Ocular Infections
Diagnosis and treatment of ocular surface	Assistant Professor Hasegawa	1	Diagnosis and treatment of ocular surface diseases
Experiments and practical training (research projects)	Professor Iida • Maruko Lecturer • Assistant Professor Hasegawa	10	Conducting research projects and writing papers
Total		15	

Ophthalmology Syllabus

(* = For those who have obtained a medical license)

Syllabus item name	General Ophthalmology		
Syllabus item name(English)	Function of the eye		
Supervisor	Professor Iida		
Number of credits	1		
Class format	Lecture and practice		
Theme	Eye function, visual transmission and information processing		
Day, Time, etc.	Monday, Wednesday, Thursday 14:30~17:30, 16:00~17:30		
Objectives	To understand the structure and function of the eye and visual system, and to understand the symptoms and pathology of eye and visual system diseases.		
Evaluation target	Attendance 50%, reports, oral examinations 50%.		
appraisal standard	There are five categories: S (90 points or more to 100 points), A (80 points or more to less than 90 points), B (70 points or more to less than 80 points), C (60 points or more to less than 70 points), and D (less than 60 points). S, A, B, and C are acceptable, and D is not acceptable.		
Study guide and Reference books, etc.	OCT/OCTA reading training (Medical View, Inc.) , Ophthalmic Examination Qualify Series (Nakayama Bookstore) , Fluorescence Fundus Angiography Case Study (Igaku Shoin)		
Preparatory study and How to study outside of class	Read the above reference books and related literature.		
Place of implementation	Conference room and outpatient		
Remarks	For those who cannot participate in the above time, the time schedule will be decided after consultation. Questions will be accepted at any time. Feedback will be given at the final session.		
Lesson plan	number of times	Teacher in charge	Lesson Content
	1	Tomohiro Iida	Structure and function of eyelid and external eye muscles
	2	Tomohiro Iida	Structure and function of the cornea
	3	Tomohiro Iida	Structure and function of the uvea
	4	Tomohiro Iida	Structure and function of the lens
	5	Tomohiro Iida	Structure and function of the retina
	6	Tomohiro Iida	Structure and function of the vitreous body
	7	Tomohiro Iida	Measurement of eye movements using a large low vision telescope
	8	Tomohiro Iida	Functional measurement by Hess and Hertel measurements
	9	Tomohiro Iida	Corneal observation using a pore light microscope
	10	Tomohiro Iida	Corneal observation using anterior segment image analysis system
	11	Tomohiro Iida	Measurement of ocular axial length using ultrasonic A-mode method
	12	Tomohiro Iida	Measurement of Choroidal Circulation by Laser Speckle Method
	13	Tomohiro Iida	Measurement and interpretation of electroretinogram
	14	Tomohiro Iida	Ultrasound images of the vitreous retina
15	Tomohiro Iida	Observation of the retina and vitreous using OCT	

Ophthalmology Syllabus

(* = For those who have obtained a medical license)

Syllabus item name	Diagnostic Ophthalmology		
Syllabus item name(English)	Diagnoses and tests of the eye		
Supervisor	Maruko Lecturer		
Number of credits	1		
Class format	Lecture and practice		
Theme	Functional and organic abnormalities		
Day, Time, etc.	Monday, Wednesday, Thursday 14:00~18:30, 14:30~17:30		
Objectives	Understand the diagnostic techniques for eye and visual system diseases.		
Evaluation target	Attendance 50%, reports, oral examinations 50%.		
appraisal standard	There are five categories: S (90 points or more to 100 points), A (80 points or more to less than 90 points), B (70 points or more to less than 80 points), C (60 points or more to less than 70 points), and D (less than 60 points). S, A, B, and C are acceptable, and D is not acceptable.		
Study guide and Reference books, etc.	OCT/OCTA reading training (Medical View, Inc.)、Ophthalmic Examination Qualify Series (Nakayama Bookstore)、Fluorescence Fundus Angiography Case Study (Igaku Shoin)		
Preparatory study and How to study outside of class	Read the above reference books and related literature.		
Place of implementation	Conference room and outpatient		
Remarks	For those who cannot participate in the above time, the time schedule will be decided after consultation. Questions will be accepted at any time. Feedback will be given at the final session.		
Lesson plan	number of times	Teacher in charge	Lesson Content
	1	Ichiro Maruko	Principle of Pore Light Microscopy
	2	Ichiro Maruko	Principle of inverted mirror observation
	3	Ichiro Maruko	Principle of visual field measurement
	4	Ichiro Maruko	Principles of electrophysiological testing
	5	Ichiro Maruko	Principles of 3D Image Analysis
	6	Ichiro Maruko	Anterior segment observation using a pore light microscope
	7	Ichiro Maruko	Observation of the posterior eye using a pore light microscope
	8	Ichiro Maruko	Observation of fundus using binocular inverted microscope
	9	Ichiro Maruko	Diagnosis of disease using static visual field meter
	10	Ichiro Maruko	Diagnosis of diseases by dynamic visual field measurement
	11	Ichiro Maruko	Measurement and diagnosis of electroretinogram
	12	Ichiro Maruko	Three-dimensional diagnostic imaging using OCT

Ophthalmology Syllabus

(* = For those who have obtained a medical license)

Syllabus item name	Comprehensive Ophthalmology		
Syllabus item name(English)	Treatments of the eye		
Supervisor	Professor Iida, Maruko Lecturer		
Number of credits	1		
Class format	Lecture and practice		
Theme	Topical ocular therapy and progressive treatment		
Day, Time, etc.	Monday, Wednesday, Thursday 14:00~18:30		
Objectives	Understand the therapeutics of eye and visual system diseases.		
Evaluation target	Attendance 50%, reports, oral examinations 50%.		
appraisal standard	There are five categories: S (90 points or more to 100 points), A (80 points or more to less than 90 points), B (70 points or more to less than 80 points), C (60 points or more to less than 70 points), and D (less than 60 points). S, A, B, and C are acceptable, and D is not acceptable.		
Study guide and Reference books, etc.	OCT/OCTA reading training (Medical View, Inc.) , Ophthalmic Examination Qualify Series (Nakayama Bookstore) , Fluorescence Fundus Angiography Case Study (Igaku Shoin)		
Preparatory study and How to study outside of class	Read the above reference books and related literature.		
Place of implementation	Conference room and outpatient		
Remarks	For those who cannot participate in the above time, the time schedule will be decided after consultation. Questions will be accepted at any time. Feedback will be given at the final session.		
Lesson plan	number of times	Teacher in charge	Lesson Content
	1	Tomohiro Iida	Cataract Surgery
	2	Ichiro Maruko	Surgical procedures for glaucoma
	3	Ichiro Maruko	Surgical procedures for retinal detachment
	4	Tomohiro Iida	Surgical procedures for diabetic retinopathy
	5	Tomohiro Iida	How to Treat Age-Related Macular Degeneration
	6	Tomohiro Iida	Cataract surgery observation
	7	Ichiro Maruko	Glaucoma surgery observation
	8	Ichiro Maruko	Observation of retinal detachment surgery
	9	Tomohiro Iida	Observation of surgery for diabetic retinopathy
10	Tomohiro Iida	Observation of surgery for age-related macular degeneration	

Ophthalmology Syllabus

(* = For those who have obtained a medical license)

Syllabus item name	Eye infections		
Syllabus item name(English)	Eye infection diagnosis and treatment.		
Supervisor	Assistant Professor Hasegawa		
Number of credits	1		
Class format	Lecture and practice		
Theme	Diagnosis and Treatment of Ocular Infections		
Day, Time, etc.	Wednesday 9:00~12:00, 13:00~17:00 Or Saturday. 9:00~12:00		
Objectives	To understand the causative microorganisms and clinical images of ocular infectious diseases, and to master the techniques of microbiological examination and response methods, so that appropriate cooperation among medical departments and planning of diagnosis and treatment of ocular infectious diseases can be achieved.		
Evaluation target	Attendance 50%, reports, oral examinations 50%.		
appraisal standard	There are five categories: S (90 points or more to 100 points), A (80 points or more to less than 90 points), B (70 points or more to less than 80 points), C (60 points or more to less than 70 points), and D (less than 60 points). S, A, B, and C are acceptable, and D is not acceptable.		
Study guide and Reference books, etc.	Ophthalmology Practice Qualify 2: Conjunctivitis All Round(Nakayama Bookstore) , Smear Specimen Atlas for Ophthalmologists(Medical Book Service) , Medical Manual for Ocular Infections [Clinical Ophthalmology Exp.](Medical Book Service) , Guidelines for the Treatment of Infectious Keratitis(2nd ed.)The Journal of the Japanese Eye 117, Volume 6, No. 467-509		
Preparatory study and How to study outside of class	Read the above reference books and related literature.		
Place of implementation	Conference room and outpatient		
Remarks	For those who cannot participate in the above time, the time schedule will be decided after consultation. Questions will be accepted at any time. Feedback will be given at the final session.		
Lesson plan	number of times	Teacher in charge	Lesson Content
	1	Taiji Hasegawa	Outside Introduction to Ocular Infections
	2	Taiji Hasegawa	Ophthalmic Search Method
	3	Taiji Hasegawa	Diagnosis and Treatment of Bacterial Conjunctivitis
	4	Taiji Hasegawa	Diagnosis and Treatment of Bacterial Corneal Ulcers
	5	Taiji Hasegawa	Stain check
	6	Taiji Hasegawa	Diagnosis and treatment of viral conjunctivitis
	7	Taiji Hasegawa	Diagnosis and Treatment of Corneal Herpes
	8	Taiji Hasegawa	Diagnosis of Infectious Keratitis
	9	Taiji Hasegawa	Diagnosis and Treatment of Chlamydia Infection
	10	Taiji Hasegawa	Diagnosis and treatment of posterior eye infections
	11	Taiji Hasegawa	Diagnosis and Treatment of Acanthamoeba Keratitis
	12	Taiji Hasegawa	How to Test for Herpes Cornea
13	Taiji Hasegawa	Testing for Bacterial Corneal Ulcers	

Ophthalmology Syllabus

(* = For those who have obtained a medical license)

Syllabus item name	Diagnosis and treatment of ocular surface		
Syllabus item name(English)	Diagnosis and treatment of ocular surface		
Supervisor	Assistant Professor Hasegawa		
Number of credits	1		
Class format	Lectures and exercises		
Theme	Diagnosis and treatment of ocular surface diseases		
Day, Time, etc.	Second Thursday of the month 9:00~12:00		
Objectives	<ul style="list-style-type: none"> Understand the anatomy and physiology of ocular surface diseases and acquire knowledge of diagnosis and treatment with an understanding of the pathology. 		
Evaluation target	Attendance (50%) Submission of reports on lecture content (50%)		
appraisal standard	There are five categories: S (90 points or more to 100 points), A (80 points or more to less than 90 points), B (70 points or more to less than 80 points), C (60 points or more to less than 70 points), and D (less than 60 points). S, A, B, and C are acceptable, and D is not acceptable.		
Study guide and Reference books, etc.	Ophthalmology Qualify for Specialists, All About Corneal Opacity, Imaging of the Anterior Segment, The Road to Dry Eye Specialist (Nakayama Bookstore) Ocular surface diseases Differential diagnosis by visual inspection (Igaku Shoin)		
Preparatory study and How to study outside of class	Read the above reference books and related literature.		
Place of implementation	Conference room and outpatient		
Remarks	For those who cannot participate in the above time, the time schedule will be decided after consultation. Questions will be accepted at any time. Feedback will be given at the final session.		
Lesson plan	number of times	Teacher in charge	Lesson Content
	1	Taiji Hasegawa	Pathogenesis of ocular surface disease(1)
	2	Taiji Hasegawa	Pathogenesis of ocular surface disease(2)
	3	Taiji Hasegawa	Diagnosis of ocular surface disease(1)
	4	Taiji Hasegawa	Diagnosis of ocular surface disease(2)
	5	Taiji Hasegawa	Treatment of Ocular Surface Disease(1)
	6	Taiji Hasegawa	Treatment of Ocular Surface Disease(2)
	7	Taiji Hasegawa	Ocular surface disease(1)
	8	Taiji Hasegawa	Ocular surface disease(2)
	9	Taiji Hasegawa	Ocular surface disease(3)
	10	Taiji Hasegawa	Ocular surface disease(1)
11	Taiji Hasegawa	Ocular surface disease(2)	

Ophthalmology Syllabus

(* = For those who have obtained a medical license)

Syllabus item name	Clinical research and practice (project research)	
Supervisor	Professor Iida•Maruko Lecturer•Assistant Professor Hasegawa	
Number of credits	10	
Class format	Clinical research and practice (project research)	
Theme	Conducting research projects and writing papers	
Day, Time, etc.	Monday, Tuesday, Thursday, Friday 9:00–12:00, 13:00–17:00 Wednesday 14:00–17:00	
Objectives	<ol style="list-style-type: none"> 1. To be able to carry out research by learning the necessary laboratory techniques according to the research plan that has been formulated. 2. Able to correctly record and store clinical findings and data. 3. Able to summarize clinical test results in appropriate charts and graphs. 4. To be able to present the contents of research appropriately at external conferences and meetings, and to discuss the contents. 5. Write a paper on your research and submit it for publication. Respond appropriately to reviewers' comments and achieve publication. 	
Evaluation target	Report of clinical findings and laboratory data (60%) Chart preparation (10%) Research presentation and discussion (10%) Paper writing (20%)	
appraisal standard	There are five categories: S (90 points or more to 100 points), A (80 points or more to less than 90 points), B (70 points or more to less than 80 points), C (60 points or more to less than 70 points), and D (less than 60 points). S, A, B, and C are acceptable, and D is not acceptable.	
Study guide and Reference books, etc.	Ophthalmology Practice Qualify, Atarashii Ophthalmology (journal), Journal of the Japanese Ophthalmological Society (journal), Ophthalmology (journal), Ophthalmology (journal) OCT/OCTA reading training(Medical View, Inc.) , Fluorescence Fundus Angiography Case Study(Igaku Shoin)	
Preparatory study and How to study outside of class	Active participation in relevant conferences and seminars, and presentations if possible. Discussions will be held as needed.	
Place of implementation	Ophthalmology extranodal, ophthalmology operating room	
Remarks	For those who cannot participate in the above time, the time schedule will be decided after consultation. Questions will be accepted at any time. Feedback will be given as needed.	
Lesson plan	number of times	Lesson Content
	1	Achievement of Objectives 1 and 2
	~	
	90	
	91	Achieve Objectives 3 and 4
	~	
	120	
	121	Achievement of Objectives 5
~		
150		

Otorhinolaryngology

I Educational Policy

Our education policy focuses mainly on conducting research on IgG4-related diseases, especially the pathogenesis of salivary gland lesions and chronic rhinosinusitis, eosinophilic otitis media and eosinophilic sinusitis, as well as functional diseases of the salivary glands.

In regard to clinical applications, we aim to improve the treatment results for eosinophilic sinusitis—which is closely related to asthma—by providing total care of the entire respiratory tract through surgery and in cooperation with TWMU's Respiratory Center.

II Goals

1. Teach students the experimental techniques necessary for planning and conducting research.
2. Teach students how to accurately record and correctly store the details of experiments and data.
3. Teach students how to appropriately and accurately summarize the results of experiments in figures and tables.
4. Teach students how to appropriately and accurately present and discuss their research findings at academic conferences and research meetings, in Japan and overseas.
5. Teach students how to accurately describe research projects and the findings in a manuscript for submission to a professional journal. Teach students how to appropriately respond to Reviewers' comments, culminating in publication of the manuscript.
6. Encourage students to impart to younger students the knowledge and skills that they have gained in their own research.

III Instructors•Research Themes

(* = for holders of a medical doctor's license)

Instructors' names and titles	Research theme
Prof. Nonaka Senior Assistant Prof. Seo Assistant Prof. Satou	Elucidation of the pathophysiology and clinical treatment of eosinophilic otitis media* Research will be conducted on the differences in the pathophysiology of mild, moderate and severe eosinophilic otitis media, and development of treatments according to the severity. Said treatments will be devised after learning the anatomy and function of the middle ear, understanding disease concepts, and mastering the methods for evaluating hearing tests.
Prof. Nonaka	Elucidation of the peculiarities of nasal and sinus fibroblasts and their roles in the pathogenesis of rhinosinusitis Fibroblasts are deeply involved in innate immunity and respond to various toll-like receptors, which are important in the pathogenesis of chronic sinusitis. Expression of non-coding RNA in nasal and sinus fibroblasts will be investigated.
Prof. Nonaka Senior Assistant Prof. Seo	Role of the nasal mucosal epithelial layer in the pathogenesis of allergic rhinitis In order to elucidate the function of the nasal mucosal epithelial layer related to the pathogenesis of allergic rhinitis, nasal brushing is used to analyze the entire genome in the epithelial layer and search for new expression products using a next-generation sequencer.
Prof. Nonaka Assistant Prof. Mukai Assistant Prof. Matsui	Elucidation of the pathophysiology of eosinophilic sinusitis* Most cases of eosinophilic sinusitis are associated with bronchial asthma. Bronchial asthma can be divided into two groups: ACO (Asthma and COPD Overlap) and simple bronchial asthma. Differences in the pathology of eosinophilic sinusitis associated with each of the two bronchial asthma groups and differences in the prognosis of each will be investigated.
Prof. Nonaka Assistant Prof. Nojima	Elucidation of the pathophysiology of IgG4-related chronic rhinosinusitis* In recent years, the existence of cases of chronic rhinosinusitis associated with IgG4-related diseases has been postulated, but it is not yet clear whether that is true. Accordingly, the expression of IgG4 class-switch inducers in the sinus mucosa is being analyzed with the goal of elucidating the existence of IgG4-related chronic rhinosinusitis.

Associate Prof. Yamamura	<p>Elucidation of the pathophysiology and clinical treatment of salivary disorders*</p> <p>Salivary disorders can be quantitative, i.e., a decrease (dry mouth syndrome) or an increase (hypersalivation) in saliva volume, or qualitative in nature. Salivary gland functions will be evaluated using various salivary secretion function tests, salivary gland echography, salivary gland scintigraphy, etc. When idiopathic hypersalivation is diagnosed, the efficacy and safety of M3-receptor-selective antagonists will be investigated.</p>
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IV Syllabus

(* = for holders of a medical doctor's license)

Title	Instructors	Credits	Theme
The Clinics of Otitis Media	Prof. Nonaka; Senior Assistant Prof. Seo; Assistant Professors (Sakitani, Tomita, Nojima, Satou, Matsui)	2	Diagnosis and treatment of otitis media.
The Clinics of Head and Neck Tumors	Prof. Nakamizo, Assistant Professors (Inai, Tomita, Nojima, Satou, Mukai)	2	Diagnosis and treatment of head and neck tumors.
Introduction to Otorhinolaryngology	Associate Prof. Yamamura; Senior Assistant Prof. Seo; Assistant Professors (Inai, Sakitani, Tomita, Nojima, Satou, Mukai, Matsui)	1	The pathophysiology of otorhinolaryngological diseases, and their diagnosis and treatment.
Experimentation and Practical Training (Thematic Research)	Prof. Nonaka; Prof. Nakamizo; Associate Prof. Yamamura; Senior Assistant Prof. Seo; Assistant Professors (Inai, Sakitani, Tomita, Nojima, Satou, Mukai, Matsui)	10	Performance of thematic research; manuscript preparation.
Total credits		15	

(Otorhinolaryngology) Syllabus (1)

Syllabus Title	Diagnosis and Treatment of Middle-Ear Diseases		
Instructors	Prof. Nonaka; Senior Assistant Prof. Seo; Assistant Professors (Sakitani, Tomita, Nojima, Satou, Matsui)		
Credits	2		
Type of Class	Lecture and Exercises		
Theme	Diagnosis and treatment of otitis media		
Schedule	Mondays & Fridays 9:00~13:00 (Lecture & Exercises); Wednesdays & Thursdays 9:00~17:00 (Surgical Observation)		
Course Objectives	<ol style="list-style-type: none"> 1. Students will learn the anatomy and function of the middle ear, and the principles of hearing tests. 2. Students will master the basic procedures of hearing tests and learn the evaluation methods. 3. Students will learn the pathologies of acute, chronic and exudative otitis media, and cholesteatoma; they will also learn the diagnostic methods. 4. Students will learn the pathology and diagnostic methods for eosinophilic otitis media, which has been increasing in recent years. 5. Students will perform actual exercises in tympanic plastic surgery and deepen their understanding of the pathology and therapeutic methods. 		
Evaluation Methods	Attendance (50%); submission of reports relating to the lectures and content of exercises (50%).		
Grading Scale	There will be 5 grading categories: S (≥90 – 100 points); A (≥80 – <90 points); B (≥70 – <80 points); C (≥60 – <70 points); D (<60 points). S, A, B and C will be passing grades. D will be a failing grade.		
Textbooks/References	Ichiro Kirikae, Yasuya Nomura: Modern Oto-Rhino-Laryngology; Nanzando Co. 2013 Yasushi Murakami, Ikuro Hisa: Illustrated Surgical Techniques in Otorhinolaryngology-Head and Neck; Tokyo, Igakusha 2017		
Independent Study Outside of Class	Students will read the above reference books and related literature. Students should actively communicate with regard to what they find interesting in the research being conducted by each instructor, and they should accumulate information and perform technical exercises.		
Location	ENT outpatient clinic・ENT test room (Ambulatory Care Center 4F), Operating room (Central Ward 2F)		
Special Note	Students who cannot participate at the above times should consult with the instructor to decide an alternate schedule. Questions, etc., will be handled at any time. Feedback will be provided at the final class.		
Course Plan	Course No.	Instructors	Content
	1	Prof. Nonaka and other instructors	Anatomy of the middle ear, and its functions
	2	Prof. Nonaka and other instructors	Principles of hearing tests and their evaluation methods
	3	Prof. Nonaka and other instructors	Principles and practices of pure-tone audiometry
	4	Prof. Nonaka and other instructors	Principles and practices of speech audiometry
	5	Prof. Nonaka and other instructors	Principles and practices of middle-ear function test (impedance audiometry)
	6	Prof. Nonaka and other instructors	Pathology, diagnosis and treatment of acute otitis media
	7	Prof. Nonaka and other instructors	Pathology, diagnosis and treatment of chronic otitis media
	8	Prof. Nonaka and other instructors	Pathology, diagnosis and treatment of exudative otitis media
	9	Prof. Nonaka and other instructors	Pathology, diagnosis and treatment of cholesteatoma
	10	Prof. Nonaka and other instructors	Pathology and testing for allergic diseases
	11	Prof. Nonaka and other instructors	Pathology, diagnosis and treatment of eosinophilic otitis media
	12	Prof. Nonaka and other instructors	Actual exercises in tympanic plastic surgery I
	13	Prof. Nonaka and other instructors	Actual exercises in tympanic plastic surgery II
	14	Prof. Nonaka and other instructors	Actual exercises in tympanic plastic surgery III
15	Prof. Nonaka and other instructors	Summary	

(Otorhinolaryngology) Syllabus (2)

Syllabus Title	The Clinics of Head and Neck Tumors		
Instructors	Prof. Nakamizo; Assistant Professors (Inai, Nojima, Satou, Mukai)		
Credits	2		
Type of Class	Lecture and Exercises		
Theme	Diagnosis and Treatment of Head and Neck Tumors.		
Schedule	Mondays & Thursdays 9:00~13:00 (Lecture & Exercises); Tuesdays & Wednesdays (Surgical Observation)		
Course Objectives	<ol style="list-style-type: none"> 1. Students will learn the anatomy and function of the head and neck. 2. Students will master the basic procedures of nasopharyngeal and laryngeal fiberoptic and learn the evaluation methods. 3. Students will master the diagnostic imaging methods (echography, computed tomography (CT), magnetic resonance (MR)) for the head and neck. 4. Students will perform actual exercises in head and neck tumor surgery and deepen their understanding of the pathology and therapeutic methods. 		
Evaluation Methods	Attendance (50%); submission of reports relating to the lectures and content of exercises (50%).		
Grading Scale	There will be 5 grading categories: S ($\geq 90 - 100$ points); A ($\geq 80 - < 90$ points); B ($\geq 70 - < 80$ points); C ($\geq 60 - < 70$ points); D (< 60 points). S, A, B and C will be passing grades. D will be a failing grade.		
Textbooks/References	Ichiro Kirikae, Yasuya Nomura: Modern Oto-Rhino-Laryngology; Nanzando Co. 2013 Yasushi Murakami, Ikuo Hisa: Illustrated Surgical Techniques in Otorhinolaryngology-Head and Neck; Tokyo, Igakusha 2017		
Independent Study Outside of Class	Students will read the above reference books and related literature. Students should actively communicate with regard to what they find interesting in the research being conducted by each instructor, and they should accumulate information and perform technical exercises.		
Location	ENT outpatient clinic • ENT test room (Ambulatory Care Center 4F); Operating room (Central Ward 2F)		
Special Note	Students who cannot participate at the above times should consult with the instructor to decide an alternate schedule. Questions, etc., will be handled at any time. Feedback will be provided at the final class.		
Course Plan	Course No.	Instructors	Content
	1	Prof. Nakamizo and other instructors	Anatomy and function of the head and neck
	2	Prof. Nakamizo and other instructors	Introduction to head and neck tumors
	3	Prof. Nakamizo and other instructors	Diagnostic imaging method (echography) for the head and neck
	4	Prof. Nakamizo and other instructors	Diagnostic imaging methods (computed tomography (CT)) for the head and neck
	5	Prof. Nakamizo and other instructors	Diagnostic imaging methods (magnetic resonance (MR)) for the head and neck
	6	Prof. Nakamizo and other instructors	Pathology, diagnosis and treatment of oral tumors
	7	Prof. Nakamizo and other instructors	Pathology, diagnosis and treatment of epipharynx tumors
	8	Prof. Nakamizo and other instructors	Pathology, diagnosis and treatment of mesopharynx tumors
	9	Prof. Nakamizo and other instructors	Pathology, diagnosis and treatment of hypopharynx tumors
	10	Prof. Nakamizo and other instructors	Pathology, diagnosis and treatment of laryngeal tumors
	11	Prof. Nakamizo and other instructors	Pathology, diagnosis and treatment of salivary gland tumors
	12	Prof. Nakamizo and other instructors	Radiation therapy for head and neck tumors
	13	Prof. Nakamizo and other instructors	Chemotherapy for head and neck tumors
	14	Prof. Nakamizo and other instructors	Palliative care for head and neck tumors
15	Prof. Nakamizo and other instructors	Summary	

(Otorhinolaryngology) Syllabus (3)

Syllabus Title	Introduction to Otorhinolaryngology		
Instructors	Associate Prof. Yamamura; Senior Assistant Prof. Seo; Assistant Professors (Inai, Sakitani, Tomita, Nojima, Satou, Mukai, Matsui)		
Credit	1		
Type of Class	Lecture		
Theme	The pathophysiology of otorhinolaryngological diseases, and their diagnosis and treatment.		
Schedule	Mondays & Fridays 9:00~17:00 (Lecture & Exercises of audiometry); Tuesdays & Wednesdays & Thursdays (Surgical Observation)		
Course Objectives	<ol style="list-style-type: none"> 1. Students will learn the dissection and functions of the ear, nose and throat. 2. Students will master the basic examination procedures in otorhinolaryngology and fully understand what represents normal findings. 3. Students will master the methods for basic hearing tests and equilibrium function tests and be able to interpret the findings. 4. Students will learn the concepts of representative otorhinolaryngologic diseases and understand their diagnostic and therapeutic methods. 		
Evaluation Methods	Attendance (50%); submission of reports relating to the lectures and content of exercises (50%).		
Grading Scale	There will be 5 grading categories: S (≥90 – 100 points); A (≥80 – <90 points); B (≥70 – <80 points); C (≥60 – <70 points); D (<60 points). S, A, B and C will be passing grades. D will be a failing grade.		
Textbooks/References	Ichiro Kirikae, Yasuya Nomura: Modern Oto-Rhino-Laryngology; Nanzando Co. 2013 Yasushi Murakami, Ikuo Hisa: Illustrated Surgical Techniques in Otorhinolaryngology-Head and Neck; Tokyo, Igakusha 2017		
Independent Study Outside of Class	Students will read the above reference books and related literature. Students should actively communicate with regard to what they find interesting in the research being conducted by each instructor, and they should accumulate information and perform technical exercises.		
Location	ENT outpatient clinic·ENT test room (Ambulatory Care Center 4F); Operating room (Central ward 2F)		
Special Note	Students who cannot participate at the above times should consult with the instructor to decide an alternate schedule. Questions, etc., will be handled at any time. Feedback will be provided at the final class.		
Course Plan	Course No.	Instructors	Content
	1	Associate Prof. Yamamura and other instructors	Introduction to otorhinolaryngology
	2	Associate Prof. Yamamura and other instructors	Anatomy, functions and testing of ear, nose and sinus
	3	Associate Prof. Yamamura and other instructors	Anatomy, functions and testing of oral cavity and pharyngolarynx
	4	Associate Prof. Yamamura and other instructors	Diagnostic methods of head and neck tumors
	5	Associate Prof. Yamamura and other instructors	Hearing and equilibrium function tests
	6	Associate Prof. Yamamura and other instructors	Diagnosis and treatment of ear, nasal and sinus diseases
	7	Associate Prof. Yamamura and other instructors	Diagnosis and treatment of oral and pharyngolaryngeal diseases
	8	Associate Prof. Yamamura and other instructors	Diagnosis and treatment of head and neck tumors

(Otorhinolaryngology) Syllabus (4)

Syllabus Title	Experimentation and Practical Training (Thematic Research)		
Instructors	Professor (Nonaka, Nakamizo); Associate Prof. Yamamura; Senior Assistant Prof. Seo; Assistant Professors (Inai, Sakitani, Tomita, Nojima, Satou, Mukai, Matsui)		
Credits	10		
Type of Class	Experimentation and Practical Training (Thematic Research)		
Themes	Performance of thematic research; manuscript preparation.		
Schedule	Mondays through Fridays 14:00~17:00		
Course Objectives	<ol style="list-style-type: none"> 1. Students will master the necessary experimental techniques in accordance with the draft research plan and be capable of carrying out research. 2. Students will learn to accurately record and preserve the details of experiments and the generated data. 3. Students will learn to prepare figures and tables that appropriately and accurately show their experimental results. 4. Students will learn how to give accurate presentations of the details of research at academic conferences and research meetings, as well as how to discuss those materials. 5. Students will learn how to write manuscripts presenting research details, as well as how to submit those manuscripts to professional journals. They will learn how to respond appropriately to reviewers' comments, culminating in manuscript publication. 6. Students will become able to impart to younger students the knowledge and skills that they have gained in their own research. 		
Evaluation Method	Attendance (50%); submission of reports relating to the lectures and content of exercises (50%).		
Grading Scale	There will be 5 grading categories: S (≥90 – 100 points); A (≥80 – <90 points); B (≥70 – <80 points); C (≥60 – <70 points); D (<60 points). S, A, B and C will be passing grades. D will be a failing grade.		
Textbooks/References	An introduction relating to the thematic research and original articles.		
Independent Study Outside of Class	Students will gain knowledge relating to the thematic research and earlier research by studying the published literature, etc. Students should actively participate in, and report on, relevant conferences, etc., compile information, and participate in discussions.		
Location	Education and Research Building (2F, Conference room)		
Special Note	Students who cannot participate at the above times should consult with the instructor to decide an alternate schedule. Questions, etc., will be handled at any time. Feedback will be provided at the final class.		
Course Plan	Course No.	Instructors	Content
	1	Prof. Nonaka and other instructors	Achievement of course objectives 1~2
	~		
	90		
	91	Prof. Nonaka and other instructors	Achievement of course objectives 3~4
	~		
	120		
	121	Prof. Nonaka and other instructors	Achievement of course objectives 5~6
~			
150			

Obstetrics and Gynecology

I Educational Policy

In gynecologic and obstetrics, there are four professionalities: obstetrics, gynecologic oncology, gynecologic benign disease, and infertility and female medicine. Our class implements study based on clinical matter. Detail of studies are obstetrical database construction and management for complications during pregnancy, management and treatment for gynecologic cancer, management and treatment for endometriosis, and infertility of implantation. We aim to bring up human resources who can systematically study all fields of obstetrics and gynecology and develop diagnosis and management for patient's profit at each category.

In gynecologic and obstetrics, there are four professionalities: obstetrics, gynecologic oncology, infertility and female medicine and gynecologic benign disease. Our class implements study based on clinical matter. Detail of studies are obstetrical compilation and complications during pregnancy, management and treatment for gynecologic cancer, management and treatment for endometriosis and infertility of implantation. We offer all professionalities systematically and aim development of human resources who enable to develop diagnosis and management for patient's profit at each category.

II Goals

1. Acquire the necessary techniques and carry out research according to your research plan
2. Record and save research contents and data correctly
3. Summarized research results in charts appropriately
4. Present research content appropriately at external academic societies and study groups, and discuss about the content
5. Make a dissertation of the research content and submit. Appropriately respond to the comments of the reviewers and achieve the publication of the paper.

III Supervisor・Research theme

(* = for doctor's license holders)

Name and position	Research theme
<p style="text-align: center;">Tsutomu Tabata Professor</p> <p style="text-align: center;">Professor and Head (of division)</p>	<p>(1) Recently, due to increasing delivery age in Japan, 60% of woman have delivered over aged 30. On the other hand, cervical cancer become younger age between aged 20's to 30's, so number of pregnancies with cervical cancer have increased nowadays. In Japan, we investigate frequency of occurrence and prognosis towards pregnancy with cervical and ovarian cancer, and examine how these treatments reflect to pregnancy, delivery and postpartum period. Moreover, we investigate prognosis for neonatal. Firstly, we design retrospective study, then examine latest treatment such like chemotherapy with the fetus in utero.</p>
<p style="text-align: center;">Jun Kumakiri Professor</p>	<p>(2) International Joint Research: Early detection and treatment for endometriosis There are relatively large number of patients with endometriosis in younger women. Delayed diagnosis of endometriosis in young age result to depression of fertility and impediment of daily life due to pain in future. In Asia, there is less basic theory of diagnosis and treatment towards endometriosis compared to America and Europe. Purpose of this study is that we investigate rate of chronic and periodic pelvic pain in Asian woman, then investigate relationship between these pain and endometriosis by questionnaire. Eligible patients are examined further investigation by use of pelvic MRI and ultrasonography. This is multinational cohort study for early diagnosis of endometriosis for these patients.</p>
<p style="text-align: center;">Akira Nakabayashi Associate Professor</p>	<p>(3) Study for elucidation of pathology in implantation disorder with endometrial cell sheet Development of assisted reproductive technology enable in vitro cultivation to blastocyst, and it became possible to continuously observe embryo development with a time-lapse microscope. On the other hand, it was difficult to observe 'in vitro' implantation. Our researcher had success to create endometrial cell sheet of rat model. It is possible to create an endometrium by laminating an epithelial sheet and an interstitial sheet, then enables to observe the process of embryo invasion to the endometrium over time. The purpose is to elucidate the implantation disorder that was black box until now.</p>

<p style="text-align: center;">Yoshika Akizawa Assistant Professor</p>	<p>(4)Basic research toward the practical application of endometrial cancer screening by endometrial liquefied sample cytology In this study, we would like to abolish the classic result report of endometrial cytology which have no evaluation of sample suitability, and establish the current status of diagnostic accuracy by developing and using a descriptive endometrial cytopathology report format which can calculate the sensitivity and specificity of cytopathology at multi-facilities. Furthermore, we are going to unify diagnostic criteria and build a system that enables prospective study. Introduction of liquid-based cytology (LBC) enable to promote standardization of diagnostic criteria and improve diagnostic accuracy in endometrial cytopathology, which is expected to have a significant difference in accuracy. For the first time, we provide the scientific basis that endometrial liquefied sample cytology is useful as a full-scale screening method for endometrial cancer.</p>
<p style="text-align: center;">Jun Kakogawa Professor</p>	<p>(5)Application of placental tissue microarray and SNP analysis for prenatal diagnosis of placental abruption Placental abruption is known to be involved in the onset of both genetic and environmental factors. Placental abruption is major causes of perinatal mortality, reflecting to serious condition for mother and fetus. It is urgent issues to be solved in obstetrics. Epidemiological study shows that early diagnosis of this disease and early intervention can provide infant intact survival. Thus, it is advisable to place patients with risk factors under appropriate control for early intervention. This study seeks to clarify the risk factors for the development of placental abruption based on genetic and epigenetic factors. The final research objective is to apply it to the prediction of the onset of placental abruption from environmental, genetic and epigenetic factors.</p>

IV Syllabus

(* = for doctor's license holders)

Title	Instructor	Credit	Theme
Gynecology	Jun Kumakiri Yoshika Akizawa	2	Diagnosis, treatment and management of gynecology
Endocrinology of reproduction	Akira Nakabayashi	1	Diagnosis, treatment and management of infertility
Obstetrics	Jun Kakogawa	2	Diagnosis, treatment and management of obstetric complication
Experiment and research	Tsutomu Tabata Jun Kumakiri Jun Kakogawa Akira Nakabayashi Yoshika Akizawa	10	Implementation of research projects and preparation of research papers
Total credits		15	

(Obstetrics and Gynecology) Syllabus (1)

Syllabus Title	Gynecology		
Instructor	Jun Kumakiri , Yoshika Akizawa		
Credit	2		
Type of Class	Lectures		
Theme	Diagnosis, treatment of endometriosis and gynecological tumor		
Schedule	every Thursday 13:00-17:00		
Course Objective	understanding epidemiological background of endometriosis and gynecological tumor understanding mechanism and pathology of endometriosis and gynecological tumor understanding medical treatment and surgical treatment of endometriosis and gynecological tumor		
Evaluation Methods	Attendance (50%) Submission of a report on lecture content (50%)		
Grading Scale	S (90 points to 100 points), A (80 points to less than 90 points), B (70 points to less than 80 points), C (60 points to less than 70 points), D (less than 60 points) There are five types, S, A, B, and C are accepted, and D is rejected.		
Textbooks/References	子宮内膜症取扱い規約 第1部 診断および進行度分類基準とカラーアトラス、第2部 治療編・診療編、金原出版 (日本語のみ)		
Independent Study Outside of Class	Read reference books and look up the literature in advance according to the lesson plan.		
Room	Seminar room on the 3rd floor of the Education and Research Building		
Special Note	Those who cannot participate in the above time will decide the timetable after consultation. Questions are accepted at any time. Give feedback in the final round.		
Course Plan	Number	Instructor	Contents
	1	Jun Kumakiri	mechanism and pathology of endometriosis
	2	Jun Kumakiri	epidemiology of endometriosis
	3	Jun Kumakiri	diagnosis of endometriosis
	4	Jun Kumakiri	dysmenorrhea and chronic pelvic pain by endometriosis
	5	Jun Kumakiri	infertility and endometriosis
	6	Jun Kumakiri	medical treatment of endometriosis
	7	Jun Kumakiri	surgical treatment of endometriosis
	8	Jun Kumakiri	summary of endometriosis
	9	Yoshika Akizawa	mechanism and pathology of gynecological tumor
	10	Yoshika Akizawa	epidemiology of gynecological tumor
	11	Yoshika Akizawa	diagnosis of gynecological tumor
	12	Yoshika Akizawa	dysmenorrhea and chronic pelvic pain by gynecological tumor
	13	Yoshika Akizawa	infertility and gynecological tumor
	14	Yoshika Akizawa	medical treatment of gynecological tumor
	15	Yoshika Akizawa	surgical treatment of gynecological tumor
16	Yoshika Akizawa	summary of gynecological tumor	

(Obstetrics and Gynecology) Syllabus (1)

Syllabus Title	Infertility		
Instructor	Akira Nakabayashi		
Credit	1		
Type of Class	Lectures		
Theme	Examination and treatment of infertility		
Schedule	every Friday 13:00-17:00		
Course Objective	Understanding cause and pathology of infertility Understanding examination of infertility Appropriate treatment for infertility		
Evaluation Methods	Attendance (50%) Submission of a report on lecture content (50%)		
Grading Scale	S (90 points to 100 points), A (80 points to less than 90 points), B (70 points to less than 80 points), C (60 points to less than 70 points), D (less than 60 points) There are five types, S, A, B, and C are accepted, and D is rejected.		
Textbooks/References	生殖医療の必須知識2017 杏林舎 (日本語のみ)		
Independent Study Outside of Class	Read reference books and look up the literature in advance according to the lesson plan.		
Room	Seminar room on the 3rd floor of the Education and Research Building		
Special Note	Those who cannot participate in the above time will decide the timetable after consultation. Questions are accepted at any time. Give feedback in the final round.		
Course Plan	Number	Instructor	Contents
	1	Akira Nakabayashi	cause and pathology of infertility
	2	Akira Nakabayashi	examination of infertility
	3	Akira Nakabayashi	endometriosis and infertility
	4	Akira Nakabayashi	treatment of ovulation disorder
	5	Akira Nakabayashi	treatment of fallopian tube obstruction
	6	Akira Nakabayashi	AIH and IVF
	7	Akira Nakabayashi	freezing germ cell and tissues
	8	Akira Nakabayashi	summary

(Obstetrics and Gynecology) Syllabus (1)

Syllabus Title	Obstetrics		
Instructor	Jun Kakogawa		
Credit	2		
Type of Class	Lectures		
Theme	diagnosis, treatment and management of obstetrical complication and complications during pregnancy		
Schedule	every Monday 13:00-17:00		
Course Objective	understanding diagnosis, treatment and management of obstetrical complication understanding diagnosis, treatment and management of complications during pregnancy understanding diagnosis, treatment and management of normal delivery and abnormal delivery		
Evaluation Methods	Attendance (50%) Submission of a report on lecture content (50%)		
Grading Scale	S (90 points to 100 points), A (80 points to less than 90 points), B (70 points to less than 80 points), C (60 points to less than 70 points), D (less than 60 points) There are five types, S, A, B, and C are accepted, and D is rejected.		
Textbooks/References	産婦人科研修の必修知識2016-2018、日本産科婦人科学会 Williams Obstetrics. 24th. Cunningham FG, et al. ed. McGrawHill 2014		
Independent Study Outside of Class	Read reference books and look up the literature in advance according to the lesson plan.		
Room	Seminar room on the 3rd floor of the Education and Research Building		
Special Note	Those who cannot participate in the above time will decide the timetable after consultation. Questions are accepted at any time. Give feedback in the final round.		
Course Plan	Number	Instructor	Contents
	1	Jun Kakogawa	diagnosis, treatment and management of abortion and premature birth
	2	Jun Kakogawa	diagnosis, treatment and management of placental abruption
	3	Jun Kakogawa	diagnosis, treatment and management of hypertensive disorders of pregnancy (1)
	4	Jun Kakogawa	diagnosis, treatment and management of hypertensive disorders of pregnancy (2)
	5	Jun Kakogawa	diagnosis, treatment and management of hypertensive disorders of pregnancy (3)
	6	Jun Kakogawa	diagnosis, treatment and management of fetal growth restriction
	7	Jun Kakogawa	diagnosis, treatment and management of amniotic fluid abnormality
	8	Jun Kakogawa	diagnosis, treatment and management of fetal abnormality
	9	Jun Kakogawa	complications during pregnancy: diagnosis, treatment and management of abnormal glucose n
	10	Jun Kakogawa	complications during pregnancy: diagnosis, treatment and management of heart disease
	11	Jun Kakogawa	complications during pregnancy: diagnosis, treatment and management of kidney disease
	12	Jun Kakogawa	complications during pregnancy: diagnosis, treatment and management of infection
	13	Jun Kakogawa	complications during pregnancy: diagnosis, treatment and management of kidney disease
	14	Jun Kakogawa	physiology and pathology of delivery
	15	Jun Kakogawa	maternal and child health
16	Jun Kakogawa	summary	

(Obstetrics and Gynecology) Syllabus (1)

Syllabus Title	Experiment and Reserch														
Instructor	Tutomu Tabata , Jun Kumakiri, Jun Kakogawa , Akira Nakabayashi , Yoshika Akizawa														
Credit	10														
Type of Class	Experiment and Lecture														
Theme	Implementation of research papers and preparation of research papers														
Schedule	every Monday 9:30 and Thursday 13:00-17:00														
Course Objective	<ol style="list-style-type: none"> 1. Acquire the necessary techniques and carry out research according to your research plan 2. Record and save research contents and data correctly 3. Summarized research results in charts appropriately 4. Present research content appropriately at external academic societies and study groups, and discuss about the content 5. Make a dissertation of the research content and submit. Appropriately respond to the comments of the reviewers and achieve the publication of the paper. 														
Evaluation Methods	Research report (60%) Interview (10%) Research presentation / discussion (10%) Paper preparation (20%)														
Grading Scale	S (90 points to 100 points), A (80 points to less than 90 points), B (70 points to less than 80 points), C (60 points to less than 70 points), D (less than 60 points) There are five types, S, A, B, and C are accepted, and D is rejected.														
Textbooks/References	Review articles and original papers related to research projects														
Independent Study Outside of Class	Actively participate in and make presentations at related academic societies, collect information, and hold discussions.														
Room	Seminar room on the 3rd floor of the Education and Research Building														
Special Note	Those who cannot participate in the above time will decide the timetable after consultation. Questions are accepted at any time. Give feedback in the final round.														
Course Plan	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%;">Number</th> <th style="width: 40%;">Instructor</th> <th style="width: 45%;">Contents</th> </tr> </thead> <tbody> <tr> <td>1 to 90</td> <td>Tutomu Tabata ,Jun Kumakiri , Jun Kakogawa , Akira Nakabayashi , Yoshika Akizawa</td> <td>achievement of the goal 1-2</td> </tr> <tr> <td>91 to 120</td> <td>Tutomu Tabata ,Jun Kumakiri , Jun Kakogawa , Akira Nakabayashi , Yoshika Akizawa</td> <td>achievement of the goal 3-4</td> </tr> <tr> <td>121 to 150</td> <td>Tutomu Tabata ,Jun Kumakiri , Jun Kakogawa , Akira Nakabayashi , Yoshika Akizawa</td> <td>achievement of the goal 5</td> </tr> </tbody> </table>			Number	Instructor	Contents	1 to 90	Tutomu Tabata ,Jun Kumakiri , Jun Kakogawa , Akira Nakabayashi , Yoshika Akizawa	achievement of the goal 1-2	91 to 120	Tutomu Tabata ,Jun Kumakiri , Jun Kakogawa , Akira Nakabayashi , Yoshika Akizawa	achievement of the goal 3-4	121 to 150	Tutomu Tabata ,Jun Kumakiri , Jun Kakogawa , Akira Nakabayashi , Yoshika Akizawa	achievement of the goal 5
	Number	Instructor	Contents												
	1 to 90	Tutomu Tabata ,Jun Kumakiri , Jun Kakogawa , Akira Nakabayashi , Yoshika Akizawa	achievement of the goal 1-2												
	91 to 120	Tutomu Tabata ,Jun Kumakiri , Jun Kakogawa , Akira Nakabayashi , Yoshika Akizawa	achievement of the goal 3-4												
121 to 150	Tutomu Tabata ,Jun Kumakiri , Jun Kakogawa , Akira Nakabayashi , Yoshika Akizawa	achievement of the goal 5													

Oral and Maxillofacial Surgery

I Education policy

Oral and Maxillofacial Surgery is a discipline aiming at a diagnosis of the disease of teeth, jaw, the oral cavity face region and treatment and prevention, a more oral function and the recovery that it is in the form. It is an important site and, as well as eating, chewing, maintenance of life called the deglutition, collaborates it for prevention, a therapy, a function of the better disease and the recovery that it is in the form aesthetically with a medical customs and manners of a licenced red-light district field and can expect the expansion of the further study. Bone regenerations, and the like are tried in oral surgery in the regenerative therapy attracting attention than before and study in particular it positively and the like because stem cells source is a lot present in oral cavity. Also, we can collaborate it about the clinical study of a diagnosis, the treatment of oral disease widely with the faculty of medicine, a school of dentistry, the research institute, and the like of clinical others course and basics laboratory, attachment research institute and other universities and can perform various studies in a graduate school without being kept in the region. We teach ways, and the like of the announcement in a search and an extract reading of the English literature, a domestic academic conference and the international academic conference through a study.

II Attainment target

- We understand diagnostic procedure, therapy for oral disease and examine better diagnostic method and a regimen.
- We set a study theme and we draw up a study plan and conduct a study.
- It allows to collect the statistics appropriately, and to handle an outcome and a laboratory finding, and the contents to give presentation.
- We make results of research an article.

III Research advisor / research theme

(* = For doctor license holders)

Teacher name	Research theme
<p>Professor Okamoto Associate professor Kaibucui</p>	<p>(1) Regenerative therapy in the oral and maxillofacial region using “cell sheet engineering” We are researching about “cell sheet engineering” in collaboration with Institute of Advanced Biomedical Engineering and Science, Tokyo Women’s Medical University (TWIns). We have completed a clinical study of Autologous periodontal ligament cell sheet transplantation for periodontitis, and confirmed the long-term stability and their safety of this cytotherapy. Moreover, we demonstrated that bone marrow derived mesenchymal stromal cell sheet transplantation is effective for bisphosphonate-related osteonecrosis of the jaw in a rat model. Besides, we are researching about oral mucosal regeneration or dental implants using tissue engineering. Our goal is actually to deliver a new treatment to patients.</p>

<p>Professor Okamoto Associate professor Kaibucui</p>	<p>(2) Development of the Dermatoscope for the oral cavity and establish of the new diagnostic method of oral mucosa disease using the artificial intelligence technology. Dermoscopes are noninvasive dermatologic diagnostic tools for making examinations at about 10 to 30 times magnification by brightly illuminating lesion sites with a halogen lamp or white light-emitting diode, and by using ultrasound gel, a polarizing filter, etc., We carried out of dermoscopy images in the oral area related to black lesions of the fungiform papillae of the tongue, black hairy tongue, melanoma, lichen sclerosis, lichen planus, leukoplakia, erythroplakia and the early oral cancer. Our aim is development of the dermatoscope for the oral cavity and establish of the new diagnostic method of oral mucosa disease using the artificial intelligence technology.</p>
<p>Professor Okamoto</p>	<p>(3) Investigation on the effect of oral microbiota dysbiosis on a lifestyle-related diseases Various inflammatory stressors (e.g. cytokines, endotoxins, pathogens) in the oral cavity of patients with periodontal disease are likely to have a significant impact on the pathogenesis of lifestyle-related diseases (diabetes, non-alcoholic fatty liver disease, atherosclerosis, etc.) and colon cancer. Therefore, we will elucidate the pathophysiology for the development of lifestyle-related diseases from the view point of an oral-organ linkage. The improvement of the oral environment will be verified as effective in the prevention and treatment of various diseases including autoimmune diseases, cancer, lifestyle-related diseases.</p>
<p>Professor Okamoto</p>	<p>(4)In collaboration with the Department of Sleep Medicine, we have been investigating the efficacy of oral myofunctional therapy for obstructive sleep apnea and confirmed its effectiveness. In Japan, which is a hyper-aged society, sarcopenia and frailty have been considered issues. Oral hypofunction is regarded as a related disease, and oral myofunction therapy is recognized as a treatment method for the oral hypofunction. Therefore, we investigate the relationship between obstructive sleep apnea and oral hypofunction to verify the efficacy of the oral function therapy.</p>

IV Syllabus

(* = for doctor's license holders)

Title	Instructor	Credit	Theme
Oral infections	Assistant professor Akagi	1	Learning and treatment of the disease caused by oral bacteria and the oral bacteria.
Oral tumor	Professor Okamoto Associate professor Kaibucui	2	Clinical condition, the pathologic understanding of benign, the malignant tumor occurring in oral cavity and examination of the diagnostic procedure.
Oral surgery	Professor Okamoto Associate professor Kaibucui Assistant professor Akagi	2	Lectures and discussions on function-oriented oral surgery and maxillofacial reconstruction surgery
Experiment / Practice (Themed research)	Professor Okamoto Associate professor Kaibucui	10	Implementation of research projects, presentation of research, and writing of article.
Toal		15	

Oral and Maxillofacial Surgery

(* = For doctor license holders)

Syllabus Title	Oral Infections		
Instructor	Professor Okamoto, Associate professor Kaibucui		
Credit	1		
Type of Class	Lectures, exercises		
Theme	Learning and treating oral bacteria and diseases caused by oral bacteria.		
Schedule	Tuesday 17 : 00 ~ 18 : 00 (60min)		
Course Objective	· Learn the characteristics of oral bacteria and learn how to diagnose, treat, and prevent biofilm infections and dental lesion infections.		
Evaluation Methods	Attendance (50%) Report (50%)		
Grading Scale	S (90 points ~ 100 points) 、 A (80 points or more but less than 90 points) 、 B (70 points or more but less than 80 points) 、 C (60 points or more but less than 70 points) 、 D (Less than 60 points) There are five types of A, B, C, D and A, B, C are accepted, and D is rejected.		
Textbooks/References	Dental Biofilm (Ishiyaku Shuppan) Death spiral caused by oral pathogens (Ishiyaku Shuppan)		
Independent Study Outside of Class	Search English articles according to the theme and create a report.		
Room	Conference Room		
Special Note	Those who cannot participate in the above time will decide the timetable after consultation. Questions etc. are accepted at any time. Give feedback in the final round.		
Course Plan	Number of times	The instructor	Course content
	1	Professor Okamoto	Oral bacteriology (1)
	2	Professor Okamoto	Oral bacteriology (2)
	3	Professor Okamoto	Oral bacteriology (3)
	4	Professor Okamoto	Oral bacteriology (4)
	5	Professor Okamoto	Oral bacteriology (5)
	6	Assistant professor Akagi	Periodontology (1)
	7	Assistant professor Akagi	Periodontology (2)
	8	Assistant professor Akagi	Periodontology (3)
	9	Assistant professor Akagi	Periodontology (4)
	10	Assistant professor Akagi	Periodontology (5)
	11	Associate professor Kaibucui	Dental infection (1)
	12	Associate professor Kaibucui	Dental infection (2)
	13	Associate professor Kaibucui	Dental infection (3)
	14	Professor Okamoto	Focal infection (1)
15	Professor Okamoto	Focal infection (2)	

Oral and Maxillofacial Surgery

(* = For doctor license holders)

Syllabus Title	Oral Oncology		
Instructor	Professor Okamoto, Associate professor Kaibucui		
Credit	2		
Type of Class	Lectures, exercises		
Theme	Understanding the pathophysiology and pathology of benign and malignant tumors that occur in the oral cavity and examining diagnostic		
Schedule	Friday 8:00~9:00 / 13:00~14:00		
Course Objective	<ul style="list-style-type: none"> Pathological diagnosis of odontogenic tumor is possible. Understand the diagnosis and treatment of oral cancer. 		
Evaluation Methods	Attendance (50%) Report (50%)		
Grading Scale	S (90 points ~ 100 points) 、 A (80 points or more but less than 90 points) 、 B (70 points or more but less than 80 points) 、 C (60 points or more but less than 70 points) 、 D (Less than 60 points) There are five types of A, B, C, D and A, B, C are accepted, and D is rejected.		
Textbooks/References	WHO Classification of Head and Neck Tumours. IARC (Lyon) New Oral Surgery Pathological Diagnosis Atlas (Ishiyaku Shuppan)		
Independent Study Outside of Class	Search English articles according to the theme and create a report.		
Room	Conference Room		
Special Note	Those who cannot participate in the above time will decide the timetable after consultation. Questions etc. are accepted at any time. Give feedback in the final round.		
Course Plan	Number of times	The instructor	Course content
	1	Professor Okamoto	Introduction to Oral Tumors
	2	Associate professor Kaibucui	Epidemiology of oral tumors
	3	Professor Okamoto	Odontogenic tumor (1)
	4	Professor Okamoto	Odontogenic tumor (2)
	5	Professor Okamoto	Odontogenic tumor (3)
	6	Professor Okamoto	Diagnosis of oral cancer (1)
	7	Professor Okamoto	Diagnosis of oral cancer (2)
	8	Professor Okamoto	Oral cancer pathology (1)
	9	Professor Okamoto	Oral cancer pathology (2)
	10	Professor Okamoto	Treatment of oral cancer (1)
	11	Professor Okamoto	Treatment of oral cancer (2)
	12	Associate professor Kaibucui	Cancer statistics (1)
	13	Associate professor Kaibucui	Cancer statistics (2)
	14	Associate professor Kaibucui	Basic research (1)
15	Associate professor Kaibucui	Basic research (2)	

Oral and Maxillofacial Surgery

(* = For doctor license holders)

Syllabus Title	Operative Oral and Maxillofacial Surgery		
Instructor	Professor Okamoto, Associate professor Kaibucui		
Credit	2		
Type of Class	Lectures, exercises		
Theme	Lectures, practices, and discussions on function-oriented oral surgery and maxillofacial reconstruction surgery		
Schedule	Wednesday 8 : 00 ~ 10 : 00		
Course Objective	<ul style="list-style-type: none"> · You can plan oral surgery with an emphasis on function. · You can practice oral surgery. 		
Evaluation Methods	Conference (30%) Technique / Attitude (70%)		
Grading Scale	S (90 points ~ 100 points) 、 A (80 points or more but less than 90 points) 、 B (70 points or more but less than 80 points) 、 C (60 points or more but less than 70 points) 、 D (Less than 60 points) There are five types of A, B, C, D and A, B, C are accepted, and D is rejected.		
Textbooks/References	Oral Surgery Volumes 1 to 4 (Quintessensu Publishing) Head and neck surgery color atlas (Nagai Shoten)		
Independent Study Outside of Class	Create a surgical record with reference to the surgical book and anatomical book.		
Room	Operating room, conference room		
Special Note	Those who cannot participate in the above time will decide the timetable after consultation. Questions etc. are accepted at any time. Give feedback in the final round.		
Course Plan	Number of times	The instructor	Course content
	1	Professor Okamoto, Associate professor Kaibucui, Assistant professor Akagi	Tooth and alveolar surgery
	2	〃	Oral implant surgery
	3	〃	Oral maxillofacial neck anti-inflammatory surgery
	4	〃	Maxillary tumor surgery
	5	〃	Salivary gland surgery
	6	〃	Maxillofacial surgery①
	7	〃	Maxillofacial surgery②
	8	〃	Temporomandibular joint surgery
	9	〃	Orthognathic Surgery①
	10	〃	Orthognathic Surgery②
	11	〃	Head and neck cancer surgery①
	12	〃	Head and neck cancer surgery②
	13	〃	Head and neck cancer surgery③
	14	〃	Head and neck reconstruction①
15	〃	Head and neck reconstruction②	

Oral and Maxillofacial Surgery

(* = For doctor license holders)

Syllabus Title	Experiment / Practice (Problem Research)	
Instructor	Professor Okamoto, Associate professor Kaibucui	
Credit	10	
Type of Class	Experiment / Practice (Problem Research)	
Theme	Implementation of research projects, research presentations, and dissertation writing	
Schedule	Friday 14:00~15:00	
Course Objective	<ol style="list-style-type: none"> 1. You can acquire the necessary experimental techniques according to the research plan you have devised, understand medical research ethics, and carry out research. 2. You can be experiment contents and data be recorded and saved correctly. 3. You can be experimental results appropriately summarized in charts. 4. You can be the research content appropriately presented at external academic societies and study groups, and discussions about the content can be conducted. 5. Make a dissertation of the research content and submit it. Appropriately respond to the comments of the reviewers and achieve the publication of the paper. 	
Evaluation Methods	Attendance (50%) Report (50%)	
Grading Scale	S (90 points ~ 100 points) 、 A (80 points or more but less than 90 points) 、 B (70 points or more but less than 80 points) 、 C (60 points or more but less than 70 points) 、 D (Less than 60 points) There are five types of A, B, C, D and A, B, C are accepted, and D is rejected.	
Textbooks/References	Statistics for conferences and dissertation presentations (Shinko Trading Medical Book Publishing Department) Medical English Practical Glossary for Writing Medical English Papers (Medical View Cop)	
Independent Study Outside of Class	Preparatory learning is conducted using learning guidance books and reference books.	
Room	Conference Room	
Special Note	Those who cannot participate in the above time will decide the timetable after consultation. Questions etc. are accepted at any time. Give feedback from time to time.	
Course Plan	Number of times	Course content
	1	How to search for articles and summarize research results.
	~	
	90	
	91	How to write an English medical dissertation and how to create a figure.
	~	
	120	
	121	How to make slides for conference presentations.
~		
150		

ADVANCED TECHNO-SURGERY

I Educational Policy

The Faculty of Advanced Techno-Surgery (FATS) conducts research and development to bring about higher levels of quality in medical care. At the core of our research is image-guided surgery (IGS) performed in our intelligent operating theater. Since adopting intraoperative magnetic resonance imaging (MRI) in March 2000, as of December 2020, we have performed IGS on over 2090 patients, and in doing so, have contributed to the spread of this modality from its inception. Now that we are entering the age of information-guided surgery, FATS aims to improve the quality of multidisciplinary medical care, not only via existing modalities of intraoperative MRI and updated neuro-navigation systems, but also through the addition of a range of innovative modalities that can deliver seamless support in pre-, intra-, and post-surgery settings. Examples of these techniques and procedures include MR spectroscopy, awake craniotomy, intraoperative examination monitoring for awake surgery (IEMAS), rapid intraoperative pathological diagnosis, intraoperative diagnosis of malignancy using flow cytometry, photodynamic diagnosis and treatment, touchless interface (Opect), automated tracking robotic arm (iArmS), and higher brain function testing. We are also working to realize the integration of these technologies in our Smart Cyber Operating Theater (SCOT) by expanding our research and development (R&D) framework to encompass interdisciplinary partnerships in the field of medical engineering with academia, industry, and government.

In the field of oncology, we are striving to realize the fourth modality of cancer therapy after surgery, radiotherapy, and chemotherapy, namely sonodynamic therapy, combining the use of high intensity focused ultrasound therapy and sonosensitizer. However, our emphasis is not solely on technological development, and we are also focused on initiatives to obtain international standard.

Our faculty bring a multidisciplinary approach to all of our processes, from basic research to clinical application and product development. Their efforts are forging a model for our next-generation collaborative (interdisciplinary) medical engineering research, translational research, and commercialization of product.

II Goals

1. Being able to carry out numerous basic investigation, accumulate appropriate collecting research results, and focus on utilizing the wide knowledge and high skills based on research results, as well as their application capabilities.
2. As the name of Faculty of Advanced Tecno-Surgery suggests, to be able to acquire research management mind that is conscious of advanced ideas and original, innovative research without having to stick to known phenomena.
3. Not only focusing on the present results, but also cultivating a broad perspective and wide communication skills that always keep an eye on the future practical application and the ideal state of surgery.
4. We will endeavor to disseminate our daily research results not only to Japan but also to the world, and we will not lose our R & D mindset with world-leading goals. In addition, always recognize that interaction with staff and patients is based on the fostering of rich humanity and high ethical standards, and encourage them to be willing to set a goal high.

III Supervisor*Research theme

(* = for doctor's license holders)

Name and position	Research theme
Yoshihiro Muragaki (Professor) Ken Masamune (Professor) Manabu Tamura (Associate Professor) Shuji Kitahara (Associate Professor) Kitaro Yoshimitsu (Assistant Professor) Tomoko Yamaguchi (Assistant Professor) Yuki Horise (Part-time Assistant Professor)	(1) Surgical strategy systems in the field of neurosurgery Surgery—and neurosurgery in particular—is host to highly complex systems characterized by the continuous introduction of various equipment for testing, diagnosis, and treatment. The key to successful surgery lies in leveraging the information from these systems to optimize procedures by developing the best surgical plans and modifying these plans in response to the surgical process. In this research theme, students will learn how to plan for surgery preoperatively, how to monitor progress by visualizing intraoperative information, how to systematically and effectively modify the surgery to resolve any identified issues, and how to develop the software and hardware to achieve these goals. Students will be required to report on the progress of their research in an academic presentation setting twice a year so that the teaching staff can provide feedback and guidance on their research presentation skills.
Yoshihiro Muragaki (Professor) Ken Masamune (Professor) Manabu Tamura (Associate Professor) Shuji Kitahara (Associate Professor) Kitaro Yoshimitsu (Assistant Professor) Tomoko Yamaguchi (Assistant Professor)	(2) Surgical risk management using surgery recorder and simulator systems Surgery recorder systems for digitally recording and storing intraoperative anesthesia management data, patient physiological data (wearable device data), and surgical data (video data of the operative field) are essential for streamlining and optimizing risk management in surgery. Surgery simulator systems have the potential to be an invaluable data-gathering tool for the analysis and assessment of unforeseen problems. In this research theme, students will learn how to develop surgery recorder and simulator systems to help ensure that surgeries are performed safely. Students will be required to report on the progress of their research in an academic presentation setting twice a year so that the teaching staff can provide feedback and guidance on their research presentation skills.

<p>Yoshihiro Muragaki (Professor) Ken Masamune (Professor) Manabu Tamura (Associate Professor) Shuji Kitahara (Associate Professor) Kitaro Yoshimitsu (Assistant Professor) Tomoko Yamaguchi (Assistant Professor)</p>	<p>(3) Surgical assistance robotic devices In this research theme, students will research and develop robotic surgical lasers and new surgical devices using ultrasound and lasers in order to provide surgeons with a “new hand” capable of realizing a level of accuracy, resolution, and operability that exceeds that of human hands by utilizing mechanical, electronic, informational, engineering, and computer-assisted surgical techniques. Students will take a medical engineering approach to their research on the conceptual design, realization, functions, and effects of various diagnostic and therapeutic supportive devices in a number of fields including neurosurgery, abdominal surgery, and thoracic surgery. Students will be required to report on the progress of their research in an academic presentation setting twice a year so that the teaching staff can provide feedback and guidance on their research presentation skills.</p>
<p>Yoshihiro Muragaki (Professor) Masamune Ken (Professor) Manabu Tamura (Associate Professor) Shuji Kitahara (Associate Professor) Kitaro Yoshimitsu (Assistant Professor) Tomoko Yamaguchi (Assistant Professor) Jun Okamoto (Part-time Assistant Professor)</p>	<p>(4) Practical development of Sonodynamic Therapy(SDT) While observing the synergistic effect with drugs that use SDT, which is attracting attention as a minimally invasive treatment, together with cancer treatment, we will conduct research on the practical application and development for a futurer treatment system as a new cancer treatment. Taking the interaction between a drug (sonosensitizer) and high-density focused ultrasound (HIFU) as an example, we aim to accelerate clinical utilization as an industry-academia collaboration model project while setting various conditions. Students will be required to report on the progress of their research in an academic presentation setting twice a year so that the teaching staff can provide feedback and guidance on their research presentation skills.</p>
<p>Yoshihiro Muragaki (Professor) Ken Masamune (Professor) Manabu Tamura (Associate Professor) Shuji Kitahara (Associate Professor) Kitaro Yoshimitsu (Assistant Professor) Tomoko Yamaguchi (Assistant Professor) Soko Ikuta (Part-time Assistant Professor)</p>	<p>(5) Regulatory science for medical devices Japan’s medical device manufacturing industry currently faces a disconnect in terms of its ability to develop devices and its inability to commercialize them. In particular, the industry is facing a crisis due to its inability to commercialize therapeutic devices, the majority of which are clinically tested and commercialized overseas. The underlying cause of this inability to manufacture is risk aversion by all stakeholders including the public, developers, management, and regulatory authorities. As such, measures to mitigate risk are essential to overcoming this situation. It is also crucial to focus on data packaging from the development stage with an eye to regulatory approval and commercialization and to submit proprietary scientific evidence for safety and efficacy evaluation. In this research theme, students will investigate the regulatory science required to develop various medical devices. Students will be required to report on the progress of their research in an academic presentation setting twice a year so that the teaching staff can provide feedback and guidance on their research presentation skills.</p>
<p>Yoshihiro Muragaki (Professor) Ken Masamune (Professor) Manabu Tamura (Associate Professor)</p>	<p>(6) Stereotactic and functional micro-radiosurgery In gamma knife radiosurgery, the surgeon uses gamma radiation as though using a knife to remove brain tumors without harming the surrounding normal brain tissue in an attempt to radically resect the tumor. The gamma knife device contains 192 cobalt-60 (Co60) sources arranged in a concentric and semi-circular array. The device is designed to focus the gamma radiation on a single point to deliver a single high dose of radiation to the target lesion. Current gamma knife technology is capable of automatically targeting any location within the brain, including tumors located in the craniocervical junction, with an accuracy of 0.1 mm. Using this precise radiosurgical device, students will study the therapeutic accuracy and clinical outcomes of stereotactic and functional micro-radiosurgery. Students will be required to report on the progress of their research in an academic presentation setting twice a year so that the teaching staff can provide feedback and guidance on their research presentation skills.</p>

IV Syllabus

(* = for doctor's license holders)

Title	Instructor	Credit	Theme
Advanced techno-surgery	Yoshihiro Muragaki, Ken Masamune, Manabu Tamura, Shuji Kitahara, Kitaro Yoshimitsu, Tomoko Yamaguchi	2	The basic idea and its application of advanced techno-surgery that constitutes advanced medicine
Advanced techno-surgery (Seminar, Group discussion)	Yoshihiro Muragaki, Ken Masamune, Manabu Tamura, Shuji Kitahara, Kitaro Yoshimitsu, Tomoko Yamaguchi	2	Seminar and group discussion of advanced techno-surgery
Advanced biomedical science (Intensive discussion)	Yoshihiro Muragaki, Ken Masamune, Manabu Tamura, Shuji Kitahara, Kitaro Yoshimitsu, Tomoko Yamaguchi	1	Presentation and intensive discussion on advanced medical research and development
Experiment / Practice (Problem Research)	Yoshihiro Muragaki, Ken Masamune, Manabu Tamura, Shuji Kitahara, Kitaro Yoshimitsu, Tomoko Yamaguchi	10	Conducting research projects and writing treatises
Total credits		15	

Gene Medicine

I Educational policy

Genetics in medicine is based on a molecular biological understanding of nucleic acids as carriers of genetic information, but cannot be applied in actual medical practice without understanding various variations in individuals. With the rapid progress of DNA analysis technology, the amount of genomic information that can be clarified is increasing at an accelerating rate, and how to interpret and clinically apply them is a major issue in the future. In the field of genetic medicine, we aim to develop human resources who will lead the era of genomic medicine, which has just reached its application stage. For this purpose, we also have a course to train clinical geneticists and certified genetic counselors who have a credit transfer system in collaboration with Ochanomizu University Graduate School.

II Attainment target

- Understand the molecular biological and medical implications of chromosomes, genomes, genes, nucleic acid structures, and functions, and explain the inheritance of monogenic diseases, mitochondrial abnormalities, and multifactorial diseases.
- Understand the concepts of gene mutation, gene diversity (polytype), and clinical genetics (including gene diagnosis and gene therapy), extract necessary information from the database, apply it to individual patients, and analyze the genome. Can correctly interpret the data of and create a report.
- Understand the laws of inheritance and population genetics, understand the concepts of linkage and linkage disequilibrium, and explain pharmacogenomics, pharmacogenomics theory, and personalized medicine with examples.
- Understand ethical issues in genetic medicine and explain various guidelines for genetic testing.
- You can listen to your family history, draw a family tree, and practice genetic counseling.
- It is possible to achieve results that show the ability to plan, carry out, and present scientifically and ethically appropriate cutting-edge research and the ability to develop researchers and educators with the spirit of sincerity and love, which is the philosophy of the university.

III Research advisor / research theme

(* = for doctor license holders)

Supervisor	Research theme
Prof. Yamamoto	(1) Elucidation of the onset mechanism of pediatric neurodevelopmental disorders Pediatric neurodevelopmental disorders are caused by a variety of causes. In particular, there are many different genes that cause them, but little is known about how those gene mutations are involved in the onset of the disease, but they affect the formation of nerve cell networks. Is speculated. In this study, we would like to clarify the seeds that will lead to the development of future therapeutic methods by analyzing the pathological conditions at the cellular level.
Prof. Yamamoto	(2) Genome diagnosis of undiagnosed intractable diseases With the development of comprehensive analysis methods such as next-generation sequencing and microarray chromosome analysis, it has become possible to diagnose intractable diseases that could not be diagnosed until now. In this study, we aim to clarify the cause of Mendel's genetic disease whose cause is not clear by using these analysis methods, and to establish a new disease concept.
Prof. Yamamoto	(3) Cancer Genome Research Nationally-led cancer genome research is being conducted to identify somatic mutations in various cancer cells and link them to treatment. However, it has not yet been established what kind of gene should be analyzed using what kind of panel for efficient diagnosis. In this study, we will examine an efficient method and link it to future clinical applications.
Prof. Yamamoto	(4) Elucidation of the mechanism of chromosomal structural abnormalities We will analyze the cleavage and fusion points of chromosomal rearrangements using ultra-long sequence technology to clarify the mechanism by which complex chromosomal abnormalities occur.
Prof. Yamamoto and Associate Prof. Nakabayashi	(5) Technological innovation in preimplantation genetic diagnosis Preimplantation genetic diagnosis methods are evolving, and in addition to chromosomal aneuploidy and unbalanced translocations, it is becoming possible to diagnose monogenic diseases. Aim for technological innovation for more accurate diagnosis.

IV Syllabus

(* = for doctor license holders)

Item	Supervisor	Credits	Theme
Human Genetics	Prof. Yamamoto, Prof. Iwasaki, Associate Prof. Nakabayashi	4	Human Genetics and its history, the concept of heredity, the concept of genome and central dogma, how to draw a pedigree, the basics of genetic medicine, general remarks on human genetics (autosomal recessive) Heredity), General Human Genetics (Autosomal Dominant Inheritance), General Human Genetics (X-Linkedity), Mitochondrial Inheritance, Triplet Repeat, Multifactorial Diseases and Permeability, Epigenome and Genome Imprinting, DNA Modulation Methods, Restrictive Enzymes Maps and RFLP, microsatellite polymorphisms and SNPs, DNA sequencing, molecular biology and genetic recombination experiments, genomic diversity, genomic changes and genetic testing, linkage imbalances and linkage analysis, population genetics and Chain imbalance / haplotype, sibling pairing and homozygous mapping of affected patients, genetic statistics and GWAS, recombinant DNA technology and library creation (DNA and cDNA), genetic biochemistry (proteins, isozymes, enzymes, growth factors, proliferation) Factors, cytoskeleton.), immunogenetics (inheritance of immune response, blood type, tissue compatibility, types and functions of HLA / MHC, antigen-identifying molecules), pharmacological genetics and SNP typing (drug susceptibility and therapeutic application), Suburban coefficient and twin studies, gene pool and gene frequency, principle of Hardy Weinberg
Clinical Genetics	Prof. Yamamoto, Prof. Iwasaki, Associate Prof. Nakabayashi	4	General remarks on clinical genetics and cytogenetics, somatic cell division, meiosis (chromosome separation and spous formation) Nuclear type and chromosome fractionation method, FISH method and SKY Law, chromosomal heterogeneity and developmental mechanism, chromosomal structural abnormality and its mechanism, germ cell mutation and somatic cell mutation, pedigree analysis, prenatal / pre-implantation diagnosis, fertility and infertility, habitual abortion and infertility, developmental abnormality Malformations, teratogenic factors, hereditary diseases and their medical care, mitochondrial diseases and genetic counseling, cloned individuals and ES cells, cell fusion and cell hybrids, complementarity, cancer genes and cancer suppressor genes, tumor development mechanism, hereditary Oncology, cancer genomic medicine, advances in comprehensive genome analysis technology (microarray / next-generation sequence), database usage, actual and result interpretation of comprehensive genome analysis, genetic risk determination, personalized medicine / custom-made medicine, Principles and indications of genetic therapy, genetic therapy
Genetic Counseling and Genetic Medicine	Prof. Yamamoto, Prof. Iwasaki, Associate Prof. Nakabayashi	4	Definition / Purpose / General Principles (Non-Directional Attitude) / Theory of Genetic Counseling, Communication Theory and Ice Break, Sympathetic Understanding and Listening, Understanding Loss Experience , Life stage and mental health, psychological support, comedical in genetic medicine, provision of genetic information, family history, pedigree, estimation of genetic prognosis / recurrence risk, Bayes' theorem, carrier identification method, confidentiality obligation , Disability and social / social security, information search, cooperation with support groups, family interviews, actual genetic counseling
Genetic Medicine and ELSI	Prof. Yamamoto, Associate Prof. Nakabayashi	4	Clinical Genetic Examination, Clinical Genetic Diagnosis, Characteristics of Genetic Testing, Natural History of Diseases, Helsinki Declaration and Ethical Guidelines, Bioethics and Researcher Ethics, WHO Guidelines, Guidelines for genomic analysis, genetic medicine and ethics committee, clinical research method, personal information protection law, consent acquisition / substitution acquisition in genetic testing, genetic testing in children, genetic information sharing and personal information protection, genes Patent issues, genetic information and discrimination, personalized medicine in the era of genomic medicine, accidental findings and their handling / actual, prenatal diagnosis / new prenatal diagnosis / pre-implantation diagnosis / carrier diagnosis / presymptomatic diagnosis / mass screening* Advances in genome editing and genetic analysis technology and the future of ELSI and genomic medicine
Intensive Discussion, Department of Advanced Biomedical	Prof. Yamamoto	1	Presentation and Intensive Discussion on Advanced Medical Research and Development
Experiment / Practice (Problem Research)	Prof. Yamamoto, Associate Prof. Nakabayashi	10	Implementation of research (including genetic counseling research) and preparation of research papers
Genetic counseling training	Prof. Yamamoto, Prof. Iwasaki, Associate Prof. Nakabayashi, Associate Prof. Matsuo	10	Clinical participatory training at a genetic medical center including role play (for training courses for clinical genetic specialists and certified genetic counselors, belonging to the field of genetic medicine) Only for graduate students)
Total		37	

Human Genetics Syllabus

(* = for doctor license holders)

Syllabus	Human genetics		
Syllabus	Human genetics		
Supervisor	Prof. Yamamoto, Prof. Iwasaki, Associate Prof. Nakabayashi		
Credits	4		
Class format	Lecture / Practice		
Theme	Lecture on the relationship between diseases and inheritance such as Mendelian inheritance, non-Mendelian inheritance, and multifactorial inheritance		
Day of the week, time limit, etc.	Tuesday 15: 30-16: 40		
Achievement goal	<ul style="list-style-type: none"> Understand the molecular biological and medical implications of chromosomes, genomes, genes, nucleic acid structures, and functions, and explain the inheritance of monogenic diseases, mitochondrial abnormalities, and multifactorial diseases. Understand the laws of inheritance and population genetics, understand the concepts of linkage and linkage disequilibrium, and explain pharmacogenomics, pharmacogenomics theory, and personalized medicine with examples. 		
Evaluation target	Attendance (50%) Submission of report on lecture content (50%)		
Evaluation criteria	S (90 points to 100 points), A (80 points to less than 90 points), B (70 points to less than 80 points), C (60 points to less than 70 points), D (less than 60 points), S, A, B, C are accepted, and D is rejected.		
Course of study Reference books, etc.	Thompson & Thompson Medical Genetics 2nd Edition (Medical Science International)		
Preparatory learning and how to learn outside of class	Read the above reference books and related literature.		
Venue	Genome Department Medical Office		
Remarks	Those who cannot participate in the above time will decide the timetable after consultation. Questions etc. are accepted at any time. Give feedback in the final round.		
Plan	Number of lesson	Supervisor	Class content
	1	Prof. Yamamoto	Human genetics and its history
	2	Prof. Yamamoto	The concept of heredity
	3	Prof. Yamamoto	Genome concept and central dogma
	4	Prof. Yamamoto, Associate Prof. Nakabayashi	How to write a family tree
	5	Prof. Yamamoto	Basics of medical genetics
	6	Prof. Yamamoto	General Human Genetics (Autosomal Recessive Inheritance)
	7	Prof. Yamamoto	General Human Genetics (Autosomal Dominant Inheritance)
	8	Prof. Yamamoto	General remarks on human genetics (X-linked inheritance)
	9	Prof. Yamamoto, Prof. Iwasaki	Mitochondrial inheritance
	10	Prof. Yamamoto	Triple repeat
	11	Prof. Yamamoto, Prof. Iwasaki	Multifactorial disease and penetration
	12	Prof. Yamamoto	Epigenome and genomic imprinting
	13	Prof. Yamamoto	How to adjust DNA
	14	Prof. Yamamoto	Restriction enzyme map and RFLP
	15	Prof. Yamamoto	Microsatellite polymorphism and SNP
	16	Prof. Yamamoto	DNA sequence determination method
	17	Prof. Yamamoto	Molecular biology and gene recombination experiments
	18	Prof. Yamamoto	Genome diversity
	19	Prof. Yamamoto	Genome changes and genetic testing
	20	Prof. Yamamoto	Linkage disequilibrium and linkage analysis
	21	Prof. Yamamoto	Population genetics and linkage disequilibrium / haplotype
	22	Prof. Yamamoto	Affected patient sibling pairing and homozygous mapping
	23	Prof. Yamamoto	Genetic statistics and GWAS
	24	Prof. Yamamoto	Recombinant DNA technology and library creation (DNA and cDNA)
	25	Prof. Yamamoto	Genetic biochemistry (proteins, isozymes, enzymes, growth factors, growth factors, cytoskeleton.)
	26	Prof. Yamamoto	Immune genetics (inheritance of immune response, blood group, histocompatibility, type and function of HLA / MHC, antigen-identifying molecule)
	27	Prof. Yamamoto	Pharmacogenomics and SNP typing (drug susceptibility and therapeutic application)
	28	Prof. Yamamoto	Coefficient of inbreeding and twin studies
	29	Prof. Yamamoto	Gene pool and gene frequency
30	Prof. Yamamoto	Principle of Hardy-Weinberg	

Gene Medicine Clinical Genetics Syllabus

(* = for doctor license holders)

Syllabus	Clinical Genetics		
Syllabus	Clinical genetics		
Supervisor	Prof. Yamamoto, Prof. Iwasaki, Associate Prof. Nakabayashi		
Credits	4		
Class format	Lecture / Practice		
Theme	Lecture on the relationship between genomic diversity and disease		
Day of the week, time limit, etc.	Tuesday 15: 30–16: 40		
Achievement goal	<ul style="list-style-type: none"> Understand the concepts of gene mutation, gene diversity (polytype), and clinical genetics (including gene diagnosis and gene therapy), extract necessary information from the database, apply it to individual patients, and analyze the genome. Can correctly interpret the data of and create a report. 		
Evaluation target	Attendance (50%) Submission of report on lecture content (50%)		
Evaluation criteria	S (90 points to 100 points), A (80 points to less than 90 points), B (70 points to less than 80 points), C (60 points to less than 70 points), D (less than 60 points), S, A, B, C are accepted, and D is rejected.		
Course of study Reference books, etc.	Genetics and Genomics in Medicine (Medical Science International)		
Preparatory learning and how to learn outside of class	Read the above reference books and related literature.		
Venue	Genome Department Medical Office		
Remarks	Those who cannot participate in the above time will decide the timetable after consultation. Questions etc. are accepted at any time. Give feedback in the final round.		
Plan	Number of lesson	Supervisor	Class content
	1	Prof. Yamamoto	General remarks on clinical genetics and cytogenetics
	2	Prof. Yamamoto	Mitosis
	3	Prof. Yamamoto	Meiosis (chromosome segregation and gametogenesis)
	4	Prof. Yamamoto	Karyotype and chromosome banding
	5	Prof. Yamamoto	FISH method and SKY method
	6	Prof. Yamamoto	Chromosome aneuploidy and developmental mechanism
	7	Prof. Yamamoto	Chromosomal structural abnormalities and their mechanisms
	8	Prof. Yamamoto	Germline and somatic mutations
	9	Prof. Yamamoto	Family analysis
	10	Prof. Yamamoto, Associate Prof. Nakabayashi	Prebirth / preimplantation genetic diagnosis
	11	Prof. Yamamoto, Associate Prof. Nakabayashi	Fertilization and infertility
	12	Prof. Yamamoto, Associate Prof. Nakabayashi	Customary miscarriage and recurrent miscarriage
	13	Prof. Yamamoto	Abnormalities and malformations, teratogenic factors
	14	Prof. Yamamoto	Hereditary diseases and their medical treatment
	15	Prof. Yamamoto, Prof. Iwasaki	Mitochondrial disease and genetic counseling
	16	Prof. Yamamoto	Clone individuals and ES cells
	17	Prof. Yamamoto	Cell fusion and cell hybrids, complementarity
	18	Prof. Yamamoto	Oncogenes and tumor suppressor genes
	19	Prof. Yamamoto	Tumor development mechanism
	20	Prof. Yamamoto	Hereditary tumor
	21	Prof. Yamamoto	Cancer genomic medicine
	22	Prof. Yamamoto	Advances in Comprehensive Genome Analysis Technology (Microarray)
	23	Prof. Yamamoto	Advances in Comprehensive Genome Analysis Technology (Next Generation Sequencing)
	24	Prof. Yamamoto	How to use the database
	25	Prof. Yamamoto	Comprehensive Genome Analysis Practice and Result Interpretation
	26	Prof. Yamamoto	Genetic risk determination
	27	Prof. Yamamoto	Personalized medicine / personalized medicine
	28	Prof. Yamamoto	Principles and adaptations of gene therapy
	29	Prof. Yamamoto	Gene therapy (congenital disease)
30	Prof. Yamamoto	Gene therapy (acquired diseases centered on cancer)	

Gene Medicine Genetic Counseling and Genetic Medicine Syllabus

(* = for doctor license holders)

Syllabus	Genetic counseling and genetics medicine		
Syllabus	Genetic counseling and genetics medicine		
Supervisor	Prof. Yamamoto, Prof. Iwasaki, Associate Prof. Nakabayashi		
Credits	4		
Class format	Lecture / Practice		
Theme	Lectures on the practice of genetic counseling in clinical practice and ethical norms and guidelines to keep in mind		
Day of the week, time limit, etc.	Tuesday 15:30-16:40		
Achievement goal	<ul style="list-style-type: none"> Understand ethical issues in genetic medicine and explain various guidelines for genetic testing. 		
Evaluation target	Attendance (50%) Submission of report on lecture content (50%)		
Evaluation criteria	S (90 points to 100 points), A (80 points to less than 90 points), B (70 points to less than 80 points), C (60 points to less than 70 points), D (less than 60 points), S, A, B, C are accepted, and D is rejected.		
Course of study Reference books, etc.	<ul style="list-style-type: none"> Genetic Counseling Handbook (Medical Doe) I understand this! How to proceed well with genetic testing, diagnosis, and genetic counseling that can be used in pediatric practice (Diagnosis and Treatment Company) 		
Preparatory learning and how to learn outside of class	Read the above reference books and related literature.		
Venue	Genome Department Medical Office		
Remarks	Those who cannot participate in the above time will decide the timetable after consultation. Questions etc. are accepted at any time. Give feedback in the final round.		
Plan	Number of lesson	Supervisor	Class content
	1	Prof. Yamamoto	Definition of genetic counseling
	2	Prof. Yamamoto	Purpose of genetic counseling
	3	Prof. Yamamoto	General principles of genetic counseling (non-directive attitude)
	4	Prof. Yamamoto	Genetic counseling theory
	5	Prof. Yamamoto	Communication theory and ice breaker
	6	Prof. Yamamoto	Empathic understanding and listening
	7	Prof. Yamamoto	Understanding the loss experience
	8	Prof. Yamamoto	Life stage and mental health
	9	Prof. Yamamoto	Psychological assistance
	10	Prof. Yamamoto	Comedic in genetic medicine
	11	Prof. Yamamoto	Providing genetic information
	12	Prof. Yamamoto	Family history interview
	13	Prof. Yamamoto	Family tree creation
	14	Prof. Yamamoto	Estimating genetic prognosis / recurrence risk (autosomal dominant inheritance)
	15	Prof. Yamamoto	Estimating genetic prognosis / recurrence risk (autosomal recessive inheritance)
	16	Prof. Yamamoto	Bayes' theorem
	17	Prof. Yamamoto, Prof. Iwasaki	Estimating genetic prognosis / recurrence risk (mitochondrial inheritance)
	18	Prof. Yamamoto	Estimating genetic prognosis / recurrence risk (chromosomal abnormality)
	19	Prof. Yamamoto, Prof. Iwasaki	Estimating genetic prognosis / recurrence risk (multifactorial inheritance)
	20	Prof. Yamamoto	Carrier identification method
	21	Prof. Yamamoto	confidentiality
	22	Prof. Yamamoto	Disability and society
	23	Prof. Yamamoto	Disability and social security
	24	Prof. Yamamoto	Information retrieval
	25	Prof. Yamamoto	Cooperation with support group
	26	Prof. Yamamoto	Family interview
	27	Prof. Yamamoto	The practice of genetic counseling in carrier diagnosis
	28	Prof. Yamamoto, Associate Prof. Nakabayashi	The practice of genetic counseling in prenatal diagnosis
	29	Prof. Yamamoto	The practice of genetic counseling in presymptomatic diagnosis
30	Prof. Yamamoto	The practice of genetic counseling in familial tumors	

Gene Medicine Genetic Medicine and ELSI Syllabus

(* = for doctor license holders)

Syllabus	Genetic medicine and ELSI		
Syllabus	Genetic medicine and ELSI		
Supervisor	Prof. Yamamoto, Associate Prof. Nakabayashi		
Credits	4		
Class format	Lecture / Practice		
Theme	Lectures on the practice of genetic counseling in clinical practice and ethical norms and guidelines to keep in mind		
Day of the week, time limit, etc.	Tuesday 15:30-16:40		
Achievement goal	<ul style="list-style-type: none"> Understand ethical issues in genetic medicine and explain various guidelines for genetic testing. 		
Evaluation target	Attendance (50%) Submission of report on lecture content (50%)		
Evaluation criteria	S (90 points to 100 points), A (80 points to less than 90 points), B (70 points to less than 80 points), C (60 points to less than 70 points), D (less than 60 points), S, A, B, C are accepted, and D is rejected.		
Course of study Reference books, etc.	<ul style="list-style-type: none"> Genetic Counseling Handbook (Medical Doe) I understand this! How to proceed well with genetic testing, diagnosis, and genetic counseling that can be used in pediatric practice (Diagnosis and Treatment Company) 		
Preparatory learning and how to learn outside of class	Read the above reference books and related literature.		
Venue	Genome Department Medical Office		
Remarks	Those who cannot participate in the above time will decide the timetable after consultation. Questions etc. are accepted at any time. Give feedback in the final round.		
Plan	Number of lesson	Supervisor	Class content
	1	Prof. Yamamoto	Clinical genetic examination
	2	Prof. Yamamoto	Clinical genetic diagnosis
	3	Prof. Yamamoto	Characteristics of genetic testing
	4	Prof. Yamamoto	Natural history of the disease
	5	Prof. Yamamoto	Declaration of Helsinki and ethical guidelines
	6	Prof. Yamamoto	Bioethics and researcher ethics
	7	Prof. Yamamoto	WHO guidelines
	8	Prof. Yamamoto	Guidelines for Genome Analysis
	9	Prof. Yamamoto	Genetic Medicine and Institutional Review Board
	10	Prof. Yamamoto	Clinical research method
	11	Prof. Yamamoto	Personal Information Protection Law
	12	Prof. Yamamoto	Obtaining consent for genetic testing
	13	Prof. Yamamoto	Obtaining consent for genetic testing (pediatric / higher brain dysfunction)
	14	Prof. Yamamoto	Genetic testing in children
	15	Prof. Yamamoto	Sharing genetic information and protecting personal information
	16	Prof. Yamamoto	Gene patent issue
	17	Prof. Yamamoto	Genetic information and discrimination
	18	Prof. Yamamoto	Personalized medicine in the age of genomic medicine
	19	Prof. Yamamoto	Secondary findings and their handling
	20	Prof. Yamamoto	Actual secondary findings # 1
	21	Prof. Yamamoto	Actual secondary findings # 2
	22	Prof. Yamamoto, Associate Prof. Nakabayashi	ELSI for prenatal diagnosis
	23	Prof. Yamamoto, Associate Prof. Nakabayashi	New prenatal diagnosis and ELSI
	24	Prof. Yamamoto, Associate Prof. Nakabayashi	ELSI for preimplantation genetic diagnosis
	25	Prof. Yamamoto	ELSI for carrier diagnosis
	26	Prof. Yamamoto	ELSI for presymptomatic diagnosis
	27	Prof. Yamamoto	Mass screening and ELSI
	28	Prof. Yamamoto	Genome editing and ELSI
	29	Prof. Yamamoto	Advances in genetic analysis technology and ELSI
30	Prof. Yamamoto	The future of genomic medicine	

Intensive Discussion, Department of Advanced Biomedical Syllabus

(* = for doctor license holders)

Syllabus	Intensive Discussion of Advanced Biomedical Engineering and Science		
Syllabus	Intensive Discussion of Advanced Biomedical Engineering and Science		
Supervisor	Prof. Yamamoto		
Credits	1		
Class format	Lecture / Practice		
Theme	Presentation and intensive discussion on advanced medical research and development		
Day of the week, time limit, etc.	Twice in a year Saturday 9:00-12:00, 13:00-18:00		
Achievement goal	<ul style="list-style-type: none"> To be able to present your own research and have a wide range of interests and discussions in the research of others regarding advanced medical care. 		
Evaluation target	Attendance (25%) Abstract submission (25%) Own research presentation / discussion content (40%) Discussion content regarding other people's research presentation (10%)		
Evaluation criteria	S (90 points to 100 points), A (80 points to less than 90 points), B (70 points to less than 80 points), C (60 points to less than 70 points), D (less than 60 points), S, A, B, C are accepted, and D is rejected.		
Course of study Reference books, etc.	None.		
Preparatory learning and how to learn outside of class	Create abstracts and presentation materials in consultation with your academic advisor as your research progresses.		
Venue	Advanced Biomedical Science Institute 2F Meeting Room		
Remarks	In principle, participation in the above time is the basis. Those who cannot do so will decide the timetable for individual discussions after consultation.		
Plan	Number of lesson	Supervisor	Class content
	1	Prof. Yamamoto	Presentation and debate at the Intensive Debate on Advanced Biomedical Sciences around June-July
	2	Prof. Yamamoto	Presentation and debate at the Intensive Debate on Advanced Biomedical Sciences from January to February

Experiment / Practice (Problem Research) Syllabus

(* = for doctor license holders)

Syllabus	Experiment / Practice (Problem Research)	
Supervisor	Prof. Yamamoto, Associate Prof. Nakabayashi	
Credits	10	
Class format	Experiment / Practice (Problem Research)	
Theme	Implementation of research papers and preparation of research papers	
Day of the week, time limit, etc.	Monday, Tuesday, Wednesday, Thursday, Friday 9: 00-12: 00, 13: 00-17: 00	
Achievement goal	<ol style="list-style-type: none"> 1. You can acquire the necessary experimental techniques and carry out research according to the planned research plan. 2. Experiment contents and data can be recorded and saved correctly. 3. Experimental results can be appropriately summarized in charts. 4. The research content can be appropriately presented at external academic societies and study groups, and discussions about the content can be conducted. 5. Make a dissertation of the research content and submit it. Appropriately respond to the comments of the reviewers and achieve the publication of the paper. 	
Evaluation target	Lab notebook / research report (60%) Chart preparation (10%) Research presentation / discussion (10%) Paper preparation (20%)	
Evaluation criteria	S (90 points to 100 points), A (80 points to less than 90 points), B (70 points to less than 80 points), C (60 points to less than 70 points), D (less than 60 points) , S, A, B, C are accepted, and D is rejected.	
Course of study Reference books, etc.	How to write lab notes (Yodosha) that you should know if you are a science student, review articles and original papers related to research projects	
Preparatory learning and how to learn outside of class	Actively participate in and make presentations at related academic societies, collect information, and hold discussions.	
Venue	Genome Department Medical Office	
Remarks	Those who cannot participate in the above time will decide the timetable after consultation. Questions etc. are accepted at any time. Give feedback from time to time.	
Plan	Number of lesson	Class content
	1	Achievement of goals 1 and 2
	~	
	90	
	91	Achievement of goals 3-4
	~	
	120	
	121	Achievement of goal 5
~		
150		

Genetic counseling training Syllabus

(* = for doctor license holders)

Syllabus	Genetic counseling training	
Supervisor	Prof. Yamamoto, Prof. Iwasaki, Associate Prof. Nakabayashi, Associate Prof. Matsuo	
Credits	10	
Class format	Practical training / clinical clerkship	
Theme	Clinical participatory training at a gene medical center including role-playing (clinical geneticist and certified genetic counselor training course)	
Day of the week, time limit, etc.	Monday, Tuesday, Wednesday, Thursday, Friday 9: 00-12: 00, 13: 00-17: 00	
Achievement goal	<ol style="list-style-type: none"> 1. Explain the theory of genetic counseling 2. Listening to family history and creating a family tree 3. Listen to the client's narrative complaints and sort out issues 4. Create scenarios and practice genetic counseling role-playing 5. Take a seat in genetic counseling as a clinical clerkship 	
Evaluation target	Practical attitude (50%) Q & A (50%)	
Evaluation criteria	S (90 points to 100 points), A (80 points to less than 90 points), B (70 points to less than 80 points), C (60 points to less than 70 points), D (less than 60 points)), S, A, B, C are accepted, and D is rejected.	
Course of study Reference books, etc.	<ul style="list-style-type: none"> • Genetic Counseling Handbook (Medical Doe) • I understand this! How to proceed well with genetic testing, diagnosis, and genetic counseling that can be used in pediatric practice (Diagnosis and Treatment Company) 	
Preparatory learning and how to learn outside of class	Read the above reference books and participate in seminars sponsored by related academic societies.	
Venue	Genome Department Medical Office / Outpatient Center	
Remarks	Those who cannot participate in the above time will decide the timetable after consultation. Questions etc. are accepted at any time. Give feedback from time to time.	
Plan	Number of lesson	Class content
	1	Achievement of goals 1 and 2
	~	
	90	
	91	Achievement of goals 3-4
	~	
	120	
	121	Achievement of goal 5
~		
150		

Organ Replacement

I Educational Policy

Replacement of organs such as organ transplants, artificial hearts, and dialysis have been applied in clinical settings for patients who are suffering from decreased or damaged functions of organs. Recently, regenerative medicine including the creation of tissue and organ using cells has become advanced, leading to the transplantation of cell-based regenerated organs in the future. The development of these substitutable organs is based on various biomedical engineering technologies. The division of organ replacement pursues the development of new types of substitutable organs utilizing cutting-edge bioengineering technologies. The division covers the design of biomaterials and methodologies of production for substitutable organs. Especially, we focus on research and development of next-generation regenerative medicine such as mass production of cells, scale-up by introduction vascular networks within the tissues, bioreactors for tissue/organ cultures, and devices and methodologies for facilitating the transplantation of the substitutable organs.

II Goals

- To understand medical treatments using substitute organs for living organs and to acquire a wide knowledge of biomedical engineering technologies related to these methods and the ability to apply them.
- To learn the fabrication methods of tissues and organs from cells (tissue engineering and organ engineering) and to acquire knowledge about them.
- To design own research theme, to develop experimental plans, and to operate research according to the plan.
- To Prepare appropriate charts regarding experimental results and to present them at domestic and international conferences.
- Publication of research results.
- To Have a wide range of interests and discussions not only in themselves but also in the research of others related to advanced medical care, and to acquire the ability to provide guidance to younger researchers.

III Supervisor* Research theme

(* = for doctor's license holders)

Name and position	Research theme
Tatsuya SHIMIZU (Professor) Yuji HARAGUCHI (Associate Professor (Fixed Term)) Sachiko SEKIYA (Assistant Professor) Tetsutaro KIKUCHI (Assistant Professor)	(1)Fabrication of 3D tissues/organs based on cell sheet technology Tissue engineering technology including cell sheet technique allow us to fabricate high density tissue/organ, like as pulsatile myocardial tissue. Co-culture technique with vascular-associated cells, and bioreactor culture system also give the vascularized biological tissue in vitro. Here, we are researching with innovative tissue engineering technology to fabrication of functional heart and liver, kidney, uterus tissue/organ for regenerative medicine.
Tatsuya SHIMIZU (Professor) Yuji HARAGUCHI (Associate Professor (Fixed Term)) Tetsutaro KIKUCHI (Assistant Professor) Daisuke SASAKI (Assistant Professor (Fixed Term))	(2)In vitro human tissue/organ models To construct tissue and organ models using tissue engineering methods based on cell sheet engineering. Human tissue and organ models using cells differentiated from human iPS cells can be a substitute for animal experiments, and useful in pharmacological studies gaining new knowledge.
Tatsuya SHIMIZU (Professor) Hironobu TAKAHASHI (Assistant Professor)	(3)Technical development to engineer skeletal muscle tissue To produce biomimetic muscle tissue, innovative techniques are required. We are studing to develop new tissue engineering techniques to produce functionally mature muscle tissue.
Tatsuya SHIMIZU (Professor) Sachiko SEKIYA (Assistant Professor)	(4)Regenerative medicine for kidney disease Kidney constructed with renal epithelial cells and specific vascular cells have a homeostatic maintaining function in the body. Chronic disease of kidney declines their regenerative potential is difficult to recover itself now. Therefore, we are continuing to research the development novel therapy for kidney disease with the innovative tissue engineering technology.
Tatsuya SHIMIZU (Professor) Tetsutaro KIKUCHI (Assistant Professor)	(5)Development of tissue/organ factory To develop technology necessary to produce tissues and organs more stably and safely for the industrialization of regenerative medicine. In addition to developing large-scale culture device and precise differentiation methods, the research aims at factory production of tissues and organs by integrating and systematizing these technologies.

<p>Tatsuya SHIMIZU (Professor) Yoshikatsu AKIYAMA (Assistant Professor) Masamichi NAKAYAMA (Assistant Professor) Jun KOBAYASHI (Assistant Professor) Hironobu TAKAHASHI (Assistant Professor)</p>	<p>(6) Development of biointerfaces for the creation of organ replacement Cell-sheets based regenerative medicine has made it possible to treat corneal epithelium, cardiac muscle, esophagus, middle ear, cartilage, and so on. In this research theme, we aim to develop next-generation intelligent surfaces for fabricating cell-sheets, using cells in tissues and organs with more complex and highly advanced physiological functions. Specifically, we are working on: 1) development of temperature-responsive culture dishes with bioactive substances such as cell adhesion factors, growth factors, and antibodies immobilized, and acceleration and enhancement of cell sheet fabrication using these dishes; 2) development of stretchable temperature-responsive culture surfaces and hydrogel, and their application for fabrication of cell-sheets; and 3) development of micro-patterned temperature-responsive culture dishes and fabrication of heterogeneous co-cultures or biomimetic cell sheets with cell orientation, 4) fabrication of cancer cell sheets and development of in vitro and in vivo cancer tissue models using these cell sheets.</p>
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IV Syllabus

(* = for doctor's license holders)

Title	Instructor	Credit	Theme
Organ engineering & biomaterials	Tatsuya SHIMIZU (Professor) Yoshikatsu AKIYAMA (Assistant Professor) Masamichi NAKAYAMA (Assistant Professor) Jun KOBAYASHI (Assistant Professor) Hironobu TAKAHASHI (Assistant Professor) Sachiko SEKIYA (Assistant Professor) Tetsutaro KIKUCHI (Assistant Professor)	2	Lecture of biomaterial research for tissue/organ engineering
Biomedical engineering	Tatsuya SHIMIZU (Professor) Yoshikatsu AKIYAMA (Assistant Professor) Masamichi NAKAYAMA (Assistant Professor) Jun KOBAYASHI (Assistant Professor) Hironobu TAKAHASHI (Assistant Professor) Sachiko SEKIYA (Assistant Professor) Tetsutaro KIKUCHI (Assistant Professor)	2	Lecture of biomedical engineering for regenerative medicine
Intensive Discussion of Advanced Biomedical Engineering and Science	Tatsuya SHIMIZU (Professor) Yoshikatsu AKIYAMA (Assistant Professor) Masamichi NAKAYAMA (Assistant Professor) Jun KOBAYASHI (Assistant Professor) Hironobu TAKAHASHI (Assistant Professor) Sachiko SEKIYA (Assistant Professor) Tetsutaro KIKUCHI (Assistant Professor)	1	Presentation and discussion about biomedical engineering and science
Research for Doctoral Degree	Tatsuya SHIMIZU (Professor) Yoshikatsu AKIYAMA (Assistant Professor) Masamichi NAKAYAMA (Assistant Professor) Jun KOBAYASHI (Assistant Professor) Hironobu TAKAHASHI (Assistant Professor) Sachiko SEKIYA (Assistant Professor) Tetsutaro KIKUCHI (Assistant Professor)	10	Publishing original research for doctoral degree
Total credits		15	

(Organ Replacement) Syllabus (1)

Syllabus Title	Organ engineering & biomaterials		
Instructor	Tatsuya SHIMIZU (Professor), Yoshikatsu AKIYAMA (Assistant Professor), Masamichi NAKAYAMA (Assistant Professor), Jun KOBAYASHI (Assistant Professor), Hironobu TAKAHASHI (Assistant Professor), Sachiko SEKIYA (Assistant Professor), Tetsutaro KIKUCHI (Assistant Professor)		
Credit	2		
Type of Class	Lecture		
Theme	Lecture on biomaterials and tissue/organ fabrication methods used in advanced medicine		
Schedule	Tuesday 18:00~19:30		
Course Objective	<ul style="list-style-type: none"> •To understand treatment methods using substitute organs for living organs, and to acquire a broad knowledge of biomaterials related to these methods. •To understand and acquire knowledge of technologies for producing tissues and organs from cells (tissue engineering and organ engineering) 		
Evaluation Methods	Attendance (50%) Reports (50%)		
Grading Scale	S (90 points or more to 100 points), A (80 points or more to less than 90 points), B (70 points or more to less than 80 points), C (60 points or more to less than 70 points), and D (less than 60 points). S, A, B, and C are acceptable, and D is not acceptable.		
Textbooks/References			
Independent Study Outside of Class	Read the above reference books and related literature. Communicate actively with each supervisor and observe the techniques of their research that you are interested in.		
Room	TWIns 2F conference room or seminar room		
Special Note	For those who are unable to attend during the above time, the time schedule will be determined through consultation.		
Course Plan	Number	Instructor	Contents
	1	Tatsuya SHIMIZU	Overview of tissue engineering
	2	Sachiko SEKIYA	Regenerative medicine for kidney
	3	Jun KOBAYASHI	Quantitative analyses in Biomaterials
	4	Hironobu TAKAHASHI	Tissue engineering approach for producing functional muscle tissue
	5	Masamichi NAKAYAMA	Biomaterials and artificial organs
	6	Tetsutaro KIKUCHI	Biomaterials for cell culture
	7	Yoshikatsu AKIYAMA	Mechanobiology
	8	Sachiko SEKIYA	Organoid technology for tissue engineering
	9	Tatsuya SHIMIZU	Overview of cell-sheet engineering
	10	Jun KOBAYASHI	Biocompatibility in Biomaterials and Tissue Engineering
	11	Masamichi NAKAYAMA	Drug Delivery System
	12	Yoshikatsu AKIYAMA	Design for functional biointerfaces
	13	Tetsutaro KIKUCHI	Three-dimensional cell culture
	14	Tatsuya SHIMIZU	Method for fabrication of three-dimensional myocardial tissue and its application
15	Hironobu TAKAHASHI	Biomaterial research for tissue engineering and regenerative medicine	

(Organ Replacement) Syllabus (1)

Syllabus Title	Biomedical engineering		
Instructor	Tatsuya SHIMIZU (Professor), Yoshikatsu AKIYAMA (Assistant Professor), Masamichi NAKAYAMA (Assistant Professor), Jun KOBAYASHI (Assistant Professor), Hironobu TAKAHASHI (Assistant Professor), Sachiko SEKIYA (Assistant Professor), Tetsutaro KIKUCHI (Assistant Professor)		
Credit	2		
Type of Class	Lecture		
Theme	Seminar and group discussion on biomedical engineering		
Schedule	Wednesday 10:00–11:00 (seminar) 12:30–15:00 (group discussion)		
Course Objective	<ul style="list-style-type: none"> •To acquire a broad knowledge of biomedical engineering. •To understand the current status and issues of the technology to produce tissues and organs from cells 		
Evaluation Methods	Attendance (50%), report (25%), discussion (25%)		
Grading Scale	S (90 points or more to 100 points), A (80 points or more to less than 90 points), B (70 points or more to less than 80 points), C (60 points or more to less than 70 points), and D (less than 60 points). S, A, B, and C are acceptable, and D is not acceptable.		
Textbooks/References			
Independent Study Outside of Class	Read the above reference books and related literature. Take an interest in the work of other researchers and acquire a broad knowledge in this field.		
Room	TWIns 2F conference room, seminar room, innovation office		
Special Note	For those who cannot participate in the above time, the time schedule will be decided after consultation.		
Course Plan	Number	Instructor	Contents
	1	Tatsuya SHIMIZU (Professor) and other faculty members	TWIns Seminar1
	2	Tatsuya SHIMIZU (Professor) and other faculty members	TWIns Seminar2
	3	Tatsuya SHIMIZU (Professor) and other faculty members	TWIns Seminar3
	4	Tatsuya SHIMIZU (Professor) and other faculty members	TWIns Seminar4
	5	Tatsuya SHIMIZU (Professor) and other faculty members	TWIns Seminar5
	6	Tatsuya SHIMIZU (Professor) and other faculty members	TWIns Seminar6
	7	Tatsuya SHIMIZU (Professor) and other faculty members	TWIns Seminar7
	8	Tatsuya SHIMIZU (Professor) and other faculty members	TWIns Seminar8
	9	Tatsuya SHIMIZU (Professor) and other faculty members	TWIns Seminar9
	10	Tatsuya SHIMIZU (Professor) and other faculty members	TWIns Seminar10
	11	Tatsuya SHIMIZU (Professor) and other faculty members	TWIns Seminar11
	12	Tatsuya SHIMIZU (Professor) and other faculty members	TWIns Seminar12
	13	Tatsuya SHIMIZU (Professor) and other faculty members	TWIns Seminar13
	14	Tatsuya SHIMIZU (Professor) and other faculty members	TWIns Seminar14
	15	Tatsuya SHIMIZU (Professor) and other faculty members	Group discussion1
	16	Tatsuya SHIMIZU (Professor) and other faculty members	Group discussion2
	17	Tatsuya SHIMIZU (Professor) and other faculty members	Group discussion3
	18	Tatsuya SHIMIZU (Professor) and other faculty members	Group discussion4
	19	Tatsuya SHIMIZU (Professor) and other faculty members	Group discussion5
	20	Tatsuya SHIMIZU (Professor) and other faculty members	Group discussion6
	21	Tatsuya SHIMIZU (Professor) and other faculty members	Group discussion7
22	Tatsuya SHIMIZU (Professor) and other faculty members	Group discussion8	

(Organ Replacement) Syllabus (1)

Syllabus Title	Intensive Discussion of Advanced Biomedical Engineering and Science		
Instructor	Tatsuya SHIMIZU (Professor), Yoshikatsu AKIYAMA (Assistant Professor), Masamichi NAKAYAMA (Assistant Professor), Jun KOBAYASHI (Assistant Professor), Hironobu TAKAHASHI (Assistant Professor), Sachiko SEKIYA (Assistant Professor), Tetsutaro KIKUCHI (Assistant Professor)		
Credit	1		
Type of Class	Lecture		
Theme	Presentations and discussions on advanced medical research and development		
Schedule	2 times/year, Saturday 9:00–12:00, 13:00–18:00		
Course Objective	Present and discuss their own research as well as take a broad interest in the research of others on advanced medicine.		
Evaluation Methods	Attendance (25%), Abstract submission (25%), Research presentation and discussion (40%), Discussion of others' research presentation (10%)		
Grading Scale	S (90 points or more to 100 points), A (80 points or more to less than 90 points), B (70 points or more to less than 80 points), C (60 points or more to less than 70 points), and D (less than 60 points). S, A, B, and C are acceptable, and D is not acceptable.		
Textbooks/References			
Independent Study Outside of Class	Prepare abstracts and presentation materials in consultation with the supervisor according to the progress of the research.		
Room	TWIns 2F conference room		
Special Note	In principle, Attendance in the above times is required. For those who are unable to do so, the time schedule for individual discussion will be decided after consultation.		
Course Plan	Number	Instructor	Contents
	1	Tatsuya SHIMIZU (Professor) and other faculty members	Presentation and discussion (June or July)
	2	Tatsuya SHIMIZU (Professor) and other faculty members	Presentation and discussion (February or March)

(Organ Replacement) Syllabus (4)

Syllabus Title	Research for Doctoral Degree		
Instructor	Tatsuya SHIMIZU (Professor), Yoshikatsu AKIYAMA (Assistant Professor), Masamichi NAKAYAMA (Assistant Professor), Jun KOBAYASHI (Assistant Professor), Hironobu TAKAHASHI (Assistant Professor), Sachiko SEKIYA (Assistant Professor), Tetsutaro KIKUCHI (Assistant Professor)		
Credit	10		
Type of Class	research project		
Theme	experimental research and writing original papers		
Schedule	Monday, Tuesday, Thursday, Friday 9:00–12:00, 13:00–17:00, Wednesday 15:00–17:00		
Course Objective	<ol style="list-style-type: none"> 1. To learn the experimental techniques and conduct research according to the research plan. 2. To record and store experimental contents and data correctly. 3. To summarize the results of experiments in appropriate figures and tables. 4. To present the contents of research in an appropriate manner at domestic and international conferences and meetings. 5. To write and submit research papers. Respond appropriately to reviewers' comments and achieve publication. 6. To teach knowledge and skills related to one's own research to other researchers. 		
Evaluation Methods	Experimental notes/research report (60%) Preparation of figures and tables (10%) Research presentation/discussion (10%) Writing of paper (20%)		
Grading Scale	S (90 points or more to 100 points), A (80 points or more to less than 90 points), B (70 points or more to less than 80 points), C (60 points or more to less than 70 points), and D (less than 60 points). S, A, B, and C are acceptable, and D is not acceptable.		
Textbooks/References			
Independent Study Outside of Class	To understand previous research through literature and other sources, and to deepen knowledge of the research topic. Students are expected to actively participate in related academic conferences to make presentations and engage in discussions.		
Room	TWIns, etc.		
Special Note	The period and duration of the research will be determined through consultation.		
Course Plan	Number	Instructor	Contents
	1	Tatsuya SHIMIZU (Professor) and other faculty members	Achievement of Objectives 1–2
	~	Tatsuya SHIMIZU (Professor) and other faculty members	
	90	Tatsuya SHIMIZU (Professor) and other faculty members	
	91	Tatsuya SHIMIZU (Professor) and other faculty members	Achievement of Objectives 3–4
	~	Tatsuya SHIMIZU (Professor) and other faculty members	
	120	Tatsuya SHIMIZU (Professor) and other faculty members	
	121	Tatsuya SHIMIZU (Professor) and other faculty members	Achievement of Objectives 5–6
	~	Tatsuya SHIMIZU (Professor) and other faculty members	
150	Tatsuya SHIMIZU (Professor) and other faculty members		

Tissue Regeneration

I Educational Policy

Although transplantation medicine is a treatment for severe diseases, the shortage of donors is a major issue, and even if transplantation is possible, the problems of side effects from immunosuppressive drugs still remain. As a solution to these problems, regenerative medicine, especially tissue engineering, is attracting attention as the medicine of the future. Tissue engineering has been proposed by Langer, an engineer, and Vacanti, a surgeon, in 1993. They demonstrated that 3D tissue structures can be regenerated by utilizing a biodegradable synthetic polymer as a scaffold, implanting cells into it, and culturing them in the existence of growth factors. In the future, the development of stem cell biology in addition to tissue engineering will synchronize to establish the field of regenerative medicine. Regenerative medicine is an interdisciplinary field that can never be realized by medicine or engineering solely. The field of regenerative medicine and engineering is a fusion of medicine, science and engineering, and biology to create new concepts and methods for the future of medicine.

II Goals

- # To understand the laws, regulations, global trends in regenerative medicine.
- # To understand the medical applications of stem cells and their ethical issues.
- # To understand the methods of cell harvesting, storage, and transplantation, as well as immune rejection and complications of cell transplantation.
- # To understand the imaging, immunohistological and molecular biological methods to evaluate the effects of tissue transplantation in animal models of disease.
- # To use molecular biological and immunohistological methods to investigate the mechanisms of functional repair of donor tissues and organs resulting from tissue and cell transplantation.
- # To understand how to appropriately differentiate target cells for regenerative medicine and tissue models from stem cells.
- # To transplant regenerated tissues constructed ex vivo into animal disease models and to evaluate the effectiveness of the transplants in improving pathological conditions.

III Supervisor* Research theme

(* = for doctor's license holders)

Name and position	Research theme
Masayuki YAMATO (Professor) Katsuhisa MATSUURA (Associate Professor) Shinako AOKI (Assistant Professor)	(1) Technical development of isolation/differentiation/amplification of stem cells It is necessary to establish the respective cell sources to reconstruct tissues. In addition to pluripotent stem cells (ES and iPS cells), SP (side population) cells, and bone marrow stem cells, tissue-specific stem cells or progenitor cells have been shown to exist as cell sources. We will develop technologies to control the isolation, differentiation induction, and amplification of these stem cells, and pursue their application to regenerative medicine.
Masayuki YAMATO (Professor) Katsuhisa MATSUURA (Associate Professor) Hidekazu SEKINE (Assistant Professor) Ryo TAKAGI (Assistant Professor) Jun HOMMA (Assistant Professor)	(2) Regenerative therapy with cell sheet engineering In regenerative medicine, it is necessary to develop tissue engineering technology to reconstruct tissues and organs from cells. We will attempt to regenerate various tissues and organs by using our original tissue engineering method, "cell sheet engineering". Cell sheet can be transplanted as monolayer or as tissue by layering. We will conduct research on regeneration of tissues and organs that are closer to living bodies by integrating various technologies. At present, clinical research is already underway in 7 tissues and organs (corneal epithelium, cardiac muscle, esophagus, periodontal, cartilage, middle ear and lung) using tissues prepared using cell sheets. Cell sheet transplantation using the patient's own cells has been shown to restore vision in cornea, improve cardiac function in heart, and prevent stricture caused by esophageal cancer resection in esophagus. In addition, regenerative medicine research is being conducted in tissues and organs such as the liver and pancreas with the aim of clinical use.
Masayuki YAMATO (Professor)	(3) Development of new regenerative treatment using mesenchymal stem cell sheet Mesenchymal stem cells (MSC) are a kind of somatic tissue stem cells, and can be isolated from adult tissues, and the cell population can differentiate to multilineage and distributed all over the body. Its clinical applications have been challenged all over the world, and the research is actively promoted to develop novel treatments of intractable diseases with conventional treatments. In this theme, transplantable MSC sheets are fabricated by utilizing cell sheet technology, and the properties of isolated MSC as a cell source, the quality of the final products as well as the therapeutic effects and the safety are evaluated according to the new law of safety of regenerative medicine the treatment.

<p>Masayuki YAMATO (Professor) Ryo TAKAGI (Assistant Professor)</p>	<p>(4)Application of culture epithelial cells to regenerative medicine We have been conducting clinical research on regenerative medicine using cultured epithelial cell sheets in the fields of ophthalmology, gastroenterology, and otolaryngology. Previous reports of regenerative medicine using cultured epithelial grafts and the results of our studies suggest that cultured epithelial cell sheets prepared from somatic epithelial stem/progenitor cells may be an effective product for the medicine. However, the most effective methods for culturing various types of epithelial cells have been established using animal-derived additive factors, such as bovine pituitary extracts, and xenogeneic mouse feeder layers. Elucidation of the mechanisms by which these factors contribute the maintenance of mitotic activity and induction of differentiation of epithelial cells in vitro is not only of academic importance, but also an urgent issue in establishing a culture method that eliminates xenogenic factors, which is one of the issues in the development of safer regenerative medical products. We addressing these issues by using cellular and molecular biological analysis methods.</p>
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IV Syllabus

(* = for doctor's license holders)

Title	Instructor	Credit	Theme
Tissue Regeneration (Introduction)	Masayuki YAMATO (Professor) Katsuhisa MATSUURA (Associate Professor) Hidekazu SEKINE (Assistant Professor) Shinako AOKI (Assistant Professor) Ryo TAKAGI (Assistant Professor) Jun HOMMA (Assistant Professor)	2	Lecture on research and practical application of regenerative medicine
Tissue Regeneration (detailed exposition)	Masayuki YAMATO (Professor) Katsuhisa MATSUURA (Associate Professor) Hidekazu SEKINE (Assistant Professor) Shinako AOKI (Assistant Professor) Ryo TAKAGI (Assistant Professor) Jun HOMMA (Assistant Professor)	2	Lecture on regenerative medicine and engineering for tissue regeneration
Intensive discussion in Biomedical Engineering and Science Major	Masayuki YAMATO (Professor) Katsuhisa MATSUURA (Associate Professor) Hidekazu SEKINE (Assistant Professor) Shinako AOKI (Assistant Professor) Ryo TAKAGI (Assistant Professor) Jun HOMMA (Assistant Professor)	1	Presentation and discussion about biomedical engineering and science
Research for Doctoral Degree	Masayuki YAMATO (Professor) Katsuhisa MATSUURA (Associate Professor) Hidekazu SEKINE (Assistant Professor) Shinako AOKI (Assistant Professor) Ryo TAKAGI (Assistant Professor) Jun HOMMA (Assistant Professor)	10	Publishing original research for doctoral degree
Total credits		15	

(Tissue Regeneration) Syllabus (1)

Syllabus Title	Tissue Regeneration (Introduction)		
Instructor	Masayuki YAMATO (Professor), Katsuhisa MATSUURA (Associate Professor), Hidekazu SEKINE (Assistant Professor), Shinako AOKI (Assistant Professor), Ryo TAKAGI (Assistant Professor), Jun HOMMA (Assistant Professor)		
Credit	2		
Type of Class	Lecture		
Theme	Lecture on research and practical application of regenerative medicine		
Schedule	Tuesday 18:00~19:30		
Course Objective	<p>To acquire knowledge of the current status of regenerative medicine development in various fields.</p> <p>To understand the mechanism of regenerative medicine, as well as the characteristics of the cells to be transplanted and the pathology of the target disease.</p> <p>To acquire the knowledge necessary to complete pre-clinical and non-clinical research.</p>		
Evaluation Methods	Attendance (50%) Reports (50%)		
Grading Scale	S (90 points or more to 100 points), A (80 points or more to less than 90 points), B (70 points or more to less than 80 points), C (60 points or more to less than 70 points), and D (less than 60 points). S, A, B, and C are acceptable, and D is not acceptable.		
Textbooks/References			
Independent Study Outside of Class	<p>Read the above reference books and related literature.</p> <p>Communicate actively with each supervisor and observe the techniques of their research that you are interested in.</p>		
Room	TWIns 2F conference room or seminar room		
Special Note	For those who are unable to attend during the above time, the time schedule will be determined through consultation.		
Course Plan	Number	Instructor	Contents
	1	Masayuki YAMATO	Orientation
	2	Masayuki YAMATO	History of regenerative medicine
	3	Masayuki YAMATO	History of tissue engineering
	4	Katsuhisa MATSUURA	Stem cells and regenerative medicine
	5	Katsuhisa MATSUURA	Cardiac regenerative medicine
	6	Katsuhisa MATSUURA	Regenerative medicine and disease model
	7	Hidekazu SEKINE	Imaging technologies for regenerative medicine research
	8	Hidekazu SEKINE	Regenerative medicine in cardiovascular field
	9	Shinako Aoki	Angiogenesis
	10	Ryo Takagi	Regenerative medicine for epithelial tissue
	11	Ryo Takagi	Fabrication of cellular products for regenerative medicine
	12	Jun Homma	Regenerative Medicine in Pediatrics
	13	Jun Homma	Mesenchymal stem cells in regenerative medicine
	14	Masayuki YAMATO	Future views on regenerative medicine
15	Masayuki YAMATO	Summary	

(Tissue Regeneration) Syllabus (2)

Syllabus Title	Tissue Regeneration (detailed exposition)		
Instructor	Masayuki YAMATO (Professor), Katsuhisa MATSUURA (Associate Professor), Hidekazu SEKINE (Assistant Professor), Shinako AOKI (Assistant Professor), Ryo TAKAGI (Assistant Professor), Jun HOMMA (Assistant Professor)		
Credit	2		
Type of Class	Lecture		
Theme	Seminar and group discussion on regenerative medicine and engineering□		
Schedule	Wednesday 10:00-11:00 (seminar) Thursday 14:00-17:00 (group discussion)		
Course Objective	<ul style="list-style-type: none"> • To acquire a broad knowledge of regenerative medicine and engineering. • To understand the current status and issues in the technology of regenerative medicine, and to acquire deeper expertise by providing feedback to one's own research. 		
Evaluation Methods	Attendance (50%), report (25%), discussion (25%)		
Grading Scale	S (90 points or more to 100 points), A (80 points or more to less than 90 points), B (70 points or more to less than 80 points), C (60 points or more to less than 70 points), and D (less than 60 points). S, A, B, and C are acceptable, and D is not acceptable.		
Textbooks/References			
Independent Study Outside of Class	Read the above reference books and related literature. Take an interest in the work of other researchers and acquire a broad knowledge in this field.		
Room	TWIns 2F conference room, seminar room, innovation office		
Special Note	For those who cannot participate in the above time, the time schedule will be decided after consultation.		
Course Plan	Number	Instructor	Contents
	1	Masayuki YAMATO (Professor) and other faculty members	TWIns Seminar1
	2	Masayuki YAMATO (Professor) and other faculty members	TWIns Seminar2
	3	Masayuki YAMATO (Professor) and other faculty members	TWIns Seminar3
	4	Masayuki YAMATO (Professor) and other faculty members	TWIns Seminar4
	5	Masayuki YAMATO (Professor) and other faculty members	TWIns Seminar5
	6	Masayuki YAMATO (Professor) and other faculty members	TWIns Seminar6
	7	Masayuki YAMATO (Professor) and other faculty members	TWIns Seminar7
	8	Masayuki YAMATO (Professor) and other faculty members	TWIns Seminar8
	9	Masayuki YAMATO (Professor) and other faculty members	TWIns Seminar9
	10	Masayuki YAMATO (Professor) and other faculty members	TWIns Seminar10
	11	Masayuki YAMATO (Professor) and other faculty members	TWIns Seminar11
	12	Masayuki YAMATO (Professor) and other faculty members	TWIns Seminar12
	13	Masayuki YAMATO (Professor) and other faculty members	TWIns Seminar13
	14	Masayuki YAMATO (Professor) and other faculty members	TWIns Seminar14
	15	Masayuki YAMATO (Professor) and other faculty members	Group discussion1
	16	Masayuki YAMATO (Professor) and other faculty members	Group discussion2
	17	Masayuki YAMATO (Professor) and other faculty members	Group discussion3
	18	Masayuki YAMATO (Professor) and other faculty members	Group discussion4
	19	Masayuki YAMATO (Professor) and other faculty members	Group discussion5
	20	Masayuki YAMATO (Professor) and other faculty members	Group discussion6
	21	Masayuki YAMATO (Professor) and other faculty members	Group discussion7
22	Masayuki YAMATO (Professor) and other faculty members	Group discussion8	

(Tissue Regeneration) Syllabus (3)

Syllabus Title	Intensive discussion in Biomedical Engineering and Science Major		
Instructor	Masayuki YAMATO (Professor), Katsuhisa MATSUURA (Associate Professor), Hidekazu SEKINE (Assistant Professor), Shinako AOKI (Assistant Professor), Ryo TAKAGI (Assistant Professor), Jun HOMMA (Assistant Professor)		
Credit	1		
Type of Class	Lecture		
Theme	Presentations and discussions on advanced medical research and development		
Schedule	2 times/year, Saturday 9:00-12:00, 13:00-18:00		
Course Objective	Present and discuss their own research as well as take a broad interest in the research of others on advanced medicine.		
Evaluation Methods	Attendance (25%), Abstract submission (25%), Research presentation and discussion (40%), Discussion of others' research presentation (10%)		
Grading Scale	S (90 points or more to 100 points), A (80 points or more to less than 90 points), B (70 points or more to less than 80 points), C (60 points or more to less than 70 points), and D (less than 60 points). S, A, B, and C are acceptable, and D is not acceptable.		
Textbooks/References			
Independent Study Outside of Class	Prepare abstracts and presentation materials in consultation with the supervisor according to the progress of the research.		
Room	TWIns 2F conference room		
Special Note	In principle, Attendance in the above times is required. For those who are unable to do so, the time schedule for individual discussion will be decided after consultation.		
Course Plan	Number	Instructor	Contents
	1	Masayuki YAMATO (Professor) and other faculty members	Presentation and discussion (June or July)
	2	Masayuki YAMATO (Professor) and other faculty members	Presentation and discussion (February or March)

(Tissue Regeneration) Syllabus (4)

Syllabus Title	Research for Doctoral Degree		
Instructor	Masayuki YAMATO (Professor), Katsuhisa MATSUURA (Associate Professor), Hidekazu SEKINE (Assistant Professor), Shinako AOKI (Assistant Professor), Ryo TAKAGI (Assistant Professor), Jun HOMMA (Assistant Professor)		
Credit	10		
Type of Class	research project		
Theme	experimental research and writing original papers		
Schedule	Monday, Tuesday, Friday 9:00–12:00, 13:00–17:00, Wednesday 13:00–17:00, Thursday 9:00–12:00		
Course Objective	<ol style="list-style-type: none"> 1. To learn the experimental techniques and conduct research according to the research plan. 2. To record and store experimental contents and data correctly. 3. To summarize the results of experiments in appropriate figures and tables. 4. To present the contents of research in an appropriate manner at domestic and international conferences and meetings. 5. To write and submit research papers. Respond appropriately to reviewers' comments and achieve publication. 		
Evaluation Methods	Experimental notes/research report (60%) Preparation of figures and tables (10%) Research presentation/discussion (10%) Writing of paper (20%)		
Grading Scale	S (90 points or more to 100 points), A (80 points or more to less than 90 points), B (70 points or more to less than 80 points), C (60 points or more to less than 70 points), and D (less than 60 points). S, A, B, and C are acceptable, and D is not acceptable.		
Textbooks/References			
Independent Study Outside of Class	Students are expected to actively participate in related academic conferences to make presentations and engage in discussions.		
Room	TWIns, etc.		
Special Note	For those who cannot participate in the above time, the time schedule will be decided after consultation.		
Course Plan	Number	Instructor	Contents
	1	Masayuki YAMATO (Professor) and other faculty members	Achievement of Objectives 1–2
	~	Masayuki YAMATO (Professor) and other faculty members	
	90	Masayuki YAMATO (Professor) and other faculty members	
	91	Masayuki YAMATO (Professor) and other faculty members	Achievement of Objectives 3–4
	~	Masayuki YAMATO (Professor) and other faculty members	
	120	Masayuki YAMATO (Professor) and other faculty members	
	121	Masayuki YAMATO (Professor) and other faculty members	Achievement of Objectives 5
	~	Masayuki YAMATO (Professor) and other faculty members	
150	Masayuki YAMATO (Professor) and other faculty members		

Field of Human Disease Models

I Educational Policy

The genome sequences of many animals, including humans, are now almost completely known due to the development of the genome project. However, the main goal in medicine and life sciences is to elucidate how each gene functions in vivo and what kind of molecular mechanisms are involved in the pathogenesis of diseases, and experiments using animals such as mice are necessary for this purpose. In the field of disease model research, various genetically engineered mice are produced and analyzed using genetic modification technology that manipulates genes at the individual level. In the graduate course in this field, students are expected to understand the concept and methods of genetic modification, analyze the genotypes and phenotypes of their own mouse lines, and summarize the results in a thesis. In addition, students learn about CRISPR/Cas9, which is a genome editing method that has been widely applied in recent years, and create a new genetically modified mouse line.

II Goals

- (1) To understand the concept of transgenic mice, knockout mice, and other genetically engineered mice, and the methods used to create them.
- (2) To understand the purpose and application of producing animal models of diseases using abnormal genes identified in human diseases.
- (3) We will be in charge of at least one line of genetically engineered mice produced in our research field, and will maintain, breed, genotype, and analyze their phenotypes.
- (4) The phenotypes obtained will be analyzed using tissues and cells obtained from mice using techniques such as molecular biology and protein engineering to elucidate the molecular basis of the phenotypes.
- (5) Analyze the analysis results obtained above and make presentations at academic conferences and research meetings.
- (6) Read the relevant papers published so far and submit the results of your research in a paper.

III Supervisor•Research theme

(* = for doctor's license holders)

Name and position	Research theme
Professor Honda, Lecturer Iwasaki, Assistant Professor Sera, Technical Staff Miyagawa	(1) Analysis of the mechanism of human disease development using mouse models Human diseases are caused by various molecular mechanisms such as DNA base substitutions, deletions, and deregulation of gene expression. We will generate genetically engineered mice with the desired gene mutations or gene expression changes and discuss the mechanisms of human disease development at the individual level.
Professor Honda, Lecturer Iwasaki, Assistant Professor Sera, Technical Staff Miyagawa	(2) Analysis of stem cell regulatory mechanism by histone modification genes Recently, it has become clear that so-called epigenetic alterations such as histone modifications and DNA methylation play important roles in stem cell maintenance and proliferation. We will generate mice genetically engineered for histone modifications and analyze the mechanisms of stem cell regulation, mainly in the hematopoietic system, and the mechanisms of tumorigenesis caused by deviations from these modifications.
Professor Honda, Technical Staff Miyagawa	(3) Investigation of new gene modification methods by genome editing In recent years, so-called genome editing methods, such as CRISPR/Cas9 and TALEN, have been developed to modify genes by manipulating the genome directly in the nucleus and have been in the limelight. We will investigate genome editing methods for mouse fertilized eggs and cultured cells using CRISPR/Cas9.

IV Syllabus

(* = for doctor's license holders)

Title	Instructor	Credit	Theme
Concept and methodology of generating genetically-engineered mice	Professor Honda, Lecturer Iwasaki, Assistant Professor Sera, Technical Staff Miyagawa	1	To understand the concept and methods of creating transgenic and knockout mice.
Genetic and phenotypic analyses of genetically-engineered mice	Professor Honda, Lecturer Iwasaki, Assistant Professor Sera, Technical Staff Miyagawa	2	To understand the genotyping and phenotyping methods of genetically engineered mice.
New technique of gene manipulation: CRISPR/Cas9	Professor Honda, Technical Staff Miyagawa	2	To understand the concept and application of CRISPR/Cas9, one of the recently developed genome editing technologies.
Experiments and practice	Professor Honda, Lecturer Iwasaki, Assistant Professor Sera, Technical Staff Miyagawa	10	Identify the phenotype of the genetically engineered mouse line for which you are responsible and analyze the molecular basis of the phenotype to prepare a research paper.
Total credits		15	

(Field of Human Disease Models) Syllabus (1)

Syllabus Title	Concepts and methodologies for the generation of genetically engineered mice		
Instructor	Professor Honda, Lecturer Iwasaki, Assistant Professor Sera, Technical Staff Miyagawa		
Credit	1		
Type of Class	Lectures and Exercises		
Theme	Lecture on concepts and methods of producing genetically engineered mice		
Schedule	Monday, 4th period		
Course Objective	To understand the concept and methods of creating transgenic and knockout mice		
Evaluation Methods	Attendance (50%), Report on the lecture (50%)		
Grading Scale	S (90 to 100 points), A (80 to 90 points), B (70 to 80 points), C (60 to 70 points), D (60 points). S, A, B, and C are passed, and D is failed.		
Textbooks/References	Manual of Developmental Engineering Experiments (Kodansha, out of print, copy here), Mouse Lab Manual (Springer)		
Independent Study Outside of Class	Read the above reference books and related literature		
Room	Laboratory Animal Research Institute, Tomoe Research and Education Bldg. 4F, or at the place designated by us.		
Special Note	For those unable to attend at the above times, the timetable will be decided by mutual consultation. Questions, etc. will be accepted at any time. Feedback will be given at the final session.		
Course Plan	Number	Instructor	Contents
	1	Professor Honda	Orientation
	2	Assistant professor Sera	Transgenic Mouse General
	3	Lecturer Iwasaki	Knockout Mouse General Theory
	4	Technical Staff Miyagawa	Methods of producing transgenic mice
	5	Professor Honda	Methods of producing knockout mice
	6	Professor Honda	Genetically engineered mice that mutate organ-specific target genes
	7	Professor Honda	Genetically engineered mice that inducibly mutate target genes
	8	Professor Honda	Summary

(Field of Human Disease Models) Syllabus (2)

Syllabus Title	Genotyping and phenotyping of genetically engineered mice		
Instructor	Professor Honda, Lecturer Iwasaki, Assistant Professor Sera, Technical Staff Miyagawa		
Credit	2		
Type of Class	Lectures and Exercises		
Theme	Lectures on genotyping and phenotyping of transgenic mice		
Schedule	Thursday, 4th period		
Course Objective	To understand the genotyping and phenotyping methods of genetically engineered mice		
Evaluation Methods	Attendance (50%), Report on the lecture (50%)		
Grading Scale	S (90 to 100 points), A (80 to 90 points), B (70 to 80 points), C (60 to 70 points), D (60 points). S, A, B, and C are passed, and D is failed.		
Textbooks/References	Mouse Lab Manual (Springer), Mouse Phenotyping (MEDS)		
Independent Study Outside of Class	Read the above reference books and related literature. Develop a broad knowledge and interest in the research of other researchers.		
Room	Laboratory Animal Research Institute, Tomoe Research and Education Bldg. 4F, or at the place designated by us.		
Special Note	For those unable to attend at the above times, the timetable will be decided by mutual consultation. Questions, etc. will be accepted at any time. Feedback will be given at the final session.		
Course Plan	Number	Instructor	Contents
	1	Professor Honda	Orientation
	2	Lecturer Iwasaki	General overview of genotyping of genetically engineered mice
	3	Assistant professor Sera	Genotyping of genetically engineered mice
	4	Technical Staff Miyagawa	Crossbreeding of genetically engineered mice
	5	Professor Honda	Individual identification of genetically engineered mice
	6	Assistant professor Sera	DNA extraction from genetically engineered mice
	7	Assistant professor Sera	PCR genotyping
	8	Lecturer Iwasaki	Cell marking using genetic modification
	9	Assistant professor Sera	Cell lineage tracing using genetic modification
	10	Lecturer Iwasaki	Hematopoietic stem cell analysis using genetic modification
	11	Assistant professor Sera	Stem cell analysis using genetic modification (other than hematopoietic stem cells)
	12	Professor Honda	Human disease models using genetic modification-1
	13	Professor Honda	Human disease models using genetic modification-2
	14	Professor Honda	Human disease models using genetic modification-3
15	Professor Honda	Summary	

(Field of Human Disease Models) Syllabus (3)

Syllabus Title	Novel gene manipulation using CRISPR/Cas9 genome editing method		
Instructor	Professor Honda, Technical Staff Miyagawa		
Credit	2		
Type of Class	Lectures and Exercises		
Theme	Lectures on genome editing methods including CRISPR/Cas9		
Schedule	Friday, 4th period		
Course Objective	Understand and practice genome editing methods, a new type of genetic manipulation including CRISPR/Cas9		
Evaluation Methods	Attendance (50%), Report on the lecture (50%)		
Grading Scale	S (90 to 100 points), A (80 to 90 points), B (70 to 80 points), C (60 to 70 points), D (60 points). S, A, B, and C are passed, and D is failed.		
Textbooks/References	Specify as needed		
Independent Study Outside of Class	Read the designated reference books and related literature		
Room	Laboratory Animal Research Institute, Tomoe Research and Education Bldg. 4F, or at the place designated by us.		
Special Note	For those unable to attend at the above times, the timetable will be decided by mutual consultation. Questions, etc. will be accepted at any time. Feedback will be given at the final session.		
Course Plan	Number	Instructor	Contents
	1	Professor Honda	Orientation
	2	Technical Staff Miyagawa	General introduction to genome editing methods
	3	Professor Honda	Genome Editing Methods
	4	Technical Staff Miyagawa	Principles of CRISPR/Cas9
	5	Professor Honda	gRNA design method
	6	Professor Honda	In vitro digestion assay
	7	Professor Honda	Understanding and preparation of fertilized egg culture reagents
	8	Technical Staff Miyagawa	Collection of fertilized eggs from mice
	9	Professor Honda	Genetic manipulation in fertilized eggs using CRISPR/Cas
	10	Professor Honda	Transplantation of Manipulated Fertilized Eggs into Pseudopregnant Mice
	11	Technical Staff Miyagawa	Cesarean section in mice and identification of target transgenic mice
	12	Technical Staff Miyagawa	Sperm extraction from the epididymis and in vitro fertilization
	13	Technical Staff Miyagawa	Freezing and Thawing of Fertilized Eggs
	14	Professor Honda	Gene manipulation in cultured cells using CRISPR/Cas
15	Professor Honda	Summary	

(Field of Human Disease Models) Syllabus (4)

Syllabus Title	Experiments and Practical Training (Problem-based Research)		
Instructor	Professor Honda, Lecturer Iwasaki, Assistant Professor Sera, Technical Staff Miyagawa		
Credit	10		
Type of Class	Experiments and Practical Training (Problem-based Research)		
Theme	Conducting research on an issue and writing a thesis		
Schedule	Monday, Tuesday, Wednesday, Thursday 9:00-12:00, 13:00-17:00 Friday 15:00-17:00		
Course Objective	<ol style="list-style-type: none"> 1. One line of genetically modified mice will be used for mating, breeding and genotyping of offspring 2. The phenotype of the mice will be observed and analyzed for differences from control mice. 3. The phenotypes observed will be compared with those of the control mice. The differences in DNA, RNA and proteins extracted from target organs of control and transgenic mice will be analyzed using molecular biology and protein engineering to elucidate the molecular pathogenesis underlying the phenotype. 5. To present and discuss the results of experiments at conferences and research meetings; 6. To search the relevant literature and compare the results of experiments with those of their own. Prepare a paper on the contents. 		
Evaluation Methods	Experiment notes/research report (60%) Chart preparation (10%) Research presentation/discussion (10%) Writing of thesis (20%)		
Grading Scale	S (90 to 100 points), A (80 to 90 points), B (70 to 80 points), C (60 to 70 points), D (60 points). S, A, B, and C are passed, and D is failed.		
Textbooks/References	Review articles and original papers related to the experiments as appropriate		
Independent Study Outside of Class	The results of the experiments will be discussed as appropriate, and the results will be summarized and presented at related conferences for discussion.		
Room	Laboratory Animal Research Institute, Tomoe Research and Education Bldg. 4F, or at the place designated by us.		
Special Note	The period and time of the research will be decided upon consultation. Questions, etc. may be submitted at any time.		
Course Plan	Number	Instructor	Contents
	1 ~ 90	Professor Honda, Lecturer Iwasaki, Assistant Professor Sera, Technical Staff Miyagawa	Achievement of Course Objectives 1 - 2
	91 ~ 120	Professor Honda, Lecturer Iwasaki, Assistant Professor Sera, Technical Staff Miyagawa	Achievement of Course Objectives 3-4
	121 ~ 150	Professor Honda, Lecturer Iwasaki, Assistant Professor Sera, Technical Staff Miyagawa	Achievement of Course Objectives 5-6