Graduate School Guidelines

School of Medicine

2026

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.

Common Curriculum (Compulsory)

Minimum Credits to Be Acquired (12 Credits)

First Semester Comprehensive Curriculum・・・・・・・・2 credits

Second Semester Comprehensive Curriculum・・・・・・・1 credit

Lectures by Professors (Heads of the Core Fields) ・ 5 credits

(1 credit for attending 5 lectures)

Practical Training・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・4 credits

Morphology Major・・・・・・・・・・・・・・・・・・・2 credits

Functional Science Major・・・・・・・・・・・・・2 credits

Social Medicine Major・・・・・・・・・・・・・・・2 credits

Advanced Biomedical Science Major・・・・2 credits

(Students must select any two of the majors listed above for practical training)

Internal medicine and surgery majors must take the following credits.

Common Clinical Lecture・・・・・・・・・・・・・・・・・・・・・・・・1 credit

Practical Clinical Medicine・・・・・・・・・・・・・・・・・・・・・・・1 credit

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.

Initial Integrated Curriculum

Course A (for students majoring in morphology, functional sciences, social medicine, advanced biomedical sciences, internal medicine, or surgery)

Asterisk (*) indicates sessions held jointly with Course B

Recording location: Classrooms in the Yayoi Memorial Education Building

	Recording time	Lecture topic	Instructor(s)	Lecture content
2026. 4.13 (Mon)	10:35–12:00 *	Basic knowledge of animal experimentation (animal experiment workshop - webinar)	Institute of Laboratory Animals Professor Honda	Animal experimentation and laboratory animals: objectives and approaches in animal experimentation, ethics and regulations, and animal models
	14:00–17:00	Introduction to regenerative medical engineering (lecture)	Institute of Advanced Biomedical Engineering and Science Professor Yamato Lecturer Nakayama	Theory and practice of regenerative medicine development; drug delivery systems
4.14 (Tue)	9:00–10:25	Principles and practice of morphological methods II	Associate Professor Yokomizo	Principles and applications of the different types of microscopy
	10:35–12:00 *	Introduction to genetic medicine	Professor Yamamoto (Toshiyuki)	Laws of inheritance, gene structure and expression, genomic medicine, and ethics in genomics
	13:00–14:25	Principles and practice of morphological methods I	Assistant Professor Arimasu	Principles of immunohistochemistry
	14:35–16:00 *	Introduction to molecular and cell biology	Professor Nakamura (Fumio)	Experimental and research methods in molecular and cell biology
4.15 (Wed)	9:00–10:25 *	Medical information processing I (lecture and practical training)	Library Chief Librarian Kato	Accessing and using medical information
	10:35–12:00	Medical information processing II (lecture and practical training)	Professor Koga	Obtaining funding: Grants-in-Aid for Scientific Research (KAKENHI) and other research grants
	13:00–14:25*	Medical information processing III (lecture and practical training)	Professor Ishizu	International research
	14:35–16:00	Medical information processing IV (lecture and practical training)	Professor Masamune	AI and robotics in medicine
	16:10–17:35 *	Chemical handling and safety	Associate Professor Komoike	Fundamentals of chemical handling; chemical toxicity and health hazards; chemical work management; work environment management; and toxicological research
4.16 (Thu)	10:35–12:00 *	Introduction to regenerative medical engineering (lecture)	Institute of Advanced Biomedical Engineering and Science Professor Shimizu	Overview of the Institute of Advanced Biomedical Engineering and Science; tissue engineering

	13:00–14:25 *	Research ethics	Part-Time Lecturer Matsuo	Responsible Conduct of Research, ethical guidelines, the Clinical Research Act, informed consent, personal information and privacy, and conflicts of interest
	16:10–17:35 *	Basics of radiation	Assistant Professor Kikkawa	Basic properties and medical applications of radiation
4.17 (Fri)	9:00–12:00	Basics of animal experimentation (demonstration video on the handling of laboratory animals)	Institute of Laboratory Animals Professor Honda Institute staff	Basic techniques for animal experimentation using various animals
	13:00–16:00	Principles and practice of research methods	Institute for Comprehensive Medical Sciences Associate Professor Tanabe	Tour of the shared-use facilities and equipment at the Institute for Comprehensive Medical Sciences; explanation of their use

Credits will be awarded to students who have completed all of the aforementioned items and the designated items in the APRIN e-learning program (eAPRIN) (see Appendix), as well as submitted the certificate of completion to the Academic Affairs Section of the School of Medicine by the end of May.

Course B (for students majoring in internal medicine or surgery)

Asterisk (*) indicates sessions held jointly with Course A

Recording location: classrooms in the Yayoi Memorial Education Building

	Recording time	Lecture topic	Instructor(s)	Lecture content
2026. 4.13 (Mon)	9:00–10:25	Introduction to clinical pathology	Professor Kurata	Clinical laboratory testing; pathophysiological analysis; introduction to surgical pathology (histopathology/cytology)
	10:35–12:00 *	Basic knowledge of animal experimentation (animal experiment workshop - webinar)	Institute of Laboratory Animals Professor Honda	Animal experimentation and laboratory animals: objectives and approaches in animal experimentation, ethics and regulations, and animal models
	13:00–13:50	Social security/health economics	Lecturer Nakajima	Social security systems; long-term care insurance system; current conditions in health economics; social security benefit expenditures; and national medical care expenditure
	14:00–14:50	Patient safety	Professor Shimizu (Yuko)	Patient safety; medical risk management; team-based care; medical accident investigation system
4.14 (Tue)	10:35–12:00 *	Introduction to genetic medicine	Professor Yamamoto (Toshiyuki)	Laws of inheritance; gene structure and expression; genomic medicine; and ethics in genomics
	13:00–14:25	Medical law	Professor Kibayashi	Medical law; ethics and laws of medical research
	14:35–16:00 *	Introduction to molecular and cell biology	Professor Nakamura (Fumio)	Experimental and research methods in molecular and cell biology
4.15 (Wed)	9:00–10:25 *	Medical information processing I (lecture and practical training)	Library Chief Librarian Kato	Accessing and using medical information
	13:00–14:25*	Medical information processing III (lecture and practical training)	Professor Ishizu	International research
	14:35–16:00	Introduction to clinical pharmacology	Professor Matsuura	Application of research on disease pathophysiology to drug discovery
	16:10–17:35 *	Chemical handling and safety	Associate Professor Komoike	Fundamentals of chemical handling; chemical toxicity and health hazards; chemical work management; work environment management; and toxicological research
4.16 (Thu)	10:35–12:00 *	Introduction to regenerative medical engineering (lecture)	Institute of Advanced Biomedical Engineering and Science Professor Shimizu	Overview of the Institute of Advanced Biomedical Engineering and Science; tissue engineering
	13:00–14:25 *	Research ethics	Part-Time Lecturer Matsuo	Responsible Conduct of Research, ethical guidelines, the Clinical Research Act, informed consent, personal information and privacy, and conflicts of interest
	14:30–15:55	Introduction to genetic diagnosis and therapy	Part-Time Lecturer Matsuo	Genetic counseling: overview, comprehensive genomic analysis and secondary findings; cancer genomics
	16:10–17:35 *	Basic knowledge of radiation	Assistant Professor Kikkawa	Basic properties and medical applications of radiation

4.17 (Fri)	13:00–14:25	Introduction to clinical trials	Assistant Professor Sasaki	Clinical research design: observational studies, interventional studies, and clinical trials
	14:35–16:00	Introduction to evidence-based medicine (EBM)	Professor Nohara	Principles of clinical epidemiology, statistical testing, and evidence synthesis
	16:10–17:35	Introduction to geriatric medicine	Associate Lecturer Ueno	Biology of aging, geriatric syndromes, and comprehensive geriatric assessment

Credits will be awarded to students who have completed all of the aforementioned items and the designated items in the APRIN e-learning program (eAPRIN) (see Appendix), as well as submitted the certificate of completion to the Academic Affairs Section of the School of Medicine by the end of May.

Initial Integrated Curriculum

(Appendix)

Required APRIN e-learning program (eAPRIN) modules

Area: Responsible Conduct of Research (RCR): Foundations

RCR credits for the Initial Integrated Curriculum will be awarded to students who complete the below-listed modules and all items in either Course A or B of the Initial Integrated Curriculum, as well as submit their certificate of completion to the Academic Affairs Section of the School of Medicine by the end of May.

Unit name	Content description
Responsible Conduct of Researchers	The research community is a competitive society. Researchers, whose responsibility is to advance science, are expected to spearhead efforts to eliminate misconduct, a counterproductive behavior. Students will learn about the origins of various laws and guidelines and understand their developmental process.
Research Misconduct	Fabrication, falsification, and plagiarism significantly undermine public trust in researchers and jeopardize support for scientific research. This module explains is the importance of ensuring unwavering global confidence in research findings published from Japan.
Data Handling	Research misconduct does not necessarily occur intentionally. Students will learn about the basic research procedures for avoiding researcher biases and assumptions.
Rules for Collaborative Research	Collaborative research is crucial to ensuring the scale and quality required of research. Students will learn about the fundamental rules that necessary to avoid possible problems in the future, including those related to intellectual property rights.
Conflicts of Interest	The existence of conflicts of interest can even distort research conclusions. Currently, many researchers in Japan misunderstand this concept, thus finding compliance with international standards burdensome. Students will learn more about this issue via an overview of the fundamentals.
Authorship	Being listed as an “author” is an important honor, which is significant for obtaining employment, positions, and research funding as well. Students will learn about the international standards governing the rights and responsibilities of authorship and preparing for international publication.
Plagiarism Acts regarded as plagiarism	In research, “plagiarism” is a dishonest act that inflates one’s own achievements. This module explains this “line that must not be crossed”: an issue of which researchers in Japan reportedly have lower awareness than researchers in Europe and the United States.

Late-stage integrated curriculum

Students must attend all of the below-listed lectures

Recording date	Recording time	Lecture topic	Instructor(s)
2027. 1.21 (Thu)	9:30–11:30	Ethics in academic publication Legal issues Evaluating journals; How to submit a manuscript	Professor Otsuki
	13:00– 14:30	Research ethics Lecture and case study assignment	Part-Time Lecturer Matsuo
1.22 (Fri)	14:30–15:30	How to write a research paper Structure of papers other than original articles	Associate Professor Satoshi Saito
1.25 (Mon)	9:00–11:00	How to develop a medical research plan Developing a research plan · Research objectives and questions ・Collecting and evaluating relevant literature ・Research approaches suited to the research question	Professor Kurata
	11:00–12:30	How to develop a medical research plan Developing a research plan · Biostatistical aspects of the research plan	Professor Hoshino
	15:30–16:30	Evaluating research papers from the perspective of a reviewer	Professor Todo
1.27 (Wed)	13:00–14:00	How to develop a medical research plan Basic issues Types of research	Associate Professor Tamura
1.28 (Thu)	15:00–16:30	How to write a research paper Structure of original articles	Professor Seo

Recording location: Classrooms in the Yayoi Memorial Education Building

Lecture Content of General Curriculum for Second Year Graduate School

Tokyo Women's Medical University Graduate School of Medical Science

I. How to formulate a medical research plan and how to write a thesis Total lecture time: 11 hr 30 mins (Person in charge)

1. Drafting a research plan
   1-1 Basic issues
      (1) Human rights and ethics
      (2) Animal ethics
      (3) Agreement with joint researchers

   1-2 Type of research
      (1) Clinical research, applied research, and basic research
      (2) Types of papers: Original article, case report, review
            Other (Rapid communication, note, letter to the editors, etc.)

   1-3 Drafting a research plan
      (1) Purpose of research and questions to be resolved
      (2) Collecting and verifying relevant literature (evaluate evidence with critical appraisal)

Target goal	Keywords
1. Able to explain research activity procedures	● Question to be resolved or hypothesis to be verified in the research ● Research design ● Data collection (target selection, observation, or measurement) ● Data analysis ● Interpretation and conclusion
2. Able to explain collection and scrutiny of literature	● Systematic collection ● Systematic scrutiny (critical appraisal) ● Research validity
3. Research approach based on purpose Ability to explain research traditions	● Biological approach ● Agricultural approach ● Epidemiological approach ● Folk law studies approach

1 hour
Associate Professor Tamura

2 hours
Professor Kurata

      (3) Medical statistical aspects of the research plan
         1) Setting a hypothesis and design to verify the hypothesis
         2) Data collection method
         3) Data analysis and presentation

1 hour 30 mins
Professor Hoshino

2. Research results presentation method (writing papers)
   2-1 Structure of original articles
      (1) How to add a title
         1) Aim of the title
         2) Requirements of a good title
         3) Points to note when adding a title
      (2) Introduction
         1) Elements of the introduction
         2) Content to be written in the introduction
         3) Points to note when writing the introduction
      (3) Methods
         1) Purpose of subjects (material) and methods (subjects and methods)
         2) What is standard structure?
         3) Tips for writing
         4) How to add headings
         5) Content and order
      (4) Results
         1) Main purpose
         2) Points to note for descriptions
         3) Order of descriptions
         4) Required elements
         5) Role and structure of tables
         6) How to effectively use figures
         7) Explanation of figures
      (5) Discussion
         1) Significance of the discussion
         2) Structural elements of the discussion
         3) Points to note when writing the discussion
         4) How to structure paragraphs
      (6) Parts other than IMRAD
         1) How to write acknowledgments
         2) Significance of references and selection criteria

1 hour30 mins
Professor Seo

2-2 Structure of papers other than original articles
(1) Case report
(2) Review
(3) Other

1 hour
Associate Professor
Satoshi Saito

3. Ethics of paper publication
3-1 Plagiarism, and misconduct in research and publication
3-2 Plagiarism, and misconduct in research and publication
3-3 Plagiarism, and misconduct in research and publication
3-4 Plagiarism, and misconduct in research and publication

4. Evaluation of submission journal, submission methods
4-1 Evaluation: citation index, impact factor
4-2 Paper submission
(1) Compliance with submission rules
(2) How to write letters to the editor-in-chief
(3) How to write letters to reviewers

5. How to write English papers

2 hours
Professor Otsuki

6. Paper evaluation (from the standpoint of reviewers)

Understand how the paper is evaluated from the standpoint of reviewers

1 hour

Professor Todo

7. Research ethics

Group work based on case studies

1 hour30 mins

Part-Time
Lecturer Matsuo

Lectures by the Professors (Heads of the respective departments)

Recording location: Classrooms in the Yayoi Memorial Education Building

Evaluation will be based on attendance at each lecture and submission of reports, questionnaires, and other academic deliverables

Number	Recording date and time	Instructor(s)/affiliation	Lecture title	Lecture content
2026-1	May 28, 2026 (Thu) 16:00–18:30	Professor Hashimoto	Fundamentals and innovations in radiation therapy	This lecture outlines the framework of clinical decision-making. It explores the principles and process of radiation therapy: from determining indications to treatment planning, including contouring, dose constraints, and DVH evaluation, as well as image-guided radiation therapy and supportive care. In addition, it explains the benefits and limitations of high-precision irradiation (IMRT and SBRT); coordination with surgery and pharmacotherapy, including immunotherapy; late adverse effects and follow-up; and prospects for AI implementation.
2026-2	June 23, 2026 (Tue) 16:00–18:30	Professor Mori	Frontiers and future perspectives in emergency medicine research	This lecture outlines the frontiers of clinical research in emergency medicine using representative emergency conditions, such as cardiac arrest, trauma, stroke, and sepsis. In addition, it covers future perspectives in emergency medicine research, including AI, big data, and medical-engineering collaboration, based on the characteristics of ER- and ICU-based care systems, multidisciplinary collaboration, and rapid decision-making.
2026-3	July 7, 2026 (Tue) 16:00–18:30	Professor Todo	Clinical research on stroke	Stroke care has changed significantly over the past 20 years. Intravenous alteplase and mechanical thrombectomy are widely used acute ischemic stroke interventions. Novel diagnostic modalities for ischemic stroke, as well as device-based treatments for preventing recurrence, have emerged in recent years. This lecture outlines clinical research conducted to address questions related to stroke care.
2026-4	September 14, 2026 (Mon) 16:00–18:30	Professor Mizutari	Pathophysiology of intractable hearing loss and tinnitus and development of novel treatments	“Once hearing loss or tinnitus occurs, it cannot be cured”: this has been a long-held assumption in clinical practice and medical education. This lecture revisits, from a pathophysiological perspective, why sensorineural hearing loss and tinnitus have been regarded as “incurable diseases,” and presents the lecturer’s own efforts in challenging and rewriting this assumption.
2026-5	October 5, 2026 (Mon) 16:00–18:30	Professor Katsumata	Participation in an international multicenter collaborative study and reporting the findings as the first author	The lecturer had participated in an international, multicenter, prospective cohort study in the Asia-Pacific region, involving patients with systemic lupus erythematosus (SLE), analyzed the data, and reported the findings in a “high-profile” journal as the first and corresponding author. Based on this experience, the lecturer explains selected aspects of clinical research on SLE.
2026-6	November 16, 2026 (Mon) 16:00–18:30	Professor Nagao	Elucidating the mechanisms underlying the development of type 2 diabetes induced by a high-fat diet: From clinical findings to basic research	Type 2 diabetes develops when environmental factors, such as overeating (particularly a high-fat diet), are superimposed on genetic factors involved in reduced insulin secretion and insulin resistance. This lecture reviews clinical and epidemiological findings on high-fat diets and the development of diabetes. In addition, drawing on mouse model studies, it outlines the progression of research into the regulation of β-cell function and mechanisms of feeding control.
2026-7	December 8, 2026 (Tue) 16:00–18:30	Professor Sakurai	Current status of reconstructive surgery	Skin grafting is a basic procedure in plastic surgery, a clinical specialty focused on repairing, reconstructing, and altering the body. Skin grafting has many features in common with transplantation of tissues such as bone, muscle, cartilage, fat, fascia, and nerves. Reconstructive surgery aims to repair tissue defects by transplanting tissue from other sites and is an important sub-field in plastic surgery.
2026-8	January 18, 2027 (Mon) 16:00–18:30	Professor Ishizu	Research methods and advances in stem cell biology	Stem cells are the foundation cells for every tissue and organ and are essential for maintaining homeostasis. Stem cell regulation is important for both the development of tissues and organs and maintenance of homeostasis in adults. This lecture uses the regulatory mechanisms of hematopoietic stem cells as an example to explain experimental and analytical methods for evaluating system homeostasis and analyzing the mechanisms that maintain homeostasis.
2026-9	February 1, 2027 (Mon) 16:00–18:30	Professor Nohara	Improving the work environment for health care professionals and physician work-style reform	As securing health care professionals became increasingly difficult owing to factors such as population decline, changing attitudes toward work, diversification of health care needs, and uneven distribution of physicians and other personnel, the amended Medical Care Act, regarding improvement of the work environment in medical institutions, was enacted in 2018. In addition, from the perspective of preventing overwork, the Work Style Reform Act was enacted and was applied to physicians in 2024. This lecture outlines the research on these topics.
2026-10	March 2, 2027 (Tue) 16:00–18:30	Professor Otsuki	Rewards of endocrine research as a physician-scientist	The lecturer is a professor of endocrinology. This lecture presents the lecturer’s path to specialization in endocrinology and career trajectory. In addition, the lecturer will introduce the basic and clinical rewards of endocrine research as a physician-scientist. In particular, the lecture focuses on the lecturer’s areas of expertise: the pituitary and adrenal glands.

Practicum in Basic Medical Sciences

(Location)

Morphology

Human pathology and pathophysiological neuroscience	…5th floor, Yayoi Memorial Education Building
Microscopic anatomy and morphogenesis	…4th floor, Yayoi Memorial Education Building

Functional sciences

Pharmacology	…5th floor, Yayoi Memorial Education Building
Microbiology and immunology	…Large practical training room 1, B1, Yayoi Memorial Education Building

Social medicine

Public health	…Practical training room, B1; lecture room, 3rd floor; and laboratory, 4th floor - Yayoi Memorial Education Building
Forensic medicine	…Forensic examination room and CT room, 1st floor, Tomoe Research and Education Building; Laboratory, 5th floor, Yayoi Memorial Education Building

Advanced biomedical sciences

Future co-creation in life sciences, genetic medicine, regenerative medical engineering, and advanced engineering in surgery	…Innovation Promotion Office, 2nd floor, TWINs Institute of Advanced Biomedical Engineering and Science; Large Practical Training Room 3, Yayoi Memorial Education Building; Medical Engineering (ME) Equipment Management Room, B2F, Outpatient Center
Integrated medical sciences (Associate Professor Akagawa)	…Tomoe Research and Education Building; Institute for Comprehensive Medical Sciences
Integrated medical sciences (Associate Professor Tanabe)	…Imaging area, 1st floor, Tomoe Research and Education Building

Date	Responsible department	Title	Overview	Capacity
2026.7.6 (Mon) ～ 2026.7.10 (Fri)	Morphology Human pathology and pathophysiological neuroscience	1. Comparison of protein levels using Western blotting 2. Comparison of expression sites and expression levels using immunostaining 3. Comparison of mRNA expression levels using qPCR	Samples used: liver tissue collected at 0, 8, 20, and 40 weeks from mice that received long-term oral administration of TAA (thioacetamide; a chronic hepatitis model) in their drinking water. 1. Protein levels will be compared between the control and TAA groups using Western blotting 2. Sites of DAB staining and expression levels will be compared between the control and TAA groups using immunostaining 3. mRNA expression levels will be compared between the control and TAA groups using qPCR Based on the protein and mRNA expression levels of Collagen 1, MZF1, and other markers in experiments 1–3, differences in expression patterns between chronic hepatitis and liver cancer will be analyzed	8
2026.7.13 (Mon) ～ 2026.7.17 (Fri)	Social medicine Public health	1. Practical application of medical statistics 2. Cytotoxicity of environmental pollutants 3. International health and tropical medicine research 4. Understanding public health research	1. Trends in mortality by cause of death in Japan will be analyzed, and the burden of various diseases on the Japanese health care system will be quantitatively assessed. Students will learn methods for analyzing mortality data and consider their public health significance. 2. Effects of external environmental factors, such as pollutants, on living organisms will be analyzed using cultured cells and the model organism *Caenorhabditis elegans* . Students will learn molecular biology techniques including Western blotting and fluorescence microscopy. 3. Students will use field specimens to identify malaria parasite species by microscopic diagnosis and genetic diagnosis using nested PCR, and compare the results. 4. Students will integrate knowledge of public health, environmental and occupational medicine, and global health to examine health issues from multiple perspectives.	8
2026.7.21 (Tue) ～ 2026.7.24 (Fri) and 2026.7.27 (Mon)	Morphology Microscopic anatomy and morphogenesis	1. Flow cytometric analysis of cellular protein expression, cell cycle, and cellular metabolism 2. Expression analysis using immunostaining 3. Bright-field histological staining analysis	1. Collection of mouse bone marrow and peripheral blood cells; flow cytometric analysis of mouse bone marrow hematopoietic stem cell fractions and cells of each differentiation lineage; cell cycle analysis 2. Flow cytometry-based cell sorting 3. Cytochemical and histochemical analysis using immunostaining and bright-field staining 4. Flow cytometric analysis of intracellular organelle staining and metabolic status 5. Overview of genetically modified mouse models	6
2026.7.27 (Mon) ～ 2026.7.31 (Fri)	Advanced biomedical sciences Future co-creation in life sciences Genetic medicine regenerative medical engineering Advanced engineering in	1. Experimental methods in tissue engineering as a foundation for regenerative medicine 2. Fundamentals and practice of 3D diagnostic imaging 3. Methods for collecting genetic information for genomic medicine 4. Drug delivery systems	Students will 1. Learn the basic techniques of tissue engineering; fabricate bioabsorbable scaffolds that serve as a cellular framework and cell sheets, use them to reconstruct 3D tissues, and evaluate the regenerated tissues. 2. Learn the fundamentals and clinical applications of 3D diagnostic imaging using MRI equipment. 3. Learn how to search for genetic information via the internet using genetic information databases. 4. Learn about the solubilization of poorly water-soluble drugs using polymeric nanoparticles and their characterization, as well as hydrogel-based encapsulation techniques using natural polymers.	10
2026.8.3 (Mon) ～ 2026.8.7 (Fri)	Social medicine Forensic medicine	Basic and clinical research in forensic medicine	Students should select one topic from the following: 1. Instrumental analysis of drugs and toxic substances 2. DNA polymorphism analysis 3. Traumatic brain injury or postmortem diagnostic imaging If a forensic autopsy is available, students who are licensed physicians will receive practical training in postmortem imaging and forensic autopsy. Students will learn about reagent preparation, instrument washing, waste classification, waste liquid treatment, and classification of general, experimental, and infectious wastewater, handling of hazardous materials and chemical substances, preparation of laboratory notebooks, and reading of English-language research papers.	3

2026.8.17 (Mon) ～ 2026.8.21 (Fri)	Functional sciences Microbiology and immunology	1. Analysis of inflammatory responses in immune cells 2. Antimicrobial susceptibility testing	Innate immune cells exposed to bacterial components activate intracellular signal transduction via innate immune receptors, causing NF-κB, a transcription factor and “master regulator” of the inflammatory response, to translocate into the nucleus and induce the expression of various genes. Students will learn methods for analyzing inflammatory responses in a macrophage cell line stimulated with lipopolysaccharide, using basic techniques such as Western blotting and ELISA. In addition, through a practical training in bacteriology, students will learn about bacterial biofilm formation and the development of drug resistance.	6
2026.9.1 (Tue) ～ 9.2 (Wed) and 2026.9.7 (Mon) ～ 9.9 (Wed)	Advanced biomedical sciences Integrated Medical Sciences (Associate Professor Tanabe)	Preparation of samples for transmission electron microscopy (TEM) and observation by TEM	Mouse tissues are embedded in epoxy resin blocks, and ultrathin sections are prepared to observe cellular ultrastructure using TEM. 1. Preparation of epoxy resin blocks ・Fixation, dehydration, resin replacement, resin embedding, and polymerization 2. Preparation of ultrathin sections using an ultramicrotome ・Trimming, preparation of semithin sections, toluidine blue staining, preparation of ultrathin sections, grid preparation, and electron staining 3. TEM observation ・Sample mounting, axis alignment, and observation	2
2026.9.14 (Mon) ～ 2026.9.18 (Fri)	Functional sciences Pharmacology	1. Calcium imaging analysis of cardiomyocytes 2. Protein expression analysis	Students will learn the methods for 1. Introducing the *GCaMP* gene into cultured cardiomyocytes using an adeno-associated virus and analyzing intracellular calcium dynamics. 2. Analyzing protein expression using Western blotting in macrophages, as well as analyzing proteomics data.	4
2026.9.28 (Mon) ～ 2026.10.2 (Fri)	Advanced biomedical sciences Integrated medical sciences (Associate Professor Akagawa)	Next-generation sequencing data analysis	Students will process output data from next-generation sequencing and receive practical training in the fundamentals of bioinformatics, including annotation of detected genetic variants, understanding of their biological significance, and methods for filtering candidate variants. Next-generation sequencing data covered will comprise output data from whole-genome sequencing and targeted resequencing, such as whole-exome sequencing. Depending on students’ interests, instruction will be provided on how to set up and run a Linux environment for analysis on a personal computer, as well as how to connect to a public supercomputer to perform analyses. Students may bring their own data (subject to prior consultation). Duration: 5-day course. Lectures will be held during the first 3 days, and practical training in the analysis of real data, including data brought by students, will be conducted during the remaining 2 days.	4

Practical training

Morphology
Human pathology and pathophysiological neuroscience

Morphology practical training
Title: Principles and practice of morphological and molecular biological methods using fibrotic liver tissue

Capacity: Up to 8

	Morning 09:00-12:00	Afternoon 13:00-16:00
Day 1 7/6 (Mon)	Lectures and practical training "Overview and schedule of the experiment" (Yayoi PC Room 1) Professor Kurata, Assistant Professor Ariyasu, Lecturer Endo, and Project Assistant Professor Murakami	Lecture "Immunostaining, Western blotting, and qPCR" (5th floor, Yayoi Memorial Education Building) Professor Kurata, Assistant Professor Ariyasu, Lecturer Endo, and Project Assistant Professor Murakami
Day 2 7/7 (Tue)	Lectures and practical training "Tissue staining (HE staining, MT staining), Immunostaining (up to primary antibody)" (First Ward MB 2F) Technicians Sakai and Iwasaki	Lectures and practical training "Western blotting (up to the primary antibody step)" (5th floor, Yayoi Memorial Education Building) Professor Kurata, Assistant Professor Ariyasu, Lecturer Endo, and Project Assistant Professor Murakami
Day 3 7/8 (Wed)	Lectures and practical training "Immunostaining (from secondary antibody to mounting)" (First Ward MB 2F) Technicians Sakai and Iwasaki	Lectures and practical training "Western blotting (from the secondary antibody step to detection)" (5th floor, Yayoi Memorial Education Building) Professor Kurata, Assistant Professor Ariyasu, Lecturer Endo, and Project Assistant Professor Murakami
Day 4 7/9 (Thu)	Lectures and practical training "RNA extraction and cDNA synthesis" (5th floor, Yayoi Memorial Education Building) Professor Kurata, Assistant Professor Ariyasu, Lecturer Endo, and Project Assistant Professor Murakami	Lectures and practical training "qPCR" (5th floor, Yayoi Memorial Education Building) Professor Kurata, Assistant Professor Ariyasu, Lecturer Endo, and Project Assistant Professor Murakami
Day 5 7/10 (Fri)	Lectures and practical training "Tissue observation" (5th floor, Yayoi Memorial Education Building) Professor Kurata, Assistant Professor Ariyasu, Lecturer Endo, and Project Assistant Professor Murakami	Lectures and practical training "Summary of results" (5th floor, Yayoi Memorial Education Building) Professor Kurata, Assistant Professor Ariyasu, Lecturer Endo, and Project Assistant Professor Murakami

Practical training

Social medicine

Public health

Objectives:

• Department of Public Health

Analyze trends in mortality by cause of death in Japan, and quantitatively assess the burden imposed by various diseases on the Japanese healthcare system

Students will learn methods for analyzing mortality data, interpreting the results, and considering their public health significance.

• Department of Environmental and Occupational Medicine

Analyze cytotoxicity resulting from exposure to heavy metal compounds and gain an understanding of current environmental issues, to understand the relationship between various harmful factors present in living and working environments and diseases or disorders

• Department of Global Health

Understand genetic research on *Plasmodium falciparum* , an important infectious agent in Africa and Asia

• Common to all three departments

Integrate knowledge of public health, environmental and occupational medicine, and global health, and examine health issues from multiple perspectives

Students will summarize research content and practical training outcomes based on their own interests and develop the ability to deliver logical and clear presentations

Capacity: Up to 8

	Morning 09:00–12:00	Afternoon 13:00–16:00
Day 1 7/13 (Mon)	Responsible department: Environmental and occupational medicine Content: Practical training in molecular cytotoxicology Location: Practical training room, B1, and laboratory, 4th floor, Yayoi Memorial Education Building Instructor(s): Lecturer Hirota, Assistant Professor Fujiki	Responsible department: Environmental and occupational medicine Content: Practical training in molecular cytotoxicology Location: Practical training room, B1, and laboratory, 4th floor, Yayoi Memorial Education Building Instructor(s): Lecturer Hirota, Assistant Professor Fujiki
Day 2 7/14 (Tue)	Responsible department: Environmental and occupational medicine Content: Practical training in molecular cytotoxicology Location: Practical training room, B1, and laboratory, 4th floor, Yayoi Memorial Education Building Instructor(s): Lecturer Hirota, Assistant Professor Fujiki	Responsible department: Public health Content: Explanation of practical training assignments; epidemiological analysis of mortality data using life table methods Location: Lecture room, 3rd floor, Yayoi Memorial Education Building Instructor(s): Professor Nohara, Associate Professor Muto, Lecturer Miki, and Assistant Professor Nagamine Assistant Professor Kawaguchi
Day 3 7/15 (Wed)	Responsible department: Public health Content: Epidemiological analysis of mortality data using Cox regression analysis Location: Lecture room, 3rd floor, Yayoi Memorial Education Building Instructor(s): Professor Nohara, Associate Professor Muto, Lecturer Miki, and Assistant Professor Nagamine Assistant Professor Kawaguchi and Part-time Lecturer Sakuratani	Responsible department: Public health Content: Epidemiological analysis of mortality data using the Kaplan–Meier method Location: Lecture room, 3rd floor, Yayoi Memorial Education Building Instructor(s): Professor Nohara, Associate Professor Muto, Lecturer Miki, and Assistant Professor Nagamine Assistant Professor Kawaguchi
Day 4 7/16 (Thu)	Responsible department: Global health Content: Practical training in tropical infectious diseases (malaria) Location: Practical training room, B1, Yayoi Memorial Education Building Instructor(s): Lecturer Iwashita Assistant Professor Nagi and Assistant Professor Arisue	Responsible department: Global health Content: Practical training in tropical infectious diseases (malaria) Location: Practical training room, B1, Yayoi Memorial Education Building Instructor(s): Lecturer Iwashita Assistant Professor Nagi and Assistant Professor Arisue
Day 5 7/17 (Fri)	Responsible department: Global health Content: Practical training in tropical infectious diseases (malaria) Location: Practical training room, B1, Yayoi Memorial Education Building Instructor(s): Lecturer Iwashita, Assistant Professor Nagi and Assistant Professor Arisue	Responsible departments: Public health, environmental and occupational medicine, and global health Content: Summary and presentations Location: Lecture room, 3rd floor, Yayoi Memorial Education Building Instructor(s): Professor Nohara, Associate Professor Muto, Lecturer Hirota, Lecturer Iwashita, Lecturer Miki, Assistant Professor Fujiki, Assistant Professor Nagi and Assistant Professor Arisue, Assistant Professor Nagamine and Assistant Professor Kawaguchi

Practical training

Morphology
Microscopic anatomy and morphogenesis

Morphology practical training
Title: Principles and practice of methods for the functional and morphological analysis of immunocompetent cells and tissues, and immunohistochemical techniques

Capacity: Up to 6

	Morning 9:00–12:00	Afternoon 13:00–16:00
Day 1 7/21 (Tue)	Lectures and practical training "Isolation and culture of mouse bone marrow cells" (4th floor, Yayoi Memorial Education Building) Professor Ishizu, Associate Professor Yokomizo, Assistant Professor Mochizuki, Assistant Professor Kikuta, Assistant Professor Yahagi, and Assistant Professor Komai	
Day 2 7/22 (Wed)	Lectures and practical training "Flow cytometric analysis of mouse bone marrow cells" (4th floor, Yayoi Memorial Education Building) Professor Ishizu, Associate Professor Yokomizo, Assistant Professor Mochizuki, Assistant Professor Kikuta, Assistant Professor Yahagi, and Assistant Professor Komai	
Day 3 7/23 (Thu)	Lectures and practical training "Mouse bone marrow tissue staining and blood cell staining" (4th floor, Yayoi Memorial Education Building) Professor Ishizu, Associate Professor Yokomizo, Assistant Professor Mochizuki, Assistant Professor Kikuta, Assistant Professor Yahagi, and Assistant Professor Komai	
Day 4 7/24 (Fri)	Lectures and practical training "Mouse tissue staining and blood cell staining" (4th floor, Yayoi Memorial Education Building) Professor Ishizu, Associate Professor Yokomizo, Assistant Professor Mochizuki, Assistant Professor Kikuta, Assistant Professor Yahagi, and Assistant Professor Komai	
Day 5 7/27 (Mon)	Lectures and practical training "Flow cytometry analysis methods and summary of results" (4th floor, Yayoi Memorial Education Building) Professor Ishizu, Associate Professor Yokomizo, Assistant Professor Mochizuki, Assistant Professor Kikuta, Assistant Professor Yahagi, and Assistant Professor Komai	

Practical training

Advanced biomedical sciences

Future co-creation in life sciences, genetic medicine, regenerative biomedical engineering, and advanced engineering in surgery

Capacity: Up to 10

	Morning (lecture and practical training) 09:00–12:00	Instructor(s)	Afternoon (practical training) 13:00–16:00	Instructor(s)	Location
Day 1 7/27 (Mon)	Regenerative medicine practical training Regeneration of 3D tissues using tissue engineering techniques Students will learn about the fundamentals of tissue engineering through the fabrication of biodegradable polymer scaffolds	Assistant Professor Yoshida Professor Deguchi Assistant Professor Hara Lecturer Nakayama Lecturer Kobayashi Lecturer Takahashi	Regenerative medicine practical training Regeneration of 3D tissues using tissue engineering techniques Students will learn about cell sheet engineering through cell culture and the preparation of cell sheets using temperature-responsive culture dishes	Lecturer Akiyama Lecturer Kobayashi Assistant Professor Takagi Assistant Professor Yoshida Assistant Professor Hara Professor Deguchi	TWIns Institute of Advanced Biomedical Engineering and Science 2nd floor, Innovation Promotion Office
Day 2 7/28 (Tue)	Regenerative medicine practical training Drug delivery systems Students will learn about the solubilization of poorly water-soluble drugs using polymeric nanoparticles and their characterization, as well as hydrogel-based encapsulation techniques using natural polymers	Professor Shimizu Associate Professor Sekine Lecturer Nakayama Lecturer Kobayashi	Regenerative medicine practical training Design and prototyping of a culture chamber using 3D CAD and a 3D printer Students will 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 Yoshida Professor Deguchi	TWINs Institute of Advanced Biomedical Engineering and Science 2nd floor, Innovation Promotion Office
Day 3 7/29 (Wed)	Practical training in genomic data analysis Students will learn how to interpret the results of genomic copy number analysis using databases	Professor Toshiyuki Yamamoto	Practical training in genomic data analysis Students will learn how to interpret the results of next-generation sequencing using databases	Professor Toshiyuki Yamamoto	Yayoi Memorial Education Building B1 PC room 1
Day 4 7/30 (Thu)	Regenerative medicine practical training Manipulation and evaluation of regenerated tissues For regenerated tissues produced using cell sheets and scaffolds, students will perform morphological observation and learn to evaluate regenerated tissues using biochemical analysis	Professor Yamato Assistant Professor Kikuchi Assistant Professor Takagi Assistant Professor Yoshida Assistant Professor Hara Professor Deguchi	Regenerative medicine practical training Layering of cell sheets Students will learn tissue engineering techniques through the production of layered tissues using cell sheets and gain an understanding of the basic properties of cultured tissues	Assistant Professor Yoshida Lecturer Takahashi Assistant Professor Takagi Assistant Professor Honma Assistant Professor Hara Professor Deguchi	TWINs Institute of Advanced Biomedical Engineering and Science 2nd floor, Innovation Promotion Office
Day 5 7/31 (Fri)	Introduction to advanced engineering in surgery 3D diagnostic imaging	Professor Masamune Associate Professor Tamura	Fundamentals and clinical applications of 3D diagnostic imaging, MRI practical training, and hands-on fabrication practice. Using neurosurgery as an example, students will learn about 3D diagnostic imaging methods using images obtained from MRI and other imaging modalities. Students will learn about surgical robots, including their concepts, applications, technologies, and clinical utility. Students will learn about precision instrument fabrication through hands-on fabrication practice.	Professor Masamune Associate Professor Tamura Associate Professor Kitahara Lecturer Yoshimitsu	TWINs Institute of Advanced Biomedical Engineering and Science 2nd floor, Innovation Promotion Office

Practical training

Social medicine

Forensic medicine

Objectives: Students will learn basic experimental techniques and develop the ability to solve forensic medical problems in clinical practice, through practical training in instrumental analysis of drugs and toxic substances, DNA polymorphism analysis, traumatic brain injury, or postmortem diagnostic imaging,

Practical training content: Students will select one topic from the following: 1. instrumental analysis of drugs and toxic substances, 2. DNA polymorphism analysis, and 3. traumatic brain injury or postmortem diagnostic imaging. 1. In instrumental analysis of drugs and toxic substances, students will perform qualitative and quantitative analyses to identify the causative drugs and toxic substances in acute poisoning using gas chromatography (GC), gas chromatography –mass spectrometry (GC-MS), headspace gas chromatography–mass spectrometry (HSGC-MS), liquid chromatography–tandem mass spectrometry (LC-MS/MS), and liquid chromatography–quadrupole time-of-flight mass spectrometry (LC-QTOF-MS). 2. In DNA polymorphism analysis, students will perform DNA extraction from samples using STR analysis. 3. In traumatic brain injury or postmortem diagnostic imaging, students will conduct basic research on traumatic brain injury using animal models or analyze postmortem diagnostic imaging in autopsy cases. Common component: If a forensic autopsy is available, licensed physicians will receive practical training in postmortem imaging and forensic autopsy. In addition, students will perform reagent preparation, instrument washing, waste classification, waste liquid treatment, and classification of general, experimental, and infectious wastewater, handling of hazardous materials and chemical substances, preparation of laboratory notebooks, and reading of English-language research papers.

Capacity: Up to 3 students, with 1 student accepted for each topic: instrumental analysis of drugs and toxic substances, DNA polymorphism analysis, and traumatic brain injury or postmortem diagnostic imaging.

	Morning 09:00–12:00	Afternoon 13:00–16:00
Day 1 8/3 (Mon)	"Instrumental analysis of drugs and toxic substances" Location: Forensic examination room, 1st floor, Tomoe Research and Education Building Instructor(s): Associate Lecturer Nakao "DNA polymorphism analysis" Location: Laboratory, 5th floor, Yayoi Memorial Education Building Instructor(s): Assistant Professor Machida "Traumatic brain injury or postmortem diagnostic imaging" Location: Laboratory, 5th floor, Yayoi Memorial Education Building; CT room and forensic autopsy room, 1st floor, Tomoe Research and Education Building Instructor(s): Professor Kibayashi, Associate Professor Shimada, and Assistant Professor Tatara	
Day 2 8/4 (Tue)	"Instrumental analysis of drugs and toxic substances" Location: Forensic examination room, 1st floor, Tomoe Research and Education Building Instructor(s): Associate Lecturer Nakao "DNA polymorphism analysis" Location: Laboratory, 5th floor, Yayoi Memorial Education Building Instructor(s): Assistant Professor Machida "Traumatic brain injury or postmortem diagnostic imaging" Location: Laboratory, 5th floor, Yayoi Memorial Education Building; CT room and forensic autopsy room, 1st floor, Tomoe Research and Education Building Instructor(s): Professor Kibayashi, Associate Professor Shimada, and Assistant Professor Tatara	
Day 3 8/5 (Wed)	"Instrumental analysis of drugs and toxic substances" Location: Forensic examination room, 1st floor, Tomoe Research and Education Building Instructor(s): Associate Lecturer Nakao "DNA polymorphism analysis" Location: Laboratory, 5th floor, Yayoi Memorial Education Building Instructor(s): Assistant Professor Machida "Traumatic brain injury or postmortem diagnostic imaging" Location: Laboratory, 5th floor, Yayoi Memorial Education Building; CT room and forensic autopsy room, 1st floor, Tomoe Research and Education Building Instructor(s): Professor Kibayashi, Associate Professor Shimada, and Assistant Professor Tatara	
Day 4 8/6 (Thu)	"Instrumental analysis of drugs and toxic substances" Location: Forensic examination room, 1st floor, Tomoe Research and Education Building Instructor(s): Associate Lecturer Nakao "DNA polymorphism analysis" Location: Yayoi Memorial Education Building 5th Floor Laboratory, Instructor(s): Assistant Professor Machida, Assistant Professor Tatara "Postmortem diagnostic imaging and forensic autopsy" Location: CT room and forensic autopsy room, 1st floor, Tomoe Research and Education Building Instructor(s): Professor Kibayashi and Associate Professor Shimada	
Day 5 8/7 (Fri)	"Instrumental analysis of drugs and toxic substances" Location: Forensic examination room, 1st floor, Tomoe Research and Education Building Instructor(s): Associate Lecturer Nakao "DNA polymorphism analysis" Location: Laboratory, 5th floor, Yayoi Memorial Education Building Instructor(s): Assistant Professor Machida "Traumatic brain injury or postmortem diagnostic imaging" Location: Laboratory, 5th floor, Yayoi Memorial Education Building; CT room and forensic autopsy room, 1st floor, Tomoe Research and Education Building Instructor(s): Professor Kibayashi, Associate Professor Shimada, and Assistant Professor Tatara	

Practical training

Functional science

Microbiology and immunology

Practical training content: Analysis of inflammatory responses in immune cells / Evaluation of bacterial antimicrobial susceptibility
Innate immune cells exposed to bacterial components activate intracellular signal transduction via innate immune-related receptors, causing NF-κB, a transcription factor and "master regulator" of the inflammatory response, to translocate into the nucleus and induce the expression of various genes. Students will learn how to analyze inflammatory responses in a macrophage cell line stimulated with lipopolysaccharide, using basic techniques such as Western blotting and ELISA. In addition, in bacteriology, students will learn about bacterial biofilm formation and the development of drug resistance.

Training locations: Laboratory, 4th floor, Yayoi Memorial Education Building; Large practical training room 1; and Institute for Comprehensive Medical Sciences, 2nd floor, Tomoe Research and Education Building

Capacity: Up to 6

	Morning 09:00–12:00		Afternoon 13:00–16:00	
Day 1 8/17 (Mon)	[Lecture] Videos of training sessions on recombinant DNA experiments. [Lecture] Explanation of the practical training	Professor Yanagisawa, Associate Professor Osaka, Assistant Professor Iizuka, Assistant Professor Takashi Nishida, and Part-time Lecturer Ueshiba	[Lecture] Explanation of the practical training [Practical training] Cell culture Bacterial culture	Professor Yanagisawa, Associate Professor Osaka, Assistant Professor Iizuka, Assistant Professor Takashi Nishida, and Part-time Lecturer Ueshiba
Day 2 8/18 (Tue)	[Lecture] Explanation of the practical training [Practical training] Protein extraction	Professor Yanagisawa, Associate Professor Osaka, Assistant Professor Iizuka, Assistant Professor Takashi Nishida, and Part-time Lecturer Ueshiba	[Lecture] Explanation of the practical training [Practical training] Western blotting I ELISA I Bacterial culture: medium replacement	Professor Yanagisawa, Associate Professor Osaka, Assistant Professor Iizuka, Assistant Professor Takashi Nishida, and Part-time Lecturer Ueshiba
Day 3 8/19 (Wed)	[Lecture] Explanation of the practical training [Practical training] Western blotting II ELISA II	Professor Yanagisawa, Associate Professor Osaka, Assistant Professor Iizuka, Assistant Professor Takashi Nishida, and Part-time Lecturer Ueshiba	[Lecture] Explanation of the practical training [Practical training] ELISA II Biofilm analysis I	Professor Yanagisawa, Associate Professor Osaka, Assistant Professor Iizuka, Assistant Professor Takashi Nishida, and Part-time Lecturer Ueshiba
Day 4 8/20 (Thu)	[Lecture] Explanation of the practical training [Practical training] Basic procedures in bacteriological experiments	Professor Yanagisawa, Associate Professor Osaka, Assistant Professor Iizuka, Assistant Professor Nishida, and Part-time Lecturer Ueshiba	[Lecture] Explanation of the practical training [Practical training] Biofilm analysis II	Professor Yanagisawa, Associate Professor Osaka, Assistant Professor Iizuka, Assistant Professor Takashi Nishida, and Part-time Lecturer Ueshiba
Day 5 8/21 (Fri)	[Practical training] Biofilm analysis III Report preparation	Professor Yanagisawa, Associate Professor Osaka, Assistant Professor Iizuka, Assistant Professor Takashi Nishida, and Part-time Lecturer Ueshiba	[Discussion] Summary and overall review	Professor Yanagisawa, Associate Professor Osaka, Assistant Professor Iizuka, Assistant Professor Takashi Nishida, and Part-time Lecturer Ueshiba

Practical training

Advanced biomedical sciences

Integrated medical sciences (Associate Professor Tanabe)

Capacity: Up to 2

	Morning (lecture and practical training) 09:00–12:00	Instructor(s)	Afternoon (practical training) 13:00–16:00	Instructor(s)	Location
Day 1 9/1 (Tue)	Preparation of transmission electron microscopy (TEM) samples ○ Preparation of epoxy resin blocks Prefixation (with glutaraldehyde)	Associate Professor Tanabe	Preparation of transmission electron microscopy samples ○ Preparation of epoxy resin blocks Postfixation (with osmium tetroxide) Dehydration (using a graded ethanol series) Preparation of epoxy resin Resin replacement	Associate Professor Tanabe	Tomoe Research and Education Building, 1st floor Imaging area
Day 2 9/2 (Wed)	Preparation of transmission electron microscopy samples ○ Preparation of epoxy resin blocks Resin embedding Thermal polymerization	Associate Professor Tanabe	Preparation of transmission electron microscopy samples ○ Preparation of ultrathin sections Operation of an ultramicrotome Preparation of glass knives Preparation of glass knife boats Trimming of resin blocks	Associate Professor Tanabe	Tomoe Research and Education Building, 1st floor Imaging area
Day 3 9/7 (Mon)	Preparation of transmission electron microscopy samples ○ Preparation of ultrathin sections Handling of glass knives Trimming of resin blocks Preparation of semithin sections Toluidine blue staining	Associate Professor Tanabe	Preparation of transmission electron microscopy samples ○ Preparation of ultrathin sections Handling of diamond knives Preparation of ultrathin sections Preparation of grid specimens	Associate Professor Tanabe	Tomoe Research and Education Building, 1st floor Imaging area
Day 4 9/8 (Tue)	Preparation of transmission electron microscopy samples ○ Preparation of ultrathin sections Handling of diamond knives Preparation of ultrathin sections Preparation of grid specimens	Associate Professor Tanabe	Preparation of transmission electron microscopy samples ○ Preparation of ultrathin sections Preparation of ultrathin sections Preparation of grid specimens Electron staining	Associate Professor Tanabe	Tomoe Research and Education Building, 1st floor Imaging area
Day 5 9/9 (Wed)	Transmission electron microscopy observation ○ TEM observation Sample mounting Adjustment of the Z-axis and voltage axis Digital observation	Associate Professor Tanabe	Transmission electron microscopy observation ○ TEM observation Sample mounting Adjustment of the Z-axis and voltage axis Digital observation	Associate Professor Tanabe	Tomoe Research and Education Building, 1st floor Imaging area

Practical training

Functional science
Pharmacology

Practical training content: Analysis of intracellular calcium dynamics and evaluation of protein expression
1. Analysis of intracellular calcium dynamics is a technique required in many fields, as these dynamics are associated with various biological phenomena. Using cultured cardiomyocytes as a model, students will visualize calcium dynamics associated with cardiomyocyte contraction-relaxation through GCaMP gene transfer using an adeno-associated virus, and learn the methods for quantifying these dynamics. 2. Using mouse macrophage-like cells, students will learn how to evaluate migratory capacity and detect phosphorylation of intracellular signaling molecules using Western blotting after stimulation with lipopolysaccharides. 3. Proteomics analysis is widely applied in research on several diseases, including cancer. Students will learn about analytical methods using proteomics data from mouse cancer cells.

Training location: Laboratory, 5th floor, Yayoi Memorial Education Building

Capacity: Up to 4 students. Experience with cell culture is desirable. Before participating in the practical training, students must attend the biosafety training session for recombinant DNA experiments.

	Morning 09:00–12:00		Afternoon 13:00–16:00	
Day 1 9/14 (Mon)	[Lecture] Explanation of the practical training [Practical training] Cell culture	Professor Matsuura, Lecturer Noguchi, Assistant Professor Takita, Assistant Professor Kaji, Assistant Professor Aoki, and Assistant Professor Fujita	[Lecture] Explanation of the practical training [Practical training] Cell culture	Professor Matsuura, Lecturer Noguchi, Assistant Professor Takita, Assistant Professor Kaji, Assistant Professor Aoki, and Assistant Professor Fujita
Day 2 9/15 (Tue)	[Lecture] Explanation of the practical training [Practical training] Cell culture, Western blotting	Professor Matsuura, Lecturer Noguchi, Assistant Professor Takita, Assistant Professor Kaji, Assistant Professor Aoki, and Assistant Professor Fujita	[Lecture] Explanation of the practical training [Practical training] Western blotting	Professor Matsuura, Lecturer Noguchi, Assistant Professor Takita, Assistant Professor Kaji, Assistant Professor Aoki, and Assistant Professor Fujita
Day 3 9/16 (Wed)	[Lecture] Explanation of the practical training [Practical training] Proteomics data analysis	Professor Matsuura, Lecturer Noguchi, Assistant Professor Takita, Assistant Professor Kaji, Assistant Professor Aoki, and Assistant Professor Fujita	[Lecture] Explanation of the practical training [Practical training] Proteomics data analysis	Professor Matsuura, Lecturer Noguchi, Assistant Professor Takita, Assistant Professor Kaji, Assistant Professor Aoki, and Assistant Professor Fujita
Day 4 9/17 (Thu)	[Lecture] Explanation of the practical training [Practical training] Western blotting	Professor Matsuura, Lecturer Noguchi, Assistant Professor Takita, Assistant Professor Kaji, Assistant Professor Aoki, and Assistant Professor Fujita	[Lecture] Explanation of the practical training [Practical training] Western blotting	Professor Matsuura, Lecturer Noguchi, Assistant Professor Takita, Assistant Professor Kaji, Assistant Professor Aoki, and Assistant Professor Fujita
Day 5 9/18 (Fri)	[Practical training] Calcium imaging analysis	Professor Matsuura, Lecturer Noguchi, Assistant Professor Takita, Assistant Professor Kaji, Assistant Professor Aoki, and Assistant Professor Fujita	[Practical training] Calcium imaging analysis	Professor Matsuura, Lecturer Noguchi, Assistant Professor Takita, Assistant Professor Kaji, Assistant Professor Aoki, and Assistant Professor Fujita

Practical training

Advanced biomedical sciences

Integrated medical sciences

(Associate Professor Akagawa)

Capacity: Up to 4

	Morning (lecture and practical training) 09:00-12:00	Instructor(s)	Afternoon (practical training) 13:00-16:00	Instructor(s)
Day 1 9/28 (Mon)	Lectures and practical training "Overview and schedule of the experiment" "Structure of output data from next-generation sequencing" Location: Tomoe Research and Education Building, Institute for Comprehensive Medical Sciences	Associate Professor Akagawa	Lectures and practical training "Setting up the data analysis environment I" Installing a Linux environment Basic command-line operations Location: Tomoe Research and Education Building, Institute for Comprehensive Medical Sciences	Associate Professor Akagawa
Day 2 9/29 (Tue)	Lectures and practical training "Setting up the data analysis environment II" Installing and using programs for next-generation sequencing data analysis Combining and extracting data Location: Tomoe Research and Education Building, Institute for Comprehensive Medical Sciences	Associate Professor Akagawa	Lectures and practical training "Setting up the data analysis environment III" Installing and using programs for next-generation sequencing data analysis Annotation assignment Location: Tomoe Research and Education Building, Institute for Comprehensive Medical Sciences	Associate Professor Akagawa
Day 3 9/30 (Wed)	Lectures and practical training "Using web databases I" Introduction to essential web databases for data analysis and how to use them Location: Tomoe Research and Education Building, Institute for Comprehensive Medical Sciences	Associate Professor Akagawa	Lectures and practical training "Using web databases II" Introduction to web-based analysis programs and how to use them Location: Tomoe Research and Education Building, Institute for Comprehensive Medical Sciences	Associate Professor Akagawa
Day 4 10/1 (Thu)	Lectures and practical training "Biological interpretation of analysis results I" Understanding the output results from the analysis programs used in the practical training to date Location: Tomoe Research and Education Building, Institute for Comprehensive Medical Sciences	Associate Professor Akagawa	Lectures and practical training "Biological interpretation of analysis results II" More advanced bioinformatics analysis How to link the results to wet-lab functional analysis experiments Location: Tomoe Research and Education Building, Institute for Comprehensive Medical Sciences	Associate Professor Akagawa
Day 5 10/2 (Fri)	Lectures and practical training "Compiling analysis data I" How to prepare a genetic analysis report paper Location: Tomoe Research and Education Building, Institute for Comprehensive Medical Sciences	Associate Professor Akagawa	Lectures and practical training "Compiling analysis data II" Data required for publication in a research Location: Tomoe Research and Education Building, Institute for Comprehensive Medical Sciences	Associate Professor Akagawa

Common Lectures in Clinical Medicine, Academic Year 2026

(for students majoring in internal medicine or surgery)

Students must select coursework equivalent to 1 credit from the items listed below (1.5 h/item × 10 items)

Lecture title	Lecture content	Department	Instructor(s)	Recording date and time
Introduction to cell therapy	Historical overview of treatments using cultured cells, including regenerative medicine, cancer immunotherapy, and gene therapy: From up-to-date basic research to therapies that have obtained regulatory approval and been commercialized	Institute of Advanced Biomedical Engineering and Science	Professor Yamato	5/27 (Wed) 10:00–11:30
Diabetes: Basic and clinical aspects	Current status, diagnosis, and treatment of diabetes	Diabetes and metabolic medicine	Professor Nagao	6/10 (Wed) 10:00–11:30
Advances in the diagnosis and treatment of systemic sclerosis	Pathophysiology, diagnosis, assessment, and treatment of systemic sclerosis	Rheumatology and collagen diseases	Clinical Professor Kawaguchi	6/4 (Thu) 13:00–14:30
Introduction to behavioral medicine	Cognitive and behavioral characteristics of children with neurodevelopmental disorders (developmental disabilities), and clinical psychological approaches	Pediatrics	Certified Public Psychologist Terasawa	6/10 (Wed) 13:00–14:30
Introduction to sleep medicine: Fundamentals of insomnia treatment	Sleep physiology, types of sleep disorders, health effects, and treatment; pathophysiology, pharmacotherapy, and nonpharmacological therapy for insomnia	Psychiatry	Associate Professor Oshibuchi	6/15 (Mon) 15:00–16:30
General anesthesia, consciousness, and pain	“Not asleep, but not dead either”: Anesthesia is a profoundly mysterious phenomenon. This lecture provides an overview of the academic basis of anesthesia	Anesthesiology	Professor Nagasaka	6/17 (Wed) 9:00–10:30
Introduction to perinatal medicine	Current status and issues in perinatal medicine	Obstetrics	Lecturer Ishikawa	6/17 (Wed) 13:00–14:30
Transplantation and artificial organ medicine I: Artificial hearts	Overview of implantable ventricular assist device therapy, which is used as a bridge to heart transplantation or as destination therapy for end-stage severe heart failure that has exceeded the limits of medical treatment, as well as a mechanical circulatory support for acute severe circulatory failure	Cardiovascular surgery	Visiting Professor Nishinaka	6/26 (Fri) 15:00–17:00
Introduction to diagnostic pathology	Purpose, significance, and workflow of diagnostic pathology, including histopathology, cytology, and autopsy pathology; immunohistochemistry for differential diagnosis, disease activity markers, and detection of therapeutic targets; and applications in cancer panel testing using formalin-fixed, paraffin-embedded specimens	Diagnostic pathology	Specially Appointed Professor Nagashima	7/1 (Wed) 9:00–10:30
Introduction to biomaterials and drug delivery systems	When artificial materials come into contact with the body, various reactions occur and foreign-body recognition responses proceed. This lecture summarizes methods for avoiding these recognition responses and explains the properties of antithrombogenic materials, biocompatible materials, and drug delivery systems (DDS).	Institute of Advanced Biomedical Engineering and Science	Lecturer Nakayama	7/2 (Thu) 14:00–15:30
Rehabilitation nutrition	Overview of rehabilitation nutrition, sarcopenia, frailty, and cachexia	Rehabilitation Science	Professor Wakabayashi	7/15 (Wed) 14:00–15:30
Surgical treatment for inflammatory bowel disease	Overview of surgical treatment for ulcerative colitis and Crohn’s disease	Gastrointestinal surgery	Associate Professor Ogawa	9/2 (Wed) 14:00–15:30
Treatment strategies for hematologic malignancies	Chemotherapy and hematopoietic cell transplantation for hematologic malignancies such as leukemia	Hematology	Professor Seo	9/2 (Wed) 14:00–15:30
Pregnancy and cancer	Diagnosis, treatment, and prognosis of gynecologic malignancies occurring during pregnancy	Gynecology	Professor Tabata	9/7 (Mon) 15:00–16:30
Frontiers in clinical endocrine surgery	Current knowledge and techniques in endocrine surgery	Endocrine surgery	Associate Professor Horiuchi	9/16 (Wed) 14:00–15:30
Recent findings in the diagnosis and treatment of endocrine disorders	Overview of contemporary approaches in the diagnosis and treatment of endocrine disorders, with presentation of actual cases	Endocrinology	Professor Otsuki	9/30 (Wed) 15:00–16:30
Surgical treatment of colorectal cancer	Evolution of surgical treatment for colorectal cancer; the practice of minimally invasive surgery	Gastrointestinal Surgery	Professor Yamaguchi	10/20 (Tue) 16:30–18:00
Transplantation and artificial organ medicine II: Heart transplantation	Heart transplantation outcomes have improved markedly owing to the development of superior immunosuppressive agents. However, a worldwide shortage of donors remains a major issue.	Cardiovascular Surgery	Associate Professor Saito	11/5 (Thu) 13:00–14:30
Analyzing physicians’ clinical consultations using the latest technology	Analysis of verbal and nonverbal communication during clinical consultations, using various methods, including artificial intelligence (AI)	General Practice/General Internal Medicine	Professor Takemura	11/6 (Fri) 9:00–10:30

Lecture title	Lecture content	Department	Instructor(s)	Recording date and time
Radiation oncology (medical physics)	Radiation therapy technology, physical quality assurance in radiation therapy, and an overview of medical physics research	Radiation oncology (medical physics)	Lecturer Kanai	12/1 (Tue) 14:00–15:30
Current status and future prospects for early diagnosis of pancreatic cancer	Overview of early diagnosis of pancreatic cancer, an intractable cancer, focusing primarily on surveillance of high-risk groups, such as patients with pancreatic cystic tumors	Gastroenterology	Professor Nakai	12/16 (Wed) 14:00–15:30
First steps toward becoming a researcher who can obtain competitive research funding	Developing a research plan from an endocrinological perspective; writing an application for competitive research funding	Internal medicine for humoral pathophysiology regulation	Specially Appointed Professor Ichihara	12/22 (Tue) 10:00–11:30
Radiation oncology: Specific topics in radiation therapy	Indications for radiation therapy; points to consider when ordering radiation therapy; management during radiation therapy; insurance coverage for particle beam therapy	Radiation oncology	Professor Hashimoto	1/8 (Fri) 14:00–15:30
Contemporary catheter-based treatments for valvular heart disease and large-vessel disease	Valvular heart disease and large-vessel disease are currently being treated with less invasive approaches. This lecture introduces current catheter-based treatments.	Cardiovascular surgery	Associate Professor Domoto	1/12 (Tue) 13:00–14:30
Diagnosis and treatment of esophageal and gastric varices	Current techniques and treatment approaches, focusing primarily on endoscopic diagnosis and treatment of esophageal and gastric varices	Gastroenterology	Professor Nakamura	1/14 (Thu) 13:00–14:30
Introduction to oral and maxillofacial surgery	Surgery for jaw deformities, trauma, jawbone tumors, and dental implants	Oral and maxillofacial surgery	Professor Koga	2/10 (Wed) 13:00–14:30
Optimization of treatment for renal cancer	Surgical and pharmacological treatment for renal cancer	Urology	Professor Takagi	2/10 (Wed) 14:00–15:30
Current status of ligament injury treatment and prospects for the development of biomaterial substitutes	Current status of ligament reconstruction using autologous tendon grafts; research on decellularized xenogeneic biomaterials	Orthopedics	Lecturer Ito	2/10 (Wed) 15:30–17:00
What clinicians should know about in medical device development	How medical devices are regulated; how they are developed; how clinicians can contribute to medical device development	Cardiology	Part-Time Lecturer Uchida	2/18 (Thu) 14:00–15:30
Advanced image processing and computer-aided diagnosis	Respiratory and mediastinal diseases	Diagnostic imaging and nuclear medicine	Professor Sakai	2/19 (Fri) 10:00–11:30

Recording location: Classrooms in the Yayoi Memorial Education Building

Schedule: In principle, Wednesdays from June to February, 14:00–15:30 p.m., excluding July 20–August 31 and January 22–February 1

Clinical Medicine Practicum, Academic year 2026

(for students majoring in internal medicine or surgery)

Students must select practicum coursework equivalent to 1 credit from the below-listed items (2 h/item × 15 items)

Practicum item		Practicum content	Department	Faculty	Location	Capacity	Days and time	Special notes/contact information
Diagnostic imaging	1	Cardiovascular CT, MRI, and nuclear medicine	Diagnostic imaging and nuclear medicine	Associate Professor Nagao	General Outpatient Center B1 Second Reading	7	From May Tuesday–Friday; Afternoon	Associate Professor Nagao PHS 28256
Diagnostic imaging	2	Nuclear medicine: Fundamentals and clinical applications of functional imaging using PET/CT	Diagnostic imaging and nuclear medicine	Professor Sakai	Education and Research Building Conference Room	5	Mornings (except Wednesday)	Professor Sakai PHS 28258
Diagnostic imaging	3	3D diagnostic imaging	Ophthalmology	Associate Professor Maruko	General Outpatient Center 3F Ophthalmology Outpatient	2	Monday and Thursday; As needed during outpatient consultations	Department Secretary PHS 29450
Diagnostic imaging	4	Differential diagnosis of neck masses	Otolaryngology/ Head and neck surgery	Associate Lecturer Inai	General Outpatient Center 4F Otolaryngology	1	Monday; Afternoon	Faculty Room 37522
Surgical treatment	1	Liver cancer surgery	Liver, gallbladder, and pancreatic surgery	Professor Honda	Central Operating Room	2	Tuesday–Friday 10:00–15:00	Professor Honda's Office 25211
Surgical treatment	2	Pancreatic cancer surgery	Liver, gallbladder, and pancreatic surgery	Professor Honda	Central Operating Room	2	Tuesday–Friday 10:00–15:00	Professor Honda's Office 25211
Surgical treatment	3	Surgical observation and procedural explanation	Neurosurgery	Lecturer Yamaguchi	Central Operating Room 14-17/19	5	Tuesday and Wednesday	Department Office 33411
Surgical treatment	4	Surgical observation and procedural explanation	Neurosurgery	Associate Professor Aihara	Central Operating Room 14-17/19	5	Monday	Department Office 33411
Surgical treatment	5	Esophageal reconstruction using free jejunal/colon transfer	Plastic surgery	Professor Sakurai	West Ward B Operating Room	2	Tuesday and Wednesday; Morning	Department Office 37111
Surgical treatment	6	Cataract surgery	Ophthalmology	Lecturer Hasegawa	West Ward Operating Room	2	Monday and Thursday; Morning, as needed during surgery	Department Secretary PHS 29450
Surgical treatment	7	Vitreous surgery	Ophthalmology	Associate Professor Maruko	West Ward Operating Room	2	Wednesday; Morning, as needed during surgery	Department Secretary PHS 29450
Surgical treatment	8	Surgical observation: dental implant	Oral and maxillofacial surgery	Professor Okamoto	General Outpatient Center 4F Dental Oral Surgery Outpatient	2	Monday–Friday 9:00–16:00 As needed	Prof. Okamoto PHS 28361
Surgical treatment	9	Orthognathic surgery	Oral and maxillofacial surgery	Professor Koga	Central Operating Room	2	Thursday 9:00–15:00	Professor Koga PHS 28334
Surgical treatment	10	Breast cancer surgery	Breast surgery	Professor Akashi Lecturer Noguchi	Central Operating Room	1	Mondays, Wednesdays, and Fridays, as needed during surgery	Faculty Room 37554
Transplantation and artificial organ medicine *	1	Artificial heart	Cardiovascular surgery	Visiting Professor Nishinaka	West Ward B 1F Conference Room	5	9/11 (Fri) 15:00–17:00	Visiting Professor Nishinaka PHS 28451
Transplantation and artificial organ medicine *	2	Heart transplantation	Cardiovascular surgery	Associate Professor Saito	West Ward B Operating Room	5	6/11 (Thu) 14:00–15:30	Associate Professor Saito PHS 28474
Transplantation and artificial organ medicine	3	Kidney transplantation	Urology	Prof. Takagi Prof.Ishida Associate Prof. Hirai	Central Operating Room	4	Days of the week: consultation-based arrangement	Professor Ishida PHS 28732
Endovascular Therapy	1	Renal artery balloon dilation	Urology	Professor Takagi	Central Ward, 1st floor Angiography Room	5	Days of the week: consultation-based arrangement	Professor Ishida PHS 28732
Endovascular Therapy	2	Internal shunt balloon dilation	Urology	Professor Takagi	Central Ward, 1st floor Angiography Room	5	Days of the week: consultation-based arrangement	Professor Ishida PHS 28732
Laparoscopic surgery	1	Robotic-assisted laparoscopic surgeries: nephrectomy and prostatectomy	Urology	Professor Takagi Associate Professor Yoshida	Central Operating Room	4	Available as needed; consultation-based arrangement	Professor Takagi extension 37536
Laparoscopic surgery	2	Retroperitoneoscopic donor nephrectomy	Urology	Professor Takagi Professor Ishida	Central Operating Room	4	Days of the week: consultation-based arrangement	Professor Ishida PHS 28732

Practicum item		Practicum content	Department	Faculty	Location	Capacity	Days and time	Special notes/contact information
Medical electrotherapy *	1	Catheter ablation	Cardiology	Specially Appointed Professor Shoda, Endowed Department	West Ward B 2F Catheter Room 5	4	5/22 (Fri) 15:00–17:00	Department Office 23110
Medical electrotherapy	2	Laser treatment of pigmented skin lesions	Plastic surgery	Professor Sakurai	General Outpatient Center 3F Laser Room	2	Monday–Friday Negotiable	Department Office 37111
Ultrasound diagnostics	1	Transrectal prostate ultrasonography	Urology	Professor Takagi Associate Professor Iizuka Lecturer Sawada	General Outpatient Center Urology Outpatient	2	Days of the week: consultation-based arrangement	Associate Professor Iizuka Extension 33511-3
Ultrasound Diagnostics	2	Renal allograft Doppler ultrasonography	Urology	Professor Takagi Professor Ishida	General Outpatient Center Urology Outpatient	2	Days of the week: consultation-based arrangement	Professor Ishida PHS 28732
Ultrasound Diagnostics	3	Renal Doppler ultrasonography (power Doppler)	Urology	Professor Takagi	General Outpatient Center Urology Outpatient	6	Days of the week: consultation-based arrangement	Professor Ishida PHS 28732
Ultrasound Diagnostics	4	Renal and urinary tract ultrasonography	Urology	Professor Takagi	General Outpatient Center Urology Outpatient	2	Days of the week: consultation-based arrangement	Professor Ishida PHS 28732
Ultrasound Diagnostics	5	Ultrasonographic diagnosis and treatment of gastrointestinal diseases	Gastroenterology	Professor Nakai Lecturer Takayama	General Outpatient Center 2F Ultrasound Laboratory	2	Upon consultation	Department Office 25212
Ultrasound Diagnostics	6	Thyroid ultrasonography, including fine-needle aspiration cytology; carotid ultrasonography	Internal medicine for humoral pathophysiology regulation	Associate Professor Seki Clinical Lecturer Takano	General Outpatient Center 4th Floor Endocrine Laboratory	1	Tuesday, Wednesday, and Thursday (limited to one of these days depending on the academic year) 13:00–15:00	Clinical Lecturer Takano PHS 28832
Therapeutic endoscopy	1	Microdebrider-assisted sinonasal surgery	Otolaryngology/ Head and neck surgery	Assistant Professor Mukai	Central Operating Room	1	Wednesday or Thursday; Upon consultation	Department Office 28531
Therapeutic endoscopy	2	Observation of bronchoscopic treatment for endobronchial tumors, including laser therapy and stent placement to maintain airway patency	Thoracic surgery	Professor Kanzaki Associate Professor Izaka	Central Operating Room or Central Angiography Room	2	Monday, Tuesday, and Friday 9:00–17:00 Available as needed	Professor's Office: Extension 37546. Professor Kanzaki: Extension 28899. Contact at least 2 weeks in advance to confirm
Therapeutic endoscopy	3	Transurethral resection of the prostate (TURP)	Urology	Professor Takagi Associate Professor Iizuka	Central Operating Room	4	Days of the week: to be arranged by consultation	Associate Professor Iizuka Extension 33511-3
Therapeutic endoscopy	4	Percutaneous lithotripsy	Urology	Professor Takagi Associate Professor Yoshida	Lithotripsy room on the 3rd basement floor of the General Outpatient Center	4	Available as needed; consultation-based arrangement	Professor Takagi Extension 37536
Therapeutic endoscopy	5	Treatment of biliary and pancreatic diseases	Gastroenterology	Professor Nakai Lecturer Shirata	General Outpatient Center Second floor Endoscope Room	2	Upon consultation	Department of Gastroenterology 25212
Therapeutic endoscopy	6	Diagnosis and treatment of colonic diseases	Gastroenterology	Professor Nakamura Assistant Professor Yonezawa	General Outpatient Center Second floor Endoscope Room	2	Upon consultation	Department Office 25212
Diagnostic endoscopy	1	Diagnosis and treatment of early gastrointestinal cancer	Gastroenterology	Professor Nonaka Associate Professor Kishino Lecturer Misumi	General Outpatient Center 2nd Floor Endoscope Room	2	Upon consultation	Department Office 25212
Diagnostic endoscopy	2	Bronchoscopy	Respiratory medicine	Lecturer Arimura	General Outpatient Center B1 Fluoroscopy room	2	Tuesday; Morning	Lecturer Arimura PHS 28193
Diagnostic endoscopy	3	Bronchoscopic diagnosis	Respiratory medicine	Lecturer Arimura	General Outpatient Center B1 Fluoroscopy room	2	Monday and Thursday; Afternoon	Lecturer Arimura PHS 28193
Diagnostic endoscopy	4	Diagnosis and treatment of middle ear lesions	Otolaryngology/ Head and neck surgery	Professor Mizutari	General Outpatient Center 4F Otolaryngology	1	Wednesday or Thursday; Upon consultation	Faculty Room 37522
Diagnostic endoscopy	5	ENT treatments; otologic surgery	Otolaryngology/ Head and neck surgery	Professor Mizutari	General Outpatient Center 4F Otolaryngology	1	Wednesday or Thursday; Upon consultation	Faculty Room 37522

Practicum item	Practicum content	Department	Faculty	Location	Capacity	Days and time	Special notes/contact information
Emergency medicine 1	Multidisciplinary treatment for multi-organ failure	Emergency medicine	Professor Mori Clinical Professor Takeda	Emergency and Critical Care Center ICU	2	October–March	Department office 36085
Emergency medicine 2	Emergency cardiac and great vessel surgery	Cardiovascular surgery	Lecturer Kikuchi	West Ward B Operating Room	2	Day and time: consultation-based arrangement	Lecturer Kikuchi PHS 28448
Colon cancer surgery	Laparoscopic or robotic-assisted colectomy	Gastrointestinal surgery	Professor Yamaguchi	Central Operating Room	2	Wednesday, Thursday, and Friday 10:00–15:00	Department Office 25214
Rectal cancer surgery	Laparoscopic or robotic-assisted rectectomy	Gastrointestinal surgery	Professor Yamaguchi	Central Operating Room	2	Wednesday, Thursday, and Friday 10:00–15:00	Department Office 25214
ENT Diagnosis	Diagnosis and treatment of taste disorders	Otolaryngology/ Head and neck surgery	Associate Professor Yamamura	General Outpatient Center 4F	1	Friday; Morning	Faculty Room 37522
Thoracic endoscopic diagnosis	Surgical observation: Biopsy of mass lesion in the chest by mediastinoscopy or thoracoscopy.	Thoracic surgery	Professor Kanzaki Associate Professor Isaka Clinical Lecturer Hagiwara	Central Operating Room	2	Monday, Tuesday, and Friday 9:00–17:00 Available as needed	Professor's Office: Extension 37546. Professor Kanzaki: Extension 28899. Contact at least 2 weeks in advance to confirm
3D Video-Assisted Thoracoscopic Surgery	Branching patterns of the pulmonary arteries and veins and bronchi vary from patient to patient. Students will review the intrathoracic anatomy preoperatively using 3D-rendered preoperative CT images, proceed through the surgical steps as a virtual operator, and observe the subsequent thoracoscopic surgery in cases for which the simulated surgery was performed.	Thoracic surgery	Professor Kanzaki Associate Professor Isaka Lecturer Mitsuboshi	Central Operating Room	2	Monday, Tuesday, and Friday 9:00–17:00 Available as needed	Professor's Office: Extension 37546. Professor Kanzaki: Extension 28899. Contact at least 2 weeks in advance to confirm
Closure of postoperative air leaks in thoracic surgery	Pulmonary air leak is a unique intraoperative situation can occur in thoracic surgery in which air leaks from the lung. Traditionally, pulmonary air leaks were closed by directly suturing the leak site or using surrounding tissue. Currently, with the development of artificial materials, pulmonary air leaks are closed using fibrin glue or a combination of fibrin glue and artificial materials. Students will learn about the current standard of care, including methods of pulmonary air leak closure, through lectures and observation-based training.	Thoracic surgery	Professor Kanzaki Associate Professor Isaka Clinical Lecturer Ogihara	Central Operating Room	2	Monday, Tuesday, and Friday 9:00–17:00 Available as needed	Professor's Office: Extension 37546. Professor Kanzaki: Extension 28899. Contact at least 2 weeks in advance to confirm
Robotic-assisted thoracoscopic surgery	Although thoracoscopic surgery is widely established, robotic systems have been introduced as surgical assistants in thoracoscopy, enabling minimally invasive and high-precision surgical manipulation. Students will attend a lecture and observation-based training in 3D imaging assisted-surgery.	Thoracic surgery	Professor Kanzaki Associate Professor Isaka Lecturer Mitsuboshi	Central Operating Room	2	Monday, Tuesday, and Friday 9:00–17:00 Available as needed	Professor's Office: Extension 37546. Professor Kanzaki: Extension 28899. Contact at least 2 weeks in advance to confirm
Diagnostic pathology	Students will observe histopathologic specimens, mainly surgical specimens, and prepare diagnostic reports. Selected organ units will be focused upon such that students will obtain a comprehensive understanding of systemic pathology.	Diagnostic pathology	Specially Appointed Professor Nagashima	Department of Pathology (West Ward A 2F)	1	Saturday 9:00–11:00 Schedule adjustment required with participating students	PHS 29611, Extension 25226
Blood purification therapy	Lymphocyte antibody removal therapy	Urology	Professor Takagi Professor Ishida	Dialysis room on the 2nd floor of Ward 1	5	Days of the week: consultation-based arrangement	Professor Ishida PHS 28732
Immunotherapy	Immunosuppressive therapy for kidney transplantation	Urology	Professor Takagi Professor Ishida Associate Professor Hirai	General Outpatient Center Urology Outpatient	5	Days of the week: consultation-based arrangement	Professor Ishida PHS 28732

Practicum item	Practicum content	Department	Faculty	Location	Capacity	Days and time	Special notes/contact information
Endocrine surgery	Surgical observation	Endocrine surgery	Associate Professor Horiuchi Lecturer Omi Associate Lecturer Yoshida	Operating room	2	Monday and Wednesday 9:00–15:00	horiuchi.kiyomi @ twmu.ac.jp Contact at least 1 week in advance
Mechanical circulatory support *	Overview of mechanical circulatory support and its management	Cardiovascular surgery	Visiting Professor Nishinaka	West Ward B 1F Conference Room	5	10/16 (Fri) 15:00–17:00	Visiting Professor Nishinaka PHS 28451
Surgical treatment of inflammatory bowel disease	Lecture and surgical observation	Gastrointestinal surgery	Associate Professor Ogawa	West Ward A 2F Conference room; central operating room	2	Upon consultation	Department Office 25214
Coronary angiography; coronary angioplasty *	Interpretation of findings; procedures and methods	Cardiology	Professor Yamaguchi	West Ward B 1F Conference Room	5	5/28 (Thu) 14:00–16:00	Faculty Room 23102
Management of ischemic heart disease *	Management of unstable angina, acute myocardial infarction, and other conditions; treatment strategies	Cardiology	Professor Yamaguchi	West Ward B 1F Conference Room	5	6/4 (Thu) 14:00–16:00	Faculty Room 23102
Radiation oncology 1	Radiation therapy: From planning to treatment delivery	Radiation oncology	Assistant Professor Kono	Radiation Treatment Room, B3 Floor, General Outpatient Center	1-2	Consultation required Available as needed	Department Office 37411-2 Assistant Professor Kono PHS 28267 kono.sawa@twmu.ac.jp
Radiation oncology 2	Practical radiation therapy planning	Radiation oncology	Lecturer Kanai	Radiation Treatment Room, B3 Floor, General Outpatient Center	1-2	Consultation required Available as needed	Department office 37411-2 Lecturer Kanai PHS29206 kanai.takayuki@twmu.ac.jp
Psychiatry diagnostics	Assessment of psychiatric symptoms	Psychiatry	Associate Professor Oshibuchi	West Ward A 5th Floor	1	Consultation-based arrangement	Department Office 33201
Catheter-based treatment for valvular heart disease *	Procedures and methods	Cardiology	Professor Yamaguchi	West Ward B 1F Conference Room	5	6/25 (Thu) 14:00–16:00	Faculty Room 23102
Pharmacological treatment of arrhythmias *	Lecture on pharmacological treatment of arrhythmias, including the latest guidelines	Cardiology	Part-Time Lecturer Ejima	West Ward B 1F Conference Room	5	7/2 (Thu) 14:00–16:00	Faculty Room 23102
Anesthesiology	Research on topics in the field of anesthesiology	Anesthesiology	Professor Nagasaka Distinguished Clinical Professor Suzuki Professor Kurokawa Associate Professor Sasagawa Associate Professor Okano Assistant Professor Yamamoto Assistant Professor Takeishi Assistant Professor Moriwaki	Zoom (consultation-based arrangement)	Several students	Available as needed; consultation-based arrangement	Professor Nagasaka's Office 29465
Hematopoietic stem cell transplantation	Hematopoietic stem cell transplantation	Hematology	Professor Seo Lecturer Shinohara	Department of Hematology	5	Wednesday; Afternoon Consultation-based arrangement	Department Office 37544
Blood disease diagnostics	Morphologic diagnosis of hematopoietic tissue	Hematology	Professor Seo Associate Professor Yoshinaga	Department of Hematology	5	Wednesday; Afternoon Consultation-based arrangement	Department Office 37544
Diagnosis of skin diseases	Approach to performing pathologic examinations important for the diagnosis of skin diseases	Dermatology	Associate Professor Yamagami	Dermatology Outpatient	2	October (Thu) 13:30–15:30	Associate Professor Yamanoue PHS 29428
Physiological function testing and diagnosis	Pulmonary function test	Respiratory medicine	Lecturer Yagi	General Outpatient Center 2nd floor Pulmonary Function Testing Room	2	Tuesday; Afternoon	Lecturer Yagi PHS 28885
Diabetic nephropathy	Diagnosis and treatment	Diabetes and metabolic medicine	Lecturer Hanai	South Building 3F Diabetes and Metabolic Medicine Department	2	Tuesday 14:00–17:00 Consultation required	Department Office 27114

Practicum item	Practicum content	Department	Faculty	Location	Capacity	Days and time	Special notes/contact information
Diabetic macroangiopathy	Diagnosis and treatment	Diabetes and metabolic medicine	Professor Nagao	South Building 3F Diabetes and Metabolic Medicine Department	2	Wednesday 9:00–12:00 Consultation required	Department Office 27114
Diagnosis and treatment of diabetes	Self-monitoring of blood glucose and evaluation of continuous glucose monitoring / device-assisted insulin therapy.	Diabetes and metabolic medicine	Associate Professor Miura	South Building 3F Diabetes and Metabolic Medicine Department	2	Monday 13:00–17:00 Wednesday 14:00–17:00 Consultation required	Department Office 27114
Pathologic diagnosis of renal diseases	Renal biopsy	Nephrology	Professor Hoshino Lecturer Manabe	East Ward 4F Pathology Laboratory	3	Wednesday 13:00–16:00 Consultation required	Nephrology Center Medical Bureau 33511
Pathological diagnosis of liver diseases	Liver biopsy	Gastroenterology	Associate Professor Taniai Lecturer Ogiso	West Ward A, 2nd Floor, Pathological Diagnosis Department	3	Upon consultation	Department Office 25212
Psychotherapeutics	Modified electroconvulsive therapy	Psychiatry	Associate Professor Oshibuchi	West Ward B 2F Operating Room	1	Consultation-based arrangement	Department Office 33201
Abdominal CT imaging diagnosis and IVR (image-guided intervention) *	Fundamentals of abdominal CT imaging diagnosis and IVR (image-guided intervention)	Diagnostic imaging and nuclear medicine	Lecturer Morita	Education and Research Building Conference Room	3-4	2/2 (Tue) 14:00–15:00	Lecturer Morita PHS 28602
Head imaging techniques	Students will learn the techniques and theory of diagnostic imaging of the head using CT and MRI	Diagnostic imaging and nuclear medicine	Lecturer Suzuki	Education and Research Building Conference Room	5	From May onward, except Wednesdays	Lecturer Suzuki PHS 28270
Clinical neurology	Students will learn about the frontiers of clinical neurology	Neurology	Lecturer Ikeguchi	Conference Room, 3rd Floor, Ward 1	2	Every Tuesday (contact in advance to confirm)	Lecturer Ikeguchi PHS 28613
Treatment of neurologic diseases	Students will learn the latest evidence on the treatment of various neurologic diseases	Neurology	Lecturer Ikeguchi	Conference Room, 3rd Floor, Ward 1	2	Every Tuesday (contact in advance to confirm)	Lecturer Ikeguchi PHS 28613
Clinical practice in rheumatoid arthritis and collagen diseases	Students will learn the practical diagnosis and treatment of collagen diseases through cases encountered during rounds	Rheumatology and collagen diseases	Associate Professor Tanaka Lecturer Higuchi	Former Collagen Disease, Rheumatology, and Gout Center 3rd floor	2	Thursday 9:00–11:30	Lecturer Higuchi PHS 29821
Robot-assisted total knee arthroplasty	Intraoperative measurement of each patient's knee joint morphology to achieve optimal implant placement	Orthopedics	Professor Okazaki	Central Operating Room	2	Wednesday and Thursday 9:00–16:00	Professor Okazaki PHS 29402

For items marked with an asterisk (*), the practicum date and time are fixed; therefore, the Academic Affairs Section will contact students in advance via email to enroll those interested in attending the sessions. For all other practicums, students interested in attending should contact the relevant inquiry desk themselves.

In addition, the documents required for attendance can be obtained from the Academic Affairs Section.

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.**

Microscopic and Developmental Anatomy

Ⅰ Educational Policy

Investigating the mechanistic link between physiological function, development and morphology in various tissues/cells is the main mission of our lab. We focus on the research of fetal and adult hematopoietic stem cells: how these stem cells develop, are maintained and influenced by their microenvironment. Our course is ideal for those fascinated on how life works and those motivated by the application of basic biology to solve health issues.

Ⅱ Goals

Microanatomy and developmental biology majors are expected to reach the following goals:

Perform background research and discusses her/his central question of project.
Formulate a concrete experimental plan based on his/her hypothesis
Master the basic experimental techniques (histology, cellular biology) necessary for her/his research.
Critically assess data obtained from his/her research and review/refine experimental protocols accordingly.
Deliver and present her/his experimental data and conclusion both orally and in writing.
Be open to discussion and communicate well with other lab members.

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

Name of instructor	Research theme
Ayako Nakamura-Ishizu	**Cell extrinsic and intrinsic regulation of adult hematopoietic stem cells** Stem cells reside at the apex of a differentiation hiearchy and potentially give rise to a multitude of cells that compose a single tissue system. Our lab primarily focuses on the study of tissue stem cells, especially hematopoietic stem cells. We aim to delineate the mechanisms of how adult hematopoietic stem cells in the bone marrow are regulated endogenously as well as exogenously through interactions with their surrounding microenvironment (niche). We wish to achieve this through the appreciation of tissue and cell morphology and integration of functional analyses to gain a novel view regarding the regulation of stem cells and a tissue system. Training in flow cytometry, basic molecular biology, single cell sequence sample preparation and analysis, immunofluorescent imaging, transmission electron microscopy will be offered. Past publications: Blood. 2021 May 13;137(19):2609-2620.doi: 10.1182/blood.2020005517. Int J Mol Sci. 2021 Apr 28;22(9):4627.doi: 10.3390/ijms22094627. Cell Rep. 2018 Nov 13;25(7):1772-1785.e6.doi: 10.1016/j.celrep.2018.10.059.
Tomomasa Yokomizo	**Mechanisms of hematopoietic stem cell development** We aim to elucidate where and how hematopoietic stem cells emerge during fetal development. Past publications: Nature 2022 Sep;609(7928):779-784. doi: 10.1038/s41586-022-05203-0 J Exp Med 2019 Jul 1;216(7):1599-1614. doi: 10.1084/jem.20181399

Ⅳ Syllabus （＊ ＝ for doctor's license holders)

Title	Instructor	Credit	Theme
General concepts of the morphological approaches	Ayako Nakamura-Ishizu, Sachiko Kikuta	5	
Cell extrinsic and intrinsic regulation of adult hematopoietic stem cells	Ayako Nakamura-Ishizu, Tomomasa Yokomizo, Makiko Mochizuki-Kashio, Ayano Yahagi, Sachiko Kikuta	10	
Total credits		15	

(Microscopic and Developmental Anatomy) Syllabus (1)

Syllabus Title	General concepts of the morphological approaches
Instructor	Ayako Nakamura-Ishizu, Sachiko Kikuta
Credit	5
Type of Class	Laboratory experiments, research meetings and individual discussions
Theme	General concepts of the morphological approaches
Schedule	4 yrs
Couse Objective	Basic and advanced methods of analyzing mophologies of cells and tissues will be mastered. Methods will include bright-field histology, immunohistochemistry, immunofluorescence imaging, whole mount 3D imaging and trasmission electron microscopy.
Evaluation Methods	Students will be evaluated based on their performance in the lab and during research meetings
Grading Scale	General performance will be graded on the scale of 1 to 10 where 10 will be the highest mark
Textbooks/References	none specified
Independent Study Outside of Class	none specified
Room	none specified
Special Note	

Course Plan

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(Microscopic and Developmental Anatomy) Syllabus (2)

Syllabus Title	Cell extrinsic and intrinsic regulation of fetal and adult hematopoietic stem cells
Instructor	Ayako Nakamura-Ishizu
Credit	10
Type of Class	Laboratory experiments, research meetings and individual discussions
Theme	Cell extrinsic and intrinsic regulation of fetal and adult hematopoietic stem cells
Schedule	4 yrs
Couse Objective	**Cell extrinsic and intrinsic regulation of adult hematopoietic stem cells** Stem cells reside at the apex of a differentiation hiearchy and potentially give rise to a multitude of cells that compose a single tissue system. Our lab primarily focuses on the study of tissue stem cells, especially hematopoietic stem cells. We aim to delineate the mechanisms of how adult hematopoietic stem cells in the bone marrow are regulated endogenously as well as exogenously through interactions with their surrounding microenvironment (niche). We wish to achieve this through the appreciation of tissue and cell morphology and integration of functional analyses to gain a novel view regarding the regulation of stem cells and a tissue system. Training in flow cytometry, basic molecular biology, single cell sequence sample preparation and analysis, immunofluorescent imaging, transmission electron microscopy will be offered. Past publications: Blood. 2021 May 13;137(19):2609–2620.doi: 10.1182/blood.2020005517. Int J Mol Sci. 2021 Apr 28;22(9):4627.doi: 10.3390/ijms22094627. Cell Rep. 2018 Nov 13;25(7):1772–1785.e6.doi: 10.1016/j.celrep.2018.10.059.
Evaluation Methods	
Grading Scale	
Textbooks/References	none specified
Independent Study Outside of Class	none specified
Room	none specified
Special Note	

Course Plan

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Human Pathology & Pathological Neuroscience

Ⅰ Educational Policy

We would like to fulfill three chief missions at TWMU. 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. Hashimoto	(3) Pulmonary and gastrointestinal pathology In vascular pathology of the lungs, specialized especially in pathology of solitary pulmonary capillary hemangioma (SPCH), vascular lesions of pulmonary fractionation disease, and pathology of lung cancer and thrombosis. In the pathology of the gastrointestinal tract, particularly elucidated the background factors of vascular invasion of intramucosal colorectal carcinoma.
Associate Prof. Yamamoto	(4) 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.

Research Associate. Hakozaki	(5) Abnormal aggregation process of amyloid β (Aβ) and its clearance mechanism in Alzheimer's disease (AD) The widely accepted amyloid hypothesis postulates that Aβ accumulation in the brain is the trigger of a pathological cascade leading to AD. We aim to elucidate the abnormal aggregation process of Aβ by characterization of seed Aβ species that initiate and expand β-amyloidosis in vivo and by identification of anatomical clearance pathways of Aβ using autopsied brain samples.
Research Associate. Arimasu	(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 underling 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. Hashimoto	1	Cytopathology and tumor pathology
Special Pathology	Prof. Kurata Research Associate. Hakozaki	1	Cerebrovascular diseases, neurodegeneration, cancer genetics and metabolism
Diagnostic Pathology (General)	Associate Prof. Yamamoto Research Associate. Hakozaki	1	Tumor diagnostics (histology, cytology, elecron microscopy, immunohistochemistry, in situ hybridization)
Diagnostic Pathology (Special)	Research Associate. Hakozaki	1	Brain tumor pathology
Practical research activities	Prof. Kurata, Associate Prof. Yamamoto, Associate Prof. Hashimoto, Research Associate. Hakozaki, Research Associate. Arimasu	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	Tuesday14:00–15:10, 15:20–16:30
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	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	Hashimoto
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	Hashimoto	Cellular adaptation and degeneration
2	Hashimoto	Molecular mechanism of cell death
3	Hashimoto	Overview of cell cycle
4	Hashimoto	Aberrant cell cycle and diseases
5	Hashimoto	Morphological features of tumor cells
6	Hashimoto	Functional features of tumor cells
7	Hashimoto	Carcinogenic agents
8	Hashimoto	Cancer genetics

Human Pathology & Pathological Neuroscience Syllabus (3)

Syllabus Title	Special Pathology
Instructor	Kurata, Hakozaki
Credit	1
Type of Class	Lectuer and Practice
Theme	Cerebrovascular diseases, neurodegeneration, cancer genetics and metabolism
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)、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	Hakozaki	Biology of cerebral ischemia
2	Kurata	Pathology of cerebral ischemia
3	Hakozaki	Therapeutics on cerebral ischemia
4	Hakozaki	Aβ proteinopathy and α-synucleinopathy
5	Hakozaki	TDP-43 proteinopathy
6	Hakozaki	Oxidative stress, inflammation, glutamate toxicity
7	Hakozaki	Cancer genetics
8	Hakozaki	Cancer metabolism

Human Pathology & Pathological Neuroscience Syllabus (4)

Syllabus Title	Diagnostic Pathology (General)		
Instructor	Yamamoto, Hakozaki		
Credit	1		
Type of Class	Lectuer and Practice		
Theme	Tumor diagnostics (histology, cytology, elecron microscopy, immunohistochemistry, in situ hybridization)		
Schedule	Tuesday14:00-15:10, 15:20-16:30		
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	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	Hakozaki	Histological diagnosis
	2	Hakozaki	Cytological diagnosis
	3	Hakozaki	Application of electron microscopy
	4	Yamamoto, Hakozaki	Immunohistochemistry and in situ hybridization

Human Pathology & Pathological Neuroscience Syllabus (5)

Syllabus Title	Diagnostic Pathology (Special)
Instructor	Hakozaki
Credit	1
Type of Class	Lectuer and Practice
Theme	Brain tumor pathology
Schedule	Wednesday14:00–15:10, 15:20–16:30
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	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	Hakozaki	Brain tumor pathology (1)
2	Hakozaki	Brain tumor pathology (2)
3	Hakozaki	Cytopathology of brain tumors
4	Hakozaki	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 developmemt 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 ～ 25	All staffs	Tissue preparation and microscopic examination: Adaptation, metabolic disorders, degeneration Tumor pathology: Macroscopic and microscopic examination, immunohistochemistry, in situ hybridization
	26 ～ 50	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
	51 ～ 75	All staffs	Histological/cytological/EM examination of tumors; Molecular pathology; Histopathology of neuroepithelial and other brain tumors; IHC of brain tumors

Neurophysiology

Ⅰ Educational Policy

We are interested in neural circuit, which underlies higher brain functions. Neural circuit formation is affected by numbers of factors, such as development, inputs from outer environments, stress,and peripheral nerve injuries. To understand the mechanism of plasticity in neural circuit 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 developmental 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, Ueta, Kodama,Maruyama	(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. Nakayama (Kawamura), Ueta, Kasedo	(2) Mechanisms of developmental synapse elimination and post-maturation maintenance of neural circuits. In the central nervous system, synaptic connections between neurons are elaborated into neural circuits in response to the environment in an experience-dependent manner during a specific developmental period called the critical period, and are maintained throughout maturation. We aim to elucidate the regulatory mechanisms of neuronal circuit development and maintenance using various experimental techniques.
Prof. Miyata, Assistant Profs. Nakayama, Kasedo	(3) Brain function analysis of social isolation stress-loaded mice and transgender mice We generate mice subjected to social isolation stress and transgender mice, and analyze the physiological and behavioral aspects of the brain circuitry of these mice. We also aim to elucidate the molecular mechanisms involved in the neural circuits and behavioral changes induced by stress and transgenderism through omics analysis.
Prof. Miyata, Assistant Profs. Nakayama, Ueta, Kodama,Kasedo, Maruyama,	(4) Linkage between somatosensation and pain sensation and behavior We will clarify how somatosensation and pain are expressed in the cerebral cortex and how they are linked to escape behavior, emotion and cognition, and social behavior.

Ⅳ Syllabus （＊ ＝ for doctor's license holders）

Title	Instructor	Credit	Theme
Neuroscience	Prof. Miyata, Assistant Profs. Nakayama, Ueta, Kodama, Maruyama, Kasedo	1	Learn the overview of neuroscinece and neuroanatomy including ongoing research
Neurotecnology	Prof. Miyata, Assistant Profs. Nakayama, Ueta, Kodama, Maruyama, Kasedo	2	Learn techniques and knowledges to perform experiment by lectures and trainings
Research Progress Seminar	Prof. Miyata, Assistant Profs. Nakayama, Ueta, Kodama, Maruyama, Kasedo	2	Learn how to perform comprehensive academic presentation and constructive discussion
Experiment/Practice (Research for thesis)	Prof. Miyata, Assistant Profs. Nakayama, Ueta, Kodama, Maruyama, Kasedo	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. Nakayama (Kawamura), Ueta, Kodama, Maruyama, Kasedo
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	・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	・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, pleasse 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. Nakayama (Kawamura), Ueta, Kodama, Maruyama, Kasedo
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	・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, pleasse 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, Hisako Nakayama	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, Ryutaro Kasedo	Lectures and practices on the fundamental techniques of neuroscience
6	Mariko Miyata, Takashi Kodama	Lectures and practices on the fundamental techniques of neuroscience
7	Mariko Miyata, Hisako Nakayama	Lectures and practices on the fundamental techniques of neuroscience
8	Mariko Miyata, Yoshifumi Ueta	Lectures and practices on the fundamental techniques of neuroscience
9	Mariko Miyata, Takuma Maruyama	Lectures and practices on the fundamental techniques of neuroscience
10	Mariko Miyata, Ryutaro Kasedo	Lectures and practices on the fundamental techniques of neuroscience
11	Mariko Miyata	Lectures and practices on the fundamental techniques of neuroscience
12	Mariko Miyata, Takashi Kodama	Lectures and practices on the fundamental techniques of neuroscience
13	Mariko Miyata, Hisako Nakayama	Lectures and practices on the fundamental techniques of neuroscience
14	Mariko Miyata, Yoshifumi Ueta	Lectures and practices on the fundamental techniques of neuroscience
15	Mariko Miyata, Takuma Maruyama	Lectures and practices on the fundamental techniques of neuroscience
16	Mariko Miyata, Ryutaro Kasedo	Lectures and practices on the fundamental techniques of neuroscience

(Neurophysiology) Syllabus (3)

Syllabus Title	Research Progress Seminar
Instructor	Prof. Miyata, Assistant Profs. Nakayama (Kawamura), Ueta, Kodama, Maruyama, Kasedo
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	・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 mentering 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, pleasse feel free to contact us.

Course Plan

Number	Instructor	Contents
1	Mariko Miyata, Takashi Kodama	Presentation and discussion of research paper related to neuroscience
2	Mariko Miyata, Hisako Nakayama	Presentation and discussion of research paper related to neuroscience
3	Mariko Miyata, Yoshifumi Ueta	Presentation and discussion of research paper related to neuroscience
4	Mariko Miyata, Takuma Maruyama	Presentation and discussion of research paper related to neuroscience
5	Mariko Miyata, Ryutaro Kasedo	Presentation and discussion of research paper related to neuroscience
6	Mariko Miyata, Takashi Kodama	Presentation and discussion of research paper related to neuroscience
7	Mariko Miyata, Hisako Nakayama	Presentation and discussion of research paper related to neuroscience
8	Mariko Miyata, Yoshifumi Ueta	Presentation and discussion of research paper related to neuroscience
9	Mariko Miyata, Takuma Maruyama	Presentation and discussion of research paper related to neuroscience
10	Mariko Miyata, Ryutaro Kasedo	Presentation and discussion of research paper related to neuroscience
11	Mariko Miyata	Presentation and discussion of research paper related to neuroscience
12	Mariko Miyata, Takashi Kodama	Presentation and discussion of research paper related to neuroscience
13	Mariko Miyata, Hisako Nakayama	Presentation and discussion of research paper related to neuroscience
14	Mariko Miyata, Yoshifumi Ueta	Presentation and discussion of research paper related to neuroscience
15	Mariko Miyata, Takuma Maruyama	Presentation and discussion of research paper related to neuroscience
16	Mariko Miyata, Ryutaro Kasedo	Presentation and discussion of research paper related to neuroscience

(Neurophysiology) Syllabus (4)

Syllabus Title	Experiment/Practice (Research for thesis)
Instructor	Prof. Miyata, Assistant Profs. Nakayama (Kawamura), Ueta, Kodama, Maruyama, Kasedo
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	・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	・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, pleasse feel free to contact us at any time.

Course Plan	Number	Contents
	1 ～ 90	・Acquire an extensive and up-to-date knowledge from scientific papers through understanding brain structures and the synaptic functions. ・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). ・Set the goal, plan the project, and perfome the experiment to solve the issue. For these purposes, use and maintain a lab notebook. To complete avobe-mentioned objectives, choose a reseach subject and perform appropriate experiments through a reflective discussion with a mentor.
	91 ～ 120	Train to acquire the following expertise and skills. ・How to choose and run the appropriate statistical analysis against the acquired data. ・How to design comprehensive figures from the acquired data to convince audience. ・How to write the academic articles. ・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 ～ 150	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. ・Write, submit, and publish the academic article(s). ・Understand the research ethics. ・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. PTPδ, one of receptor-type protein tyrosine phosphatases, is involved in cortical dendritic growth regulated by Semaphorin 3A (Sema3A), an axon guidance molecule. We are currently investigating endogenous substrates for PTPδ, which have been identified phosphoproteome. We will also examine how these molecules are involved in higher brain functions such as memory and neurological disorders.

We are analysing the involvement of Collapsin Response Mediator Protein 1 (CRMP1), one of the signaling molecules of Sema3A, in neurodevelopmental disorders. We are investigating how the disease-related variants of CRMP1 affect neuronal developments in primary cultured neurons as well as in iPS derived neurons.

In addition, we are investigating the molecular mechanism involved in the formation and maturation of mast cell secretory granules, and the asymmetric distribution of the lipid bilayer at the elongating 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 graduate 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 graduate 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 Takizawa K	(1) Elucidation of the molecular mechanism of dendrites and synaptogenesis by tyrosine phosphatase PTPδ PTPδ is involved in the formation of dendrites and synapses in various regions such as cerebral cortex and cerebellum. Preliminary experiments suggests that PTPδ 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 PTPδ in dendrite / synaptogenesis and higher-order functions.
Nakamura F Makihara H	(2) Elucidation of novel molecular mechanisms of neurodevelopmental disorders focusing on CRMP1 mutations CRMPs are intracellular phospho-proteins, which are involved in neurite guidance and spine development via transmitting the Sema3A signal. Since we found missense mutations in CRMP1 in patients with neurodevelopmental disorders, we are analyzing how these mutations affect neuronal development using primary cultured neurons.
Tanaka S Nakamura F	(3) 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).

Arashiki N Nakamura F	(4) 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 scramblerase. 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.
Chimura T Nakamura F	(5) Elucidation of novel molecular mechanisms regulating intracellular calcium signaling in the central nervous systems Intracellular calcium signaling mediated by protein phosphorylation/dephosphorylation plays a critical role in neuronal functions. We have developed an in-vitro assay system for monitoring the phosphorylation state of proteins expressed in mouse brains. By using this system, we are analyzing the role of a novel protein, UF1 (Unknown Function 1), in the calcium-dependent regulation of the phosphorylation state of synaptic proteins. Identification and characterization of novel mechanisms regulating intracellular calcium signaling in neurons are currently underway.

Ⅳ Syllabus (＊ ＝ for doctor's license holders)

Title	Instructor	Credit	Theme
New findings in biochemistry, molecular biology and Neuroscience	Nakamura F., Tanaka S., Makihara H., Arashiki N., Takizawa K., Chimura T	2	New findings in biochemistry, molecular biology and Neuroscience
Progress reports and original article readings	Nakamura F., Tanaka S., Makihara H., Arashiki N., Takizawa K., Chimura T	3	Progress reports and original article readings
Preparation for meeting presentation	Nakamura F., Tanaka S., Makihara H., Arashiki N., Takizawa K., Chimura T	1	Preparation for meeting presentation
Practice, experiments, writing dissertation (Project Research)	Nakamura F., Tanaka S., Makihara H., Arashiki N., Takizawa K., Chimura T	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., Tanaka S., Makihara H., Arashiki N., Takizawa K., Chimura T
Credit	2
Type of Class	Lecture, Seminar
Theme	New findings in biochemistry, molecular biology and Neuroscience
Schedule	Saturday 10:00 – 12:00
Course Objective	・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; Lehniinger Principles of Biochemistry 6th Ed; Principles og 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, ST, HM, NA, KT, TC	Biochemistry, overview of metabolism
3	FN, ST, HM, NA, KT, TC	Biochemisry, new findings in sugar metabolism
4	FN, ST, HM, NA, KT, TC	Biochemisry, new findings in lipids metabolism
5	FN, ST, HM, NA, KT, TC	Biochemistry, new findings in pathological metabolism
6	FN, ST, HM, NA, KT, TC	Molecular Biology, overview of signal transduction
7	FN, ST, HM, NA, KT, TC	Molecular Biology, new findings in signal transduction
8	FN, ST, HM, NA, KT, TC	Overview of molecular biology (DNA duplication, RNA transcription, Translation, etc)
9	FN, ST, HM, NA, KT, TC	New finding in molecular biology (DNA duplication, RNA transcription, Translation, etc) (1)
10	FN, ST, HM, NA, KT, TC	New finding in molecular biology (DNA duplication, RNA transcription, Translation, etc) (2)
11	FN, ST, HM, NA, KT, TC	Neuroscience, overview
12	FN, ST, HM, NA, KT, TC	New findings in synaptic transmission
13	FN, ST, HM, NA, KT, TC	New findings in developmental neuroscience
14	FN, ST, HM, NA, KT, TC	New findings in Neurological disorders
15	Nakamura F	Concluding Remarks

(Biochemistry) Syllabus (2)

Syllabus Title	Progress reports and original article readings
Instructor	Nakamura F., Tanaka S., Makihara H., Arashiki N., Takizawa K., Chimura T
Credit	3
Type of Class	Lecture, Seminar
Theme	Progress reports and original article readings
Schedule	Saturday 10:00 – 12:00
Course Objective	・Progress report: Each member reports recent progress of one's own experimental project with rigorous assessment. ・Article readings: Each member should find intersting aritlces relalting 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 publised (within 2 years). Textbook: Molecular Biology of THE CELL 6th Ed; Lehniinger Principles of Biochemistry 6th Ed; Principles og 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	FN, ST, HM, NA, KT, TC	Progress report
2	FN, ST, HM, NA, KT, TC	Original article recently published
3	FN, ST, HM, NA, KT, TC	Progress report
4	FN, ST, HM, NA, KT, TC	Original article recently published
5	FN, ST, HM, NA, KT, TC	Progress report
6	FN, ST, HM, NA, KT, TC	Original article recently published
7	FN, ST, HM, NA, KT, TC	Progress report
8	FN, ST, HM, NA, KT, TC	Original article recently published
9	FN, ST, HM, NA, KT, TC	Progress report
10	FN, ST, HM, NA, KT, TC	Original article recently published
11	FN, ST, HM, NA, KT, TC	Progress report
12	FN, ST, HM, NA, KT, TC	Original article recently published
13	FN, ST, HM, NA, KT, TC	Progress report
14	FN, ST, HM, NA, KT, TC	Original article recently published
15	FN, ST, HM, NA, KT, TC	Progress report
16	FN, ST, HM, NA, KT, TC	Original article recently published
17	FN, ST, HM, NA, KT, TC	Progress report
18	FN, ST, HM, NA, KT, TC	Original article recently published
19	FN, ST, HM, NA, KT, TC	Progress report
20	FN, ST, HM, NA, KT, TC	Original article recently published
21	FN, ST, HM, NA, KT, TC	Progress report
22	FN, ST, HM, NA, KT, TC	Original article recently published
23	FN, ST, HM, NA, KT, TC	Progress report
24	FN, ST, HM, NA, KT, TC	Original article recently published
25	FN, ST, HM, NA, KT, TC	Progress report
26	FN, ST, HM, NA, KT, TC	Original article recently published
27	FN, ST, HM, NA, KT, TC	Progress report
28	FN, ST, HM, NA, KT, TC	Original article recently published
29	FN, ST, HM, NA, KT, TC	Progress report
30	FN, ST, HM, NA, KT, TC	Original article recently published

(Biochemistry) Syllabus (3)

Syllabus Title	Preparation for meeting presentation		
Instructor	Nakamura F., Tanaka S., Makihara H., Arashiki N., Takizawa K., Chimura T		
Credit	1		
Type of Class	practice		
Theme	Preparation for meeting presentation		
Schedule	2 times/year, Saturday before any meetings 9:00–10:00, 13:00–18:00		
Course Objective	・ Preparation for meeting presentation (poster, oral) ・ Reharsal for presentation.		
Evaluation Methods	Attendance (25%), Writing Abstract (25%), Preparation and reharsal 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, ST, HM, NA, KT, TC	Any meetings in Biochemistry, Molecular Biology, or Neuroscience
	2	FN, ST, HM, NA, KT, TC	Any meetings in Biochemistry, Molecular Biology, or Neuroscience

(Biochemistry) Syllabus (4)

Syllabus Title	Practice, experiments, writing dissertation (Project Research)		
Instructor	Nakamura F., Tanaka S., Makihara H., Arashiki N., Takizawa K., Chimura T		
Credit	9		
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	1. Acquire the necessary experimental techniques and execute planned research. 2. Record experimental contents and data correctly. 3. Summarize and vizualize 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 aritticles relating to the research project Handbook for Academic writing Texbook 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, ST, HM, NA, KT, TC	Aim 1 and 2
	91～120	FN, ST, HM, NA, KT, TC	Aim 3 and 4
	121～150	Nakamura F	Aim 5

Pharmacology

Ⅰ Educational Policy

Pharmacology is the science of understanding treatment through "medicine". "Medicine" includes not only low-molecular-weight compounds but also all therapies based on their mechanism of action, including biopharmaceuticals, regenerative medicine, and gene therapy, all of which have seen remarkable development in recent years.
Pharmacology encompasses a very wide range of fields, including pharmacodynamics and pharmacokinetics, drug discovery based on knowledge of biological homeostasis and the mechanisms of disease onset and progression, and toxicological evaluation to ensure the safety of new drugs.
In the Department of Pharmacology, we aim to elucidate the molecular mechanisms of pathogenesis and tissue/organ homeostasis, and to develop novel therapeutics through the discovery of drug target molecules by making full use of tissue/disease models using human pluripotent stem cells, disease model animals, regenerative medicine technologies, and actively conducting interdisciplinary research such as medical engineering collaboration. In particular, our research using pluripotent stem cells is based on technology for inducing differentiation into various cell types, which enables us to create various tissue models, and we are targeting not only genetic diseases but also lifestyle- and aging-related diseases for therapeutic drug development.
Although medical science is advancing day by day, there is still no fundamental cure for many diseases. Based on the graduate school education, we train students to be involved in the development of treatments throughout their lives.

Ⅱ Goals

・The course aims to provide students with an understanding of various drug therapies and the relationship between drugs and living organisms, as well as a broad knowledge of the basic research techniques involved in these areas and the ability to apply this knowledge.
・Students will develop research themes in the field of pharmacology, formulate experimental plans, and conduct research in accordance with the plans.
・To be able to present the results of experiments at domestic and international conferences.
・To write papers on the results of research.
・To be able to discuss not only one's own research but also the research of others in the field of advanced medicine with broad interest, and to acquire the ability to provide guidance to younger researchers.
・To have a strong sense of social ethics regarding drug discovery.

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

Name and position	Research theme
Katsuhisa Matsuura, Professor Rei Noguchi, Lecturer	Multiomics analysis of rare cancers
Katsuhisa Matsuura, Professor Kyohei Fujita, Assistant Professor	Research on the pathogenesis of cardiovascular
Katsuhisa Matsuura, Professor Shinako Aoki, Assistant Professor	Regulatory mechanisms of angiogenesis targeting stromal cells
Katsuhisa Matsuura, Professor Kenjiro Kaji, Assistant Professor	1) Cancer Treatment Research Based on Molecular Pathology2) Comparative oncology
Katsuhisa Matsuura, Professor Morichika Takita. Assistant Professor	Analysis of cancer metastasis and premetastatic microenvironment

Ⅳ Syllabus （＊ ＝ for doctor's license holders）

Title	Instructor	Credit	Theme
Molecular Pharmacology (Introduction)	Katsuhisa Matsuura, Rei Noguchi, Morichika Takita, ,Kenjiro Kaji, Shinako Aokl, Kyohei Fujita	2	Lectures of Cellular biology, Molecular pharmacology
Molecular pharmacology (detailed exposition)	Katsuhisa Matsuura, Rei Noguchi, Morichika Takita, ,Kenjiro Kaji, Shinako Aokl, Kyohei Fujita	1	Lectures, practical training, and exercises on research techniques and analytical methods
Seminar and Discussion	Katsuhisa Matsuura, Rei Noguchi, Morichika Takita, ,Kenjiro Kaji, Shinako Aokl, Kyohei Fujita	2	Seminar and Discussion
Experiments and practical training	Katsuhisa Matsuura, Rei Noguchi, Morichika Takita, ,Kenjiro Kaji, Shinako Aokl, Kyohei Fujita	10	Research project （Project for thesis）
Total credits		15	

Division of Phamacology

Syllabus Title	Molecular pharmacology (Introduction)
Instructor	Katsuhisa Matsuura, Rei Noguchi, Morichika Takita, ,Kenjiro Kaji, Shinako Aoki, Kyohei Fujita
Credit	2
Type of Class	Lecture
Theme	Molecular pharmacology, Pharmacology
Schedule	Monday, 16:10-17:20
Course Objective	to understand the state-of-the-art in cell biology, disease and drug discovery research
Evaluation Methods	Attendance (50%), Discussion (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	Braunwald's Heart Disease (12th edition)、Inflammation and metastasis (Maru), the Biology of Cancer (RA Weinberg, 2023)、related text books and articles
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 Memorial Building for Education, 5F, Department of Pharmacology, Division of Pharmacology
Special Note	The schedule can be reconsidered uder specific reason.

Course Plan

Number	Instructor	Contents
1	Katsuhisa Matsuura, Rei Noguchi, Morichika Takita, Kenjiro Kaji, Shinako Aokl, Kyohei Fujita	Lecture and Discussion
2	Katsuhisa Matsuura, Rei Noguchi, Morichika Takita, Kenjiro Kaji, Shinako Aokl, Kyohei Fujita	Lecture and Discussion
3	Katsuhisa Matsuura, Rei Noguchi, Morichika Takita, Kenjiro Kaji, Shinako Aokl, Kyohei Fujita	Lecture and Discussion
4	Katsuhisa Matsuura, Rei Noguchi, Morichika Takita, Kenjiro Kaji, Shinako Aokl, Kyohei Fujita	Lecture and Discussion
5	Katsuhisa Matsuura, Rei Noguchi, Morichika Takita, Kenjiro Kaji, Shinako Aokl, Kyohei Fujita	Lecture and Discussion
6	Katsuhisa Matsuura, Rei Noguchi, Morichika Takita, Kenjiro Kaji, Shinako Aokl, Kyohei Fujita	Lecture and Discussion
7	Katsuhisa Matsuura, Rei Noguchi, Morichika Takita, Kenjiro Kaji, Shinako Aokl, Kyohei Fujita	Lecture and Discussion
8	Katsuhisa Matsuura, Rei Noguchi, Morichika Takita, Kenjiro Kaji, Shinako Aokl, Kyohei Fujita	Lecture and Discussion
9	Katsuhisa Matsuura, Rei Noguchi, Morichika Takita, Kenjiro Kaji, Shinako Aokl, Kyohei Fujita	Lecture and Discussion
10	Katsuhisa Matsuura, Rei Noguchi, Morichika Takita, Kenjiro Kaji, Shinako Aokl, Kyohei Fujita	Lecture and Discussion
11	Katsuhisa Matsuura, Rei Noguchi, Morichika Takita, Kenjiro Kaji, Shinako Aokl, Kyohei Fujita	Lecture and Discussion
12	Katsuhisa Matsuura, Rei Noguchi, Morichika Takita, Kenjiro Kaji, Shinako Aokl, Kyohei Fujita	Lecture and Discussion
13	Katsuhisa Matsuura, Rei Noguchi, Morichika Takita, Kenjiro Kaji, Shinako Aokl, Kyohei Fujita	Lecture and Discussion
14	Katsuhisa Matsuura, Rei Noguchi, Morichika Takita, Kenjiro Kaji, Shinako Aokl, Kyohei Fujita	Lecture and Discussion
15	Katsuhisa Matsuura, Rei Noguchi, Morichika Takita, Kenjiro Kaji, Shinako Aokl, Kyohei Fujita	Lecture and Discussion

Division of Phamacology

Syllabus Title	Molecular pharmacology (detailed exposition)
Instructor	Katsuhisa Matsuura, Rei Noguchi, Morichika Takita, ,Kenjiro Kaji, Shinako Aoki, Kyohei Fujita
Credit	1
Type of Class	Lectures and Exercises
Theme	To acquire skills from principles to techniques through lectures, practical training, and exercises in research techniques and analytical methods.
Schedule	Monday, 15:00-16:10
Course Objective	・To be able to set up a research theme, plan an experiment, and conduct the research in accordance with the plan. ・Understand the principles of experimental techniques, acquire accurate skills, and obtain reproducible experimental results. ・The student should be able to select and analyze appropriate statistical analysis methods using the raw data obtained. ・To be able to present the results of experiments in an appropriate diagram and table. ・To be able to write papers in English on research results.
Evaluation Methods	Attendance (50%), Discussion (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	Braunwald's Heart Disease (12th edition)、Inflammation and metastasis (Maru), the Biology of Cancer (RA Weinberg, 2023)、related text books and articles
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	Yayoi Memorial Building for Education, 5F, Department of Pharmacology, Division of Pharmacology
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	Katsuhisa Matsuura, Rei Noguchi, Morichika Takita, Kenjiro Kaji, Shinako Aokl, Kyohei Fujita	Basic Lectures and Exercises in Molecular Pharmacology Research Techniques
2	Katsuhisa Matsuura, Rei Noguchi, Morichika Takita, Kenjiro Kaji, Shinako Aokl, Kyohei Fujita	Basic Lectures and Exercises in Molecular Pharmacology Research Techniques
3	Katsuhisa Matsuura, Rei Noguchi, Morichika Takita, Kenjiro Kaji, Shinako Aokl, Kyohei Fujita	Basic Lectures and Exercises in Molecular Pharmacology Research Techniques
4	Katsuhisa Matsuura, Rei Noguchi, Morichika Takita, Kenjiro Kaji, Shinako Aokl, Kyohei Fujita	Basic Lectures and Exercises in Molecular Pharmacology Research Techniques
5	Katsuhisa Matsuura, Rei Noguchi, Morichika Takita, Kenjiro Kaji, Shinako Aokl, Kyohei Fujita	Basic Lectures and Exercises in Molecular Pharmacology Research Techniques
6	Katsuhisa Matsuura, Rei Noguchi, Morichika Takita, Kenjiro Kaji, Shinako Aokl, Kyohei Fujita	Basic Lectures and Exercises in Molecular Pharmacology Research Techniques
7	Katsuhisa Matsuura, Rei Noguchi, Morichika Takita, Kenjiro Kaji, Shinako Aokl, Kyohei Fujita	Basic Lectures and Exercises in Molecular Pharmacology Research Techniques
8	Katsuhisa Matsuura, Rei Noguchi, Morichika Takita, Kenjiro Kaji, Shinako Aokl, Kyohei Fujita	Basic Lectures and Exercises in Molecular Pharmacology Research Techniques
9	Katsuhisa Matsuura, Rei Noguchi, Morichika Takita, Kenjiro Kaji, Shinako Aokl, Kyohei Fujita	Basic Lectures and Exercises in Molecular Pharmacology Research Techniques
10	Katsuhisa Matsuura, Rei Noguchi, Morichika Takita, Kenjiro Kaji, Shinako Aokl, Kyohei Fujita	Basic Lectures and Exercises in Molecular Pharmacology Research Techniques
11	Katsuhisa Matsuura, Rei Noguchi, Morichika Takita, Kenjiro Kaji, Shinako Aokl, Kyohei Fujita	Basic Lectures and Exercises in Molecular Pharmacology Research Techniques
12	Katsuhisa Matsuura, Rei Noguchi, Morichika Takita, Kenjiro Kaji, Shinako Aokl, Kyohei Fujita	Basic Lectures and Exercises in Molecular Pharmacology Research Techniques
13	Katsuhisa Matsuura, Rei Noguchi, Morichika Takita, Kenjiro Kaji, Shinako Aokl, Kyohei Fujita	Basic Lectures and Exercises in Molecular Pharmacology Research Techniques
14	Katsuhisa Matsuura, Rei Noguchi, Morichika Takita, Kenjiro Kaji, Shinako Aokl, Kyohei Fujita	Basic Lectures and Exercises in Molecular Pharmacology Research Techniques
15	Katsuhisa Matsuura, Rei Noguchi, Morichika Takita, Kenjiro Kaji, Shinako Aokl, Kyohei Fujita	Basic Lectures and Exercises in Molecular Pharmacology Research Techniques

Division of Phamacology

Syllabus Title	Seminar and Discussion
Instructor	Katsuhisa Matsuura, Rei Noguchi, Morichika Takita, ,Kenjiro Kaji, Shinako Aoki, Kyohei Fujita
Credit	2
Type of Class	Seminar and Discussion
Theme	Discuss research progress
Schedule	Wednesday 13:00–15:00
Course Objective	1. Understand the articles which are related to articles, 2. Discuss and Summarize the artcles.
Evaluation Methods	Attendance (50%), Discussion (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	Braunwald's Heart Disease (12th edition)、Inflammation and metastasis (Maru), the Biology of Cancer (RA Weinberg, 2023)、related text books and articles
Independent Study Outside of Class	Read the above textbooks and related articles, and discuss about them.
Room	Yayoi Memorial Building for Education, 5F, Department of Pharmacology, Division of Pharmacology
Special Note	For those who cannot attend the above time, re-schedule will be considered after consultation. Questions will be accepted at any time. Feedback will be given as needed.

Course Plan

Number	Instructor	Contents
1	Katsuhisa Matsuura, Rei Noguchi, Morichika Takita, Kenjiro Kaji, Shinako Aokl, Kyohei Fujita	Lecture and Discussion
2	Katsuhisa Matsuura, Rei Noguchi, Morichika Takita, Kenjiro Kaji, Shinako Aokl, Kyohei Fujita	Lecture and Discussion
3	Katsuhisa Matsuura, Rei Noguchi, Morichika Takita, Kenjiro Kaji, Shinako Aokl, Kyohei Fujita	Lecture and Discussion
4	Katsuhisa Matsuura, Rei Noguchi, Morichika Takita, Kenjiro Kaji, Shinako Aokl, Kyohei Fujita	Lecture and Discussion
5	Katsuhisa Matsuura, Rei Noguchi, Morichika Takita, Kenjiro Kaji, Shinako Aokl, Kyohei Fujita	Lecture and Discussion
6	Katsuhisa Matsuura, Rei Noguchi, Morichika Takita, Kenjiro Kaji, Shinako Aokl, Kyohei Fujita	Lecture and Discussion
7	Katsuhisa Matsuura, Rei Noguchi, Morichika Takita, Kenjiro Kaji, Shinako Aokl, Kyohei Fujita	Lecture and Discussion
8	Katsuhisa Matsuura, Rei Noguchi, Morichika Takita, Kenjiro Kaji, Shinako Aokl, Kyohei Fujita	Lecture and Discussion
9	Katsuhisa Matsuura, Rei Noguchi, Morichika Takita, Kenjiro Kaji, Shinako Aokl, Kyohei Fujita	Lecture and Discussion
10	Katsuhisa Matsuura, Rei Noguchi, Morichika Takita, Kenjiro Kaji, Shinako Aokl, Kyohei Fujita	Lecture and Discussion
11	Katsuhisa Matsuura, Rei Noguchi, Morichika Takita, Kenjiro Kaji, Shinako Aokl, Kyohei Fujita	Lecture and Discussion
12	Katsuhisa Matsuura, Rei Noguchi, Morichika Takita, Kenjiro Kaji, Shinako Aokl, Kyohei Fujita	Lecture and Discussion
13	Katsuhisa Matsuura, Rei Noguchi, Morichika Takita, Kenjiro Kaji, Shinako Aokl, Kyohei Fujita	Lecture and Discussion
14	Katsuhisa Matsuura, Rei Noguchi, Morichika Takita, Kenjiro Kaji, Shinako Aokl, Kyohei Fujita	Lecture and Discussion
15	Katsuhisa Matsuura, Rei Noguchi, Morichika Takita, Kenjiro Kaji, Shinako Aokl, Kyohei Fujita	Lecture and Discussion

Division of Phamacology

Syllabus Title	Research Project (Project for thesis)
Instructor	Katsuhisa Matsuura, Rei Noguchi, Morichika Takita, ,Kenjiro Kaji, Shinako Aoki, Kyohei Fujita
Credit	10
Type of Class	Experimental Practice, Discussion (Project for thesis)
Theme	Research Project
Schedule	Mon. – Fri. 9:00～12:00,13:00～17:00. Sat. 9:00～13:00
Course Objective	1. Design and perform experiments for the theme, and acuqire the skills which are necessary for the project. 2. Save results appropriately. Understand research ethics. 3. Summarize the expreimental data for figure of manuscript, appropriately. 4. Present reserach progress, and discuss with researchers at a conference, 5. Write manuscript based on own project, and publsh as an article to academic journal.
Evaluation Methods	Attendance (50%), Discussion (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	Braunwald's Heart Disease (12th edition)、Inflammation and metastasis (Maru), the Biology of Cancer (RA Weinberg, 2023)、related text books and articles
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	Yayoi Memorial Building for Education, 5F, Department of Pharmacology, Division of Pharmacology
Special Note	For those who cannot attend the above time, another time schedule will be decided after consultation. Questions will be accepted at anytime. Feedback will be given as needed.

Course Plan	Number	Instructor	Contents
	1 ～ 90	Katsuhisa Matsuura, Rei Noguchi, Morichika Takita, Kenjiro Kaji, Shinako Aokl, Kyohei Fujita	Achievement of Aims 1-2
	91 ～ 120	Katsuhisa Matsuura, Rei Noguchi, Morichika Takita, Kenjiro Kaji, Shinako Aokl, Kyohei Fujita	Achievement of Aims 3-4
	121 ～ 150	Katsuhisa Matsuura, Rei Noguchi, Morichika Takita, Kenjiro Kaji, Shinako Aokl, Kyohei Fujita	Achievement of Aims 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 microorgamisms 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 reseach 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 Assistant Professor Iizuka	(4) 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 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 Nishida	(6) Pathogenic mechanisms of intracellular bacteria. The survival and growth mechanisms of intracellular bacteria will be analyzed using molecular and cellular bacteriological techniques. The revealed mechanisms will provide fundamental information for developing therapeutic strategies against bacterial infections.

Ⅳ Syllabus (＊ ＝ for doctor's license holders)

Title	Instructor	Credit	Theme
Self-recognition of the immune system	Professor Yanagisawa, Associate Professor Osaka, Assistant Professor Iizuka, Assistant Professor Nishida	1	Pathogenesis of autoimmune diseases and its clinical applications.
Indigenous microbiota in inflammatory diseases	Professor Yanagisawa, Associate Professor Osaka, Assistant Professor Iizuka, Assistant Professor Nishida	2	Analysis of indigenous microbiota using disease-specific mouse models and clinical specimens.
Immunity and metabolic disorders	Professor Yanagisawa, Associate Professor Osaka, Assistant Professor Iizuka, Assistant Professor Nishida	1	Immune pathogenesis in metabolic diseases.
Mechanisms of bacterial infection	Professor Yanagisawa, Associate Professor Osaka, Assistant Professor Iizuka, Assistant Professor Nishida	1	Analysis of intracellular bacteria using cultured cells
Practical training in microbiology and immunology experiments	Professor Yanagisawa, Associate Professor Osaka, -Assistant Professor Iizuka, Assistant Professor Nishida	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, Assistant Professor Iizuka, Assistant Professor Nishida
Credit	1
Type of Class	Lectures and Exercises
Theme	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.
Schedule	Monday 10:20-11:30
Course Objective	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 inlude 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	Mechanisms of acquired immunity
3	Assistant Professor Nishida	Introduction to methods in analysis of the immune system
4	Professor Yanagisawa	Breakdown of self-tolerance and autoimmunity
5	Professor Yanagisawa	Introduction to autoimmune diseases
6	Assistant Professor Iizuka	Immune tolerance and environmental factors
7	Associate Professor Osaka	Clinical applications of mouse models of autoimmune disease
8	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, Assistant Professor Iizuka, Assistant Professor Nishida
Credit	2
Type of Class	Lectures and Exercises
Theme	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.
Schedule	Saturday 10:00-12:00, 13:00-17:00
Course Objective	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	Assistant Professor Nishida	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	Professor Yanagisawa	Molecular ecological analysis technique (4) (data analysis), presentation, discussion
6	Associate Professor Osaka	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, Assistant Professor Iizuka, Assistant Professor Nishida
Credit	1
Type of Class	Lectures and exercises
Theme	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. 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.
Schedule	Monday 9:00-10:10
Course Objective	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	Assistant Professor Nishida	Analysis of immune responses in inflammatory diseases
	6	Assistant Professor Iizuka	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	Mechanisms of bacterial infection
Instructor	Professor Yanagisawa, Associate Professor Osaka, Assistant Professor Iizuka. Assistant Professor Nishida
Credit	1
Type of Class	Lectures and exercises
Theme	Pathogenic bacteria possess a variety of virulence mechanisms. Revealing and understanding these mechanisms are essential for controlling bacterial infections. In this field, mechanisms of bacterial pathogenesis, such as toxin production and immune evasion, will be studied. Furthermore, experimental techniques for bacterial research will be learned using intracellular bacteria.
Schedule	Tuesday 9:00–10:10
Course Objective	1. To learn the virulence mechanisms of bacteria. 2. To acquire practical experimental skills in cell biology through the use of bacteria and cultured cells. 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	Bacterial Pathogenesis: Molecular and Cellular Mechanisms (Caister Academic Press)
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	Professor Yanagisawa	General bacteriology
2	Associate Professor Osaka	Bacterial virulence factors
3	Professor Yanagisawa	Bacterial infections and host immunity
4	Assistant Professor Nishida	Bacteriological and cell biological analysis
5	Assistant Professor Iizuka	Basic techniques for handling bacteria and cells
6	Assistant Professor Nishida	Genetic analysis of bacteria (Gene manipulation)
7	Assistant Professor Nishida	Analysis of bacterial pathogenicity using cultured cells I (Evaluation of intracellular growth)
8	Assistant Professor Nishida	Analysis of bacterial pathogenicity using cultured cells II (Evaluation of intracellular localization)

Microbiology and Immunology Syllabus (5)

Syllabus Title	Practical training in microbiology and immunology experiments
Instructor	Professor Yanagisawa, Associate Professor Osaka, Assistant Professor Iizuka, Assistant Professor Nishida
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	1. To be able to explain the importance and originality of the designed research plan. 2. To aquire 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/expreimental 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	Professor Yanagisawa Assistant Professor Iizuka	Achievement of Objectives 1 through 2
	91 to 120	Associate Professor Osaka Assistant Professor Nishida	Achievement of Objectives 3-4
	121 to 150	Professor Yanagisawa Associate Professor Osaka	Achievement of Objectives 5

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
Michiko Nohara (Professor) Go Muto (Associate Professor) Takako Miki (Lecturer) Daiki Nagamine (Assistant Professor) Kenjiro Karaguchi (Assistant Professor)	(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.
Michiko Nohara (Professor) Go Muto (Associate Professor) Takako Miki (Lecturer) Daiki Nagamine (Assistant Professor) Kenjiro Karaguchi (Assistant Professor)	(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.

Ⅳ Syllabus （＊ ＝ for doctor's license holders）

Title	Instructor	Credit	Theme
Discussion in Science of Labour	Michiko Nohara Go Muto Takako Miki Daiki Nagamine Kenjiro Kawaguchi	1	Presentation and Discussion on Science of Labour
Women's Health	Michiko Nohara Go Muto Takako Miki Daiki Nagamine Kenjiro Kawaguchi	2	Lecture and Practice on Women's Health
Epidemiology and Medical Statistics	Ken Masamune Sayaka Shimizu (Institute of Advanced Biomedical Sciences) Go Muto Takako Miki Daiki Nagamine Kenjiro Kawaguchi	2	Knowledge and Skills in Epidemiology and Medical Statistics for Conducting Epidemiological Studies
Individual research project (planning, data collection, analysis/interpretation of data, discussion and presentation of individual projects)	Michiko Nohara Go Muto Takako Miki Daiki Nagamine Kenjiro Kawaguchi	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, Go Muto, Takako Miki, Daiki Nagamine, Kenjiro Kawaguchi
Credit	1
Type of Class	Lecture and Discussion
Theme	Presentation and Discussion on Science of Labour
Schedule	Every third Saturday of the month 10:00–11:30
Course Objective	・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, Go Muto, Takako Miki, Daiki Nagamine, Kenjiro Kawaguchi	Presentation and Discussion
2	Michiko Nohara, Go Muto, Takako Miki, Daiki Nagamine, Kenjiro Kawaguchi	Discussion at September seminar
3	Michiko Nohara, Go Muto, Takako Miki, Daiki Nagamine, Kenjiro Kawaguchi	Discussion at October seminar
4	Michiko Nohara, Go Muto, Takako Miki, Daiki Nagamine, Kenjiro Kawaguchi	Discussion at November seminar
5	Michiko Nohara, Go Muto, Takako Miki, Daiki Nagamine, Kenjiro Kawaguchi	Discussion at December seminar
6	Michiko Nohara, Go Muto, Takako Miki, Daiki Nagamine, Kenjiro Kawaguchi	Discussion at January seminar
7	Michiko Nohara, Go Muto, Takako Miki, Daiki Nagamine, Kenjiro Kawaguchi	Discussion at February seminar
8	Michiko Nohara, Go Muto, Takako Miki, Daiki Nagamine, Kenjiro Kawaguchi	Presentation and Discussion

Public Health Syllabus (2)

Syllabus Title	Women's Health
Instructor	Michiko Nohara, Go Muto, Takako Miki, Daiki Nagamine, Kenjiro Kawaguchi
Credit	2
Type of Class	Lecture and Discussion
Theme	Lecture and Discussion on Women's Health
Schedule	Every Wednesday 14:30–16:00
Course Objective	・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, Go Muto, Takako Miki, Daiki Nagamine, Kenjiro Kawaguchi	Course outline and Overview of Women and Health 2nd Edition
2	Michiko Nohara, Go Muto, Takako Miki, Daiki Nagamine, Kenjiro Kawaguchi	Women's Health in the 21st Century
3	Michiko Nohara, Go Muto, Takako Miki, Daiki Nagamine, Kenjiro Kawaguchi	The Mutability of Women's Health with Age
4	Michiko Nohara, Go Muto, Takako Miki, Daiki Nagamine, Kenjiro Kawaguchi	Current Approaches to Women's Health Care
5	Michiko Nohara, Go Muto, Takako Miki, Daiki Nagamine, Kenjiro Kawaguchi	Understanding Research Design
6	Michiko Nohara, Go Muto, Takako Miki, Daiki Nagamine, Kenjiro Kawaguchi	Progress in Women's Health
7	Michiko Nohara, Go Muto, Takako Miki, Daiki Nagamine, Kenjiro Kawaguchi	Life Course Approach to Research in Women's Health
8	Michiko Nohara, Go Muto, Takako Miki, Daiki Nagamine, Kenjiro Kawaguchi	Presentation of class papers and Discussion
9	Michiko Nohara, Go Muto, Takako Miki, Daiki Nagamine, Kenjiro Kawaguchi	Working Women the United State: A Statistical Profile
10	Michiko Nohara, Go Muto, Takako Miki, Daiki Nagamine, Kenjiro Kawaguchi	International Perspectives: Women's Occupational Health
11	Michiko Nohara, Go Muto, Takako Miki, Daiki Nagamine, Kenjiro Kawaguchi	Multiple Roles and Complex Exposures
12	Michiko Nohara, Go Muto, Takako Miki, Daiki Nagamine, Kenjiro Kawaguchi	Socioeconomic Determinants of Women's Health
13	Michiko Nohara, Go Muto, Takako Miki, Daiki Nagamine, Kenjiro Kawaguchi	Do Social Policies Influence the Health of Women and their Children
14	Michiko Nohara, Go Muto, Takako Miki, Daiki Nagamine, Kenjiro Kawaguchi	The Impact of the Built Environment on Health
15	Michiko Nohara, Go Muto, Takako Miki, Daiki Nagamine, Kenjiro Kawaguchi	Presentation of class papers and Discussion

Public Health Syllabus (3)

Syllabus Title	Epidemiology and Medical Statistics
Instructor	Ken Masamune, Sayaka Shimizu (Institute of Advanced Biomedical Sciences), Go Muto, Takako Miki, Daiki Nagamine, Kenjiro Kawaguchi
Credit	2
Type of Class	Lecture and Practice
Theme	Knowledge and Skills in Epidemiology and Medical Statistics for Conducting Epidemiological Studies
Schedule	Every Tuesday 10:30–12:00
Course Objective	・Students will be able to understand basic study designs for conducting epidemiological studies. ・Students will be able to understand basic medical statistics and acquire data analysis skills through exercises using statistical software.
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	Fukuhara, S. On the Road to Clinical Research: Research Design in Seven Steps. 2020.
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; FATS, ABMES in TWIns; Institute of Advanced Biomedical Sciences in Tomoe Education and Research Building; 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	Ken Masamune, Sayaka Shimizu, Go Muto, Takako Miki	Introduction
2	Ken Masamune, Sayaka Shimizu, Go Muto, Daiki Nagamine	Basic Principles for Selecting Statistical Methods in Clinical Research
3	Ken Masamune, Sayaka Shimizu, Go Muto, Kenjiro Kawaguchi	Structuring a Research Question
4	Ken Masamune, Sayaka Shimizu, Go Muto, Takako Miki	Descriptive Statistics: Hands-on Practice Using Statistical Software
5	Ken Masamune, Sayaka Shimizu, Go Muto, Daiki Nagamine	Comparing Continuous Variables: Hands-on Practice Using Statistical Software
6	Ken Masamune, Sayaka Shimizu, Go Muto, Kenjiro Kawaguchi	Literature Searching
7	Ken Masamune, Sayaka Shimizu, Go Muto, Takako Miki	Comparing Categorical Variables: Hands-on Practice Using Statistical Software
8	Ken Masamune, Sayaka Shimizu, Go Muto, Daiki Nagamine	Designing Measurement: Validity and Reliability
9	Ken Masamune, Sayaka Shimizu, Go Muto, Kenjiro Kawaguchi	Correlation and Linear Regression: Hands-on Practice Using Statistical Software
10	Ken Masamune, Sayaka Shimizu, Go Muto, Takako Miki	Types of Research Designs
11	Ken Masamune, Sayaka Shimizu, Go Muto, Daiki Nagamine	Logistic Regression Analysis: Hands-on Practice Using Statistical Software
12	Ken Masamune, Sayaka Shimizu, Go Muto, Kenjiro Kawaguchi	Survival Analysis: Hands-on Practice Using Statistical Software
13	Ken Masamune, Sayaka Shimizu, Go Muto, Takako Miki	Factors That Compromise the Quality of Comparisons
14	Ken Masamune, Sayaka Shimizu, Go Muto, Daiki Nagamine	Sample Size Calculation: Hands-on Practice Using Statistical Software
15	Ken Masamune, Sayaka Shimizu, Go Muto, Kenjiro Kawaguchi	Fundamentals of Research Using Patient-Reported Outcomes

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, Go Muto, Takako Miki, Daiki Nagamine, Kenjiro Kawaguchi
Credit	10
Type of Class	Individual research project
Theme	Research implementation and development of dissertation
Schedule	Every Monday, Tuesday, Wednesday and Friday 9:00–12:00, 13:00–17:00
Course Objective	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 ～ 90	Michiko Nohara, Go Muto, Takako Miki, Daiki Nagamine, Kenjiro Kawaguchi	Achievement 1–2
	91 ～ 120	Michiko Nohara, Go Muto, Takako Miki, Daiki Nagamine, Kenjiro Kawaguchi	Achievement 3–4
	121 ～ 150	Michiko Nohara, Go Muto, Takako Miki, Daiki Nagamine, Kenjiro Kawaguchi	Achievement 5–6

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 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 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.
Kazuhiko Kibayashi, Professor and Head Ryo Shimada, Associate Professor Ken-ichiro Nakao, Assistant Professor Mitsuyo Machida, Assistant Professor Yuki Tatara, Assistant Professor	(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.

Kazuhiko Kibayashi, Professor and Head Ryo Shimada, Associate Professor Ken-ichiro Nakao, Assistant Professor Mitsuyo Machida, Assistant Professor Yuki Tatara, Assistant Professor	(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.

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 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 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 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 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 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	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 Kyouikuto, 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	Mitsuyo Machda	Research in forensic medicine 1: human identification
7	Ken-ichiro Nakao	Research in forensic medicine 2: forensic toxicology
8	Mitsuyo Machda	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 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	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 Kyouikuto, 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	Mitsuyo Machida	Drug screening: medications, abused drugs
6	Mitsuyo Machida	Drug screening: poisons
7	Ken-ichiro Nakao	Drug analysis: spectorophotometer
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 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	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 Kyouikuto, 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	Mitsuyo Machida	DNA polymorphism 6: STR typing
10	Mitsuyo Machida	DNA polymorphism 7: STR typing
11	Mitsuyo Machida	DNA polymorphism 8: SNP typing
12	Mitsuyo Machida	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 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	1. Acquirement 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	Mitsuyo Machida	Achievement of Goal 5
	～	Mitsuyo Machida	Achievement of Goal 5
	150	Mitsuyo Machida	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, 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)Research into airway pathology to examine the effectiveness of treatment for severe asthma patients. We will examine phenotypes and endotypes of patients with severe asthma based on the results of blood and sputum tests, respiratory function tests, and chest and sinus CT scans. We also examine the definition of asthma remission and predictive factors for selecting individual biological preparations.
Assistant Professor Tomohiro Akaba	(2)The role of mast cell tryptase in chronic allergic pulmonary diaseses and interstitial pneumonia. To elucidate how mast cell tryptase affects for chronic eosinophillic peumonia and idiopathic interstitial pneumonia, we will measure tryptase levels and analyze histological findings using their animal models.
Assistant Professor Ken Arimura	(3)Exploratory study of therapeutic targets and biomarkers in lung cancer and mesothelioma After identifying poor prognostic factors using clinical samples, target genes are knocked out in cell lines. Then, we will elucidate the therapeutic targets by comparing the growth potential in vitro and vivo with and without inhibitors, and by confirming the changes in each gene after knockout using Western blotting and RNA seq. Translated with DeepL.com (free version)
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 studied the effects of macrolides on lipopolysaccharide (LPS)-induced airway goblet cell secretion in the guinea pig trachea.
Assistant Professor Keiko Kan-o	(5) Identifying severity factors in chronic airway diseases through epithelial barrier analysis To examine epithelial barrier dysfunction in chronic airway diseases such as asthma and COPD. Students will use ex vivo analysis of patient-derived airway epithelial cells and bronchial surface liquid to investigate factors compromising barrier integrity, including type 2 cytokines, viral infections, and microbiome changes. The research aims to identify novel therapeutic targets for maintaining airway homeostasis.

Ⅳ Syllabus （＊ ＝ for doctor's license holders）

Title	Instructor	Credit	Theme
Lung function	Assistant Professor Keiko Kan-o	1	Pathophysiology on respiration and respiratory regulation
Diagnosis of respirology	Assistant Professor Osamitsu Yagi	1	Introduction to clinical diagnosis of respiratory diseases
Obstructive lung disease	Assistant Professor Keiko Kan-o	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 Details＊	Assistant Professor Ken Arimura	1	Diagnosis and Treatment of Lung Cancer
Experiment / Practice (Task Research)	Etsuko Tagaya Osamitsu Yagi Ken Arimura Keiko Kan-o	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	Assistant Professor Keiko Kan-o
Credit	1
Type of Class	Lecture/Practice
Theme	Pathophysiology on respiration and respiratory regulation
Schedule	Wednesday・13：00～14：10
Course Objective	・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	Keiko Kan-o	Spirometry and lung volume
2	Keiko Kan-o	Flow-volume curve
3	Keiko Kan-o	Respiratory mechanics
4	Keiko Kan-o	Chest wall and respiratory muscle
5	Keiko Kan-o	Shunt and dead space
6	Keiko Kan-o	Diffusion
7	Keiko Kan-o	Closing volume
8	Keiko Kan-o	Respiratory regulation

Respiratory Medicine Syllabus (2)

（＊ ＝ for doctor's license holders）

Syllabus Title	Diagnosis of respirology
Instructor	Assistant Professor , Osamitsu Yagi
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	Osamitsu Yagi	Pulmonary function test
	2	Osamitsu Yagi	Bronchoscopy
	3	Osamitsu Yagi	Interpretation of radiological images
	4	Osamitsu Yagi	Examination of physical findings

Respiratory Medicine Syllabus (3)

（＊ ＝ for doctor's license holders）

Syllabus Title	Obstructive lung disease
Instructor	Assistant Professor Keiko Kan-o
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	To understand classification and pathophysiology of obstructive To create treatment plan of obstructive lung diseases according to disease severity To understand animal model of obstructive lung diseases
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	COPD guideline for diagnosis and treatment Asthma guideline for prevention and treatment
Independent Study Outside of Class	To study and understand the findings before the lecture according to Syllabus. 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	Keiko Kan-o	Pathophysiology of obstructive disorder
	2	Keiko Kan-o	COPD
	3	Keiko Kan-o	Diffuse panbronchiolitis
	4	Keiko Kan-o	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 guidline 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	Assistant Professor Ken Arimura
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 2022 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	Ken Arimura	Lung cancer
	2	Ken Arimura	Beneign bronchial and lung tumor
	3	Ken Arimura	Bronchial and lung carcinoid
	4	Ken Arimura	Lymphangitis carcinomatosa and pleuritis carcinomatosa

Respiratory Medicine Syllabus (6)

（＊ ＝ for doctor's license holders）

Syllabus Title	Experiment / Practice (Task Research)
Instructor	Etsuko Tagaya, Osamitsu Yagi, Ken Arimura, Keiko Kan-o
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	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 with "Sincerity and Compassion" which are the academic philosophy of Tokyo Women's Medical University. To understand between solved and unsolved points based on clinical techniques described above.
2. To make a proper research plan to analyze the unsolved points of endocrine diseases and to judge the results properly in addition to the essential knowledge and technique of both clinical and basic research.
3. To present the research result at a conference and publish it in the academic journal.
4. 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	1. To investigate the novel clinical parameter to perform the adequate glucocorticoid replacement in adrenal insufficiency The purpose of this research investigates whether long-term (3 months) glucocorticoid excess by glucocorticoid replacement is evaluated by comparison in hair cortisol concentrations between patients with and without adrenal insufficiency. This research may give the evidence of long-term adequate glucocorticoid replacement therapy in adrenal insufficiency. 2. 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)This is the first and largest prospective study of the real situation of adult 21-hydroxylase deficiency in Japan. The purpose of this study investigates the complication related factors and improves the treatment in adult 21-hydroxylase deficiency.

Ⅳ Syllabus

Content	Faculty	credit	Title
Hypothalamic and pituitary diseaes, and adrenal diseases	Michio Otsuki	2	The progress of diagnosis and treatment in hypothalamic and pituitary diseaes, and adrenal diseases
Thyroid and parathyroid diseases, Gonadal diseases, Polyendcrine disease, Immunoendocrinopathy syndrome and Transition of endocrine 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 (Reseach 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 15th Edition
Independent Study Outside of Class	To read the textbook and check the latest ariticles according to the course.
Room	undecided
Special Note	

Course Plan

Number	Instructor	Contents
1	Michio Otsuki	Hypothalamic and pituitary hormonne-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, Polyendcrine 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, polyendcrine 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, polyendcrine 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 15th Edition
Independent Study Outside of Class	To read the textbook and check the latest ariticles 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	Hypercaicemia
8	Michio Otsuki	hypocalcemia
9	Michio Otsuki	Osteoprosis
10	Michio Otsuki	Sex hormone-physiological action
11	Michio Otsuki	Hypogonadism (male and female)
12	Michio Otsuki	Precosious 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 pathopthysiology. 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 15th 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 (Reseach project)
Instructor	Michio Otsuki
Credit	10
Type of Class	Experiment and practice (Reseach project)
Theme	Conducting a research project and writing a manuscript
Schedule	undecided (240min)
Course Objective	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 thhe 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%), mauscript (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 achievemet of Goals 1～2
	～	
	50	
	51	The achievemet of Goals 3～5
	～	
	150	

Division of Diabetology and Metabolism

Ⅰ Educational Policy

Division of Diabetology and Metabolism is in charge of Metbolism and Diabetology in clinical care and examines more than 20,000 people with diabetes and metabolic diseases annually. Currently, the increase in the number of diabetic patients is a global problem, and countermeasures are urgently needed. The purpose of this course is to acquire advanced knowledge of treatment and to develop new diagnosis and treatment methods. In clinical research, we will not only deepen our understanding of the evidence so far, but also try to develop new diagnoses and treatments by planning and conducting clinical studies using the vast database of patients examined in our department mentioned above. In basic research, we will promote research aimed at elucidating the pathophysiology of diabetes and its complications through joint research with the departments of basic medicin.

Ⅱ Goals

・Organize and understand the latest evidence on the pathophysiology, diagnosis, and treatment of metabolic diseases such as diabetes mellitus.
・Organize and understand the latest evidence on the pathophysiology, diagnosis, and treatment of diabetic complications.
・Actually engage in the treatment of person with diabetes and acquire diagnostic and treatment techniques for diabetes and its complications.
・Actually plan clinical research and conduct it yourself.
・Learn the basics of biostatistics.
・In Plan and conduct basic research aimed at elucidating the pathophysiology of diabetes and its complications.
・Publish your research results in a paper.

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

Name and position	Research theme
Professor Nakagami	(1) Examination of the pathophysiology, treatment, and prognosis of obesity complicated by diabetes In recent years, the number of people with impairedglucose tolerance complicated by extreme obesity has increased rapidly. In addition to examining the clinical, social, and psychological backgrounds of these people, we will examine the intestinal and oral microbiota as a joint research with the Department of Microbiology and Immunology of our university to search for optimal drug and non-drug therapy.
Professor Nakagami	(2) Examination of drug therapy for diabetes Although drug therapy for diabetes has made great progress in recent years, there has been insufficient study of its efficacy and safety in actual clinical practice. Using our large patient database, we will investigate the efficacy and safety of various patterns of treatment regimens with oral and injectable drugs for hypoglycemia.
Associate Professor Miura	(3) Epidemiological studies of type 1 diabetes* Type 1 diabetes often develops in childhood and adolescence, but because the incidence of this disease in Japan is low compared to the rest of the world, it is necessary to have an experienced medical field to treat this disease. About 10% of patients with this disease nationwide are registered at our division. In such an environment, our division is suitable as a place for epidemiological research on the pathophysiology and onset of type 1 diabetes, as well as epidemiological research on the development of complications.
Associate Professor Miura	(4) Etiological study of diabetic complications centered on advanced glycation endproducts and their receptors In a state of continuous hyperglycemia, proteins undergo glycation, dehydration, condensation, crosslinking, etc., and advanced glycation endproducts (AGEs) are generated. It is becoming clear that AGEs are one of the causes of microvascular complications and macroangiopathy. In young-onset type 1 diabetes mellitus with a clear morbidity and the effects of aging, AGEs and receptor for AGEs (RAGE) to study the association between abnormalities at the gene level and their protein complications.
Associate Professor Miura, Assistant Professor Kobayashi	(5) Study of the psychosocial background of people with diabetes* Whether it is type 1 diabetes or type 2 diabetes, the mental burden on patients to self-manage their diabetes for the rest of their lives is significant. This can lead to the inability to accept diabetes itself and a decrease in self-esteem, which in turn leads to a deterioration in blood glucose control and the development of complications. The most important thing in medical treatment is to analyze the psychosocial background, understand their personality, and create a better treatment environment. We will conduct research on these psychological aspects.

Associate Professor Miura	(6) Epidemiological studies on the onset of complications of juvenile-onset type 2 diabetes mellitus* Our division is not only for young type 1 diabetic patients, but also for many type 2 diabetes patients who develop it at a young age. How to prevent the onset of complications based on good blood glucos level is an important medical point and a point of research. We will conduct epidemiological studies on the onset of complications of juvenile-onset type 2 diabetes mellitus by age of onset.
Assistant Professor Hanai	(7) Search for biomarkers on susceptibility in diabetic nephropathy Although susceptibility is thought to be involved in the development of diabetic nephropathy, there is still no consensus on it. So far, we have searched for markers related to diabetic nephropathy, but we will search for a large number of markers on a larger scale.
Assistant Professor Hanai	(8) Cohort study on clinical factors involved in the development of diabetic nephropathy The analysis of various clinical factors related to the development of diabetic nephropathy will be clarified by an observational study using a historical cohort of more than 20,000 patients visiting our division.
Assistant Professor Hanai	(9) Study on the prognosis of patients with diabetic renal failure We will analyze of factors that affect the prognosis of life of approximately 1,500 people with diabetes who have undergone dialysis or kidney transplantation in our division using statistical methods.
Professor Nagao	(10) Investigation of the mechanisms underlying lipotoxicity in pancreatic β-cells Lipotoxicity refers to the phenomenon in which excessive accumulation of fatty acids and their metabolites in non-adipose tissues leads to cellular dysfunction and cell death. To elucidate the contribution of lipotoxicity to impaired insulin secretion observed in type 2 diabetes, we investigate the role of the fatty acid transporter CD36 expressed in pancreatic β-cells.
Professor Nagao	(11) Investigation of the pathogenesis of type 2 diabetes using a novel diabetic mouse model Type 2 diabetes arises from interactions between genetic susceptibility affecting insulin secretion and insulin sensitivity and environmental factors such as a high-fat diet. However, few mouse models reproduce this complex pathophysiology. We therefore employ a newly established mouse model that successfully recapitulates these features to analyze the mechanisms underlying diabetes development during high-fat diet exposure.
Professor Nagao	(12) Development of novel diagnostic strategy for non-islet cell tumor hypoglycemia (NICTH) Insulin-like growth factor II (IGF-II) secreted from non-islet cell tumors is a major cause of endocrine hypoglycemia. However, current diagnostic methods are complex and available only at limited laboratories worldwide.We therefore focus on microRNA-483 (miR-483), encoded within an intronic region of the IGF-II gene, to develop a novel diagnostic approach for NICTH.

Ⅳ Syllabus (＊ ＝ for doctor's license holders)

Title	Instructor	Credit	Theme
Overview of metabolic medicine	Associate Professor Miura, Assistant Professor Kobayashi	2	
Diabetic complications	Assistant Professor Hanai	2	
Clinical epidemiology of Diabetes	Professor Nakagami	1	
Experimentation / practical training (research on an issue)	Professor Nagao	10	
Total credits		15	

Division of Diabetology and Metabolism Syllabus

Syllabus Title	Overview of metabolic medicine
Instructor	Associate Professor Miura, Assistant Professor Kobayashi
Credit	2
Type of Class	Lectures and Exercises
Theme	General and individual aspects of diabetes mellitus
Schedule	Monday 9:00～12:00
Course Objective	To understand the pathogenesis and pathology of diabetes, the diagnostic process, and the concept of treatment options, and to be able to select appropriate tests in a timely manner.
Evaluation Methods	Report Submission
Grading Scale	There are five categories: S (90 to 100 points), A (80 to 89 points), B (70 to 79 points), C (60 to 69 points), and D (lower than 60 points), with S, A, B, and C being passed and D being failed.
Textbooks/References	Diabetes Treatment Guide, edited and written by Japan Diabetes Society , Manual for Treatment of Diabetes, 6th edition, edited by Diabetes Center, Tokyo Women's Medical University Food Exchange Lists Dietary Guidance for Persons with Diabetes, 7th Edition, edited and written by Japan Diabetes Society, Guidelines for Diabetes Care, edited and written by Japan Diabetes Society
Independent Study Outside of Class	Read the reference books according to the lesson plan and check the latest literature.
Room	Diabetology and Metabolism Office, on 3rd floor, South Bldg.
Special Note	Those unable to attend at the above times will be assigned a time slot 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	Junnosuke Miura	What is diabetes? Indicators of diabetes
2	Junnosuke Miura	Classification of Diabetes Mellitus: subtypes of Type 1 Diabetes
3	Junnosuke Miura	Classification of Diabetes Mellitus: Type 2 Diabetes
4	Junnosuke Miura	Classification of Diabetes Mellitus: Other Diabetes and Gestational Diabetes
5	Junnosuke Miura	Diagnosis of Diabetes: Necessary Tests
6	Junnosuke Miura	Diagnosis of Diabetes: Disease Status Determination
7	Junnosuke Miura	Information necessary for treatment: How to formulate a treatment plan
8	Junnosuke Miura	What are insulin-independent and insulin-dependent states?
9	Hiroko Kobayashi	Team Medicine in Diabetes Education
10	Hiroko Kobayashi	Dietary Therapy: the concept of Food Exchange List
11	Hiroko Kobayashi	Dietary Therapy: How to proceed with dietary therapy
12	Junnosuke Miura	Exercise Therapy: Types and Intensity of Exercise Therapy
13	Junnosuke Miura	Exercise Therapy: Precautions and Case-Specific Responses
14	Junnosuke Miura	Drug Therapy: Oral hypoglycemic agents
15	Junnosuke Miura	Drug Therapy: Injection
16	Junnosuke Miura	Side effects of treatment

Division of Diabetology and Metabolism Syllabus

Syllabus Title	Diabetic complications
Instructor	Assistant Professor Hanai
Credit	2
Type of Class	Lectures and Exercises
Theme	Lecture and practical training on chronic complications of diabetes
Schedule	Thursday 9:00–12:00 13:00–16:00
Course Objective	To acquire knowledge of the pathophysiology, diagnosis and treatment of chronic complications of diabetes mellitus. To learn methods of clinical research of diabetic complications, and basis of biologycal statistics
Evaluation Methods	Report Submission
Grading Scale	There are five categories: S (90 to 100 points), A (80 to 89 points), B (70 to 79 points), C (60 to 69 points), and D (lower than 60 points), with S, A, B, and C being passed and D being failed.
Textbooks/References	Japanese Clinical Practice Guidelines for Diabetes 2024, edited and written by Japan Diabetes Society, , Manual for Treatment of Diabetes, 6th ed.
Independent Study Outside of Class	Read reference books in advance according to the lesson plan.
Room	Diabetology and Metabolism Office, on 3rd floor, South Bldg.
Special Note	Those unable to attend at the above times will be assigned a time slot 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	Ko Hanai	Overview of Diabetology (I) Glucose Metabolism, Pathology of Diabetes Mellitus
2	Ko Hanai	Overview of Diabetology (II) Diagnosis and Treatment of Diabetes Mellitus
3	Ko Hanai	Overview of Diabetes Complications
4	Ko Hanai	Diabetic Nephropathy (I) Epidemiology
5	Ko Hanai	Diabetic Nephropathy (II) Pathology and Developmental Mechanisms
6	Ko Hanai	Diabetic Nephropathy (III) Treatment
7	Ko Hanai	Diabetic Nephropathy (IV) Dialysis, transplantation therapy
8	Ko Hanai	Diabetic Neuropathy
9	Ko Hanai	Treatment plan for hypertention in people with diabetes
10	Ko Hanai	Stroke in people with diabetes
11	Ko Hanai	Coronary artery disease in people with diabetes
12	Ko Hanai	Peripheral artery disease in people with diabetes
13	Ko Hanai	Neuropsychiatric Disorders in people with diabetes
14	Ko Hanai	Clinical Research Methods
15	Ko Hanai	Basic Biostatistics

Division of Diabetology and Metabolism Syllabus

Syllabus Title	Clinical epidemiology of Diabetes
Instructor	Professor Nakagami
Credit	1
Type of Class	Lectures and Exercises
Theme	Diabetes Clinical Epidemiology
Schedule	Wednesday 13:00 ～16:00
Course Objective	To understand representative clinical epidemiology studies in the field of diabetes and design optimal studies to address one's own research questions.
Evaluation Methods	Report Submission
Grading Scale	There are five categories: S (90 to 100 points), A (80 to 89 points), B (70 to 79 points), C (60 to 69 points), and D (lower than 60 points), with S, A, B, and C being passed and D being failed.
Textbooks/References	Type 2 Diabetes ―Prediction and Prevention, other
Independent Study Outside of Class	Students are expected to read references and books in advance according to the class plan.
Room	Diabetology and Metabolism Office, on 3rd floor, South Bldg.
Special Note	Those unable to attend at the above times will be assigned a time slot 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・2	Tomoko Nakagami	Descriptive Statistics
	3・4	Tomoko Nakagami	Estimation Statistics
	5・6	Tomoko Nakagami	Introduction to representative clinical epidemiology studies in the field of diabetes
	7	Tomoko Nakagami	Introduction to the use of statistical software
	8	Tomoko Nakagami	Summary

Division of Diabetology and Metabolism Syllabus

Syllabus Title	Experiments and practical training (research on an issue)	
Instructor	Professor Nagao	
Credit	10	
Type of Class	Experiments and practical training (research on an issue)	
Theme	Conducting research on an issue and writing a thesis	
Schedule	Monday and Tuesday 9:00 – 12:00, Thursday 9:00 – 12:00, 13:00 – 16:00	
Course Objective	1. to acquire the necessary experimental techniques and conduct research in accordance with the established research plan. 2. to properly record and store experimental contents and data. 3. to be able to summarize the results of experiments in an appropriate manner. 4. to be able to present the contents of research appropriately at external conferences and research meetings, and to be able to discuss the contents. 5. to write and submit research papers. Respond appropriately to reviewers' comments and achieve publication.	
Evaluation Methods	Experiment notes/research report (60%) Preparation of figures and tables (10%) Research presentation/discussion (10%) Preparation of thesis (20%)	
Grading Scale	There are five categories: S (90 to 100 points), A (80 to 89 points), B (70 to 79 points), C (60 to 69 points), and D (lower than 60 points), with S, A, B, and C being passed and D being failed.	
Textbooks/References	Review articles and original papers related to the subject research	
Independent Study Outside of Class	Actively participate in and present at related conferences to gather information and engage in discussion.	
Room	Diabetology and Metabolism Office, on 3rd floor, South Bldg.	
Special Note	Those unable to attend at the above times will be assigned a time slot by mutual agreement. Questions, etc. will be accepted at any time. Feedback will be given at the final session.	
Course Plan	Number	Contents
	1	Achievement of course objective 1 and 2
	～	
	90	
	91	Achievement of course objective 3 and 4
	～	
	120	
	121	Achievement of course objective 5
	～	
	150	

Department of Nephrology

Ⅰ Educational Policy

The main research interests are related to the pathogenesis and treatment of chronic kidney disease (CKD) arising from clinical practice. As basic research, we are investigating the pathogenesis of various CKDs using cultured cells, animal models, and cell sheets. As for clinical research, using our department's registry and a national and international multicenter cohort, we are investigating factors associated with progression of CKD and validating treatment, as well as studies using AI. In particular, we have one of the largerst cohorts of IgA nephropathy, rituximab treatment for recurrent nephrotic syndrome, and polycystic kidney disease (PKD). We are striving to improve the quality of medical care by applying the results to clinical practice.

Ⅱ Goals

Year 1: Understand the basics of CKD and learn differential diagnosis and standard treatment.
Second year: Identify a clinical research topic, develop a research plan, and collect data.
Third year: Students learn methods of searching for papers and statistical analysis while producing research results in accordance with their research plan.
Fourth year: Research results will be published as a thesis.

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

Name and position	Research theme
Junichi Hoshino Professor	(1) Clinical research on chronic kidney disease Using our registry of more than 1500 patients and a national multicenter database, we will extract factors contributing to the progression of chronic kidney disease and analyze whether therapeutic intervention inhibits progression. In particular, we will analyze clinical studies on the inhibition of the progression of chronic kidney disease by novel drugs such as mineralocorticoid receptor antagonists, sodium-dependent glucose cotransporter 2 inhibitors, and HIF-PH inhibitors using the latest epidemiological and statistical methods. International collaborative studies are also ongoing.
Junichi Hoshino Professor Hiroshi Kataoka Assistant Prof.	(2) Research on pathogenesis and treatment of multiple cystic kidney disease Renal volume, hypertension and proteinuria are known factors that define the renal prognosis of multiple cystic kidney disease. Recent advances in genetics and research on intracellular signaling are revealing new insights into novel therapies. Using epidemiological, genetic, and molecular biological methods, as well as animal models, we will elucidate the pathogenesis of the disease and develop new treatment methods, as well as elucidate the pathogenesis of complications such as cystic liver and cerebral aneurysms.
Junichi Hoshino Professor	(3) Research on changes in physical function in chronic kidney disease Chronic kidney disease (CKD) causes various pathological developments related to physical functions such as increased protein catabolism, muscle atrophy, mitochondrial dysfunction, atherosclerosis, and osteoporosis. We will use animal models of various types of nephritis to understand the mechanisms of these diseases and elucidate novel therapeutic agents to suppress them. We will also conduct clinical studies on renal rehabilitation, including exercise and nutritional therapies.
Shun Manabe Assistant Professor	(4) Reseach of the pathogenesis and new treatment of hereditary nephritis. Various hereditary diseases, including rare diseases, cause chronic kidney disease. We will identify the causative genes and perform morphological examinations using low-vacuum scanning electron microscopes (LVSEM) to develop prognostic factors and new treatment methods.
Shun Manabe Assistant Professor	(5) Research on the pathophysiology and treatment of albuminuria in chronic kidney disease*. Proteinuria (albuminuria) is widely recognized as a risk factor for the progression of various renal diseases. Albuminuria must permeabilize glomerular coagulation cells to develop, and we will elucidate the mechanism of this permeabilization using glomerular endothelial and epithelial cells. In addition, we will use animal models of various types of nephritis to understand the mechanism of molecular-targeted therapies such as rituximab, which have recently been applied clinically, and to elucidate novel therapeutic agents to inhibit such therapies.

Shun Manabe Assistant Professor	(6) Research on the pathogenesis and treatment of IgA nephropathy Hypertension and proteinuria are known clinical risk factors that define the renal prognosis of IgA nephropathy. It is also necessary to determine the efficacy of tonsillectomy with corticosteroid pulse therapy and renin angiotensin inhibitors. Recently, the OXFORD classification, the Japanese classification, and the International Risk Prediction Tool have attracted attention as prognostic factors in renal biopsies, and we will discuss the use of these classifications in predicting prognosis and determining the indication for treatment.

Ⅳ Syllabus (＊ ＝ for doctor's license holders)

Title	Instructor	Credit	Theme
Basic and clinical science of CKD	Hoshino (prof) Manabe (Asst. prof) Kataoka (Asst. prof)	1	Basic and clinical in CKD
Renal pathology and differential diagnosis in CKD	Hoshino (prof) Manabe (Asst. prof) Kataoka (Asst. prof)	2	Renal pathology and differential diagnosis in CKD
Verification of the newest treatment of CKD	Hoshino (prof) Manabe (Asst. prof) Kataoka (Asst. prof)	2	Verification of the newest treatment in CKD
Conducting research on an issue and writing a thesis	Hoshino (prof) Manabe (Asst. prof) Kataoka (Asst. prof)	10	Conducting research on an issue and writing a thesis
Total credits		15	

(Department of Nephrology) Syllabus (1)

Syllabus Title	Basic and Clinical Science of Chronic Kidney Disease
Instructor	Prof. Hoshino, Asst. Prof. Manabe, Asst. Prof. Kataoka
Credit	1
Type of Class	Lecture and practice
Theme	Basic and Clinical Sciences of Chronic Kidney Disease
Schedule	Mon 8:30~9:30, Wed 9:00~10:00, 16:00~17:00, 17:00~18:00, Fri 8:30~9:00
Course Objective	Understand the structure and function of the kidney. To understand the pathogenesis of acute kidney injury and chronic kidney disease for selecting appropriate treatment. Understand the techniques of hemodialysis, hemodiafiltration and peritoneal dialysis, and these complications. Acquire knowledge of donor selection for renal transplantation.
Evaluation Methods	Attendance (50%), Submission of reports on lecture content (50%)
Grading Scale	There are five categories: 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 being passed and D being failed.
Textbooks/References	Internal Medicine Asakura Shoten, 2017, Evidence-based CKD Clinical Practice Guidelines 2018 Tokyo Igaku-sha, 2018, Handbook of Blood Purification Therapy Dialysis Therapy Joint Committee, Kyodo Igaku-sho Publisher, 2017
Independent Study Outside of Class	Students should read reference books on the topic and research the latest literature.
Room	Conference room, the 3rd floor of the first Bldg, Dialysis center, the 2nd floor of the frist Bldg. Staff room, the 5th floor of the south Bldg. Conference room, the 5th floor of the Tomoe Bldg.
Special Note	Those unable to attend at the above times will be assigned a time slot 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	Prof. Hoshino and others	Anatomical features and differentiation of the kidney
2	Prof. Hoshino and others	Functions of glomeruli
3	Prof. Hoshino and others	Functions of renal tubules
4	Prof. Hoshino and others	Basic and clinical sciences of acute kidney injury
5	Prof. Hoshino and others	Basic and clinical sciences of chronic kidney diseases
6	Prof. Hoshino and others	Basic and clinical sciences of hemodialysis
7	Prof. Hoshino and others	Basic and clinical sciences of peritoneal dialysis
8	Prof. Hoshino and others	Basic and clinical sciences of kidney transplantation

(Department of Nephrology) Syllabus (2)

Syllabus Title	Renal pathology and differential diagnosis in CKD
Instructor	Prof. Hoshino, Asst. Prof. Manabe, Asst. Prof. Kataoka
Credit	2
Type of Class	Lecture and practice
Theme	Renal biopsy for differential diagnosis of chronic kidney disease
Schedule	Mon 8:30~9:30, Wed 9:00~10:00, 16:00~17:00, 17:00~18:00, Fri 8:30~9:00
Course Objective	Epidemiology of chronic kidney disease Distribution of primary disease Differential diagnosis and treatment options
Evaluation Methods	Attendance (50%), Submission of reports on lecture content (50%)
Grading Scale	There are five categories: 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 being passed and D being failed.
Textbooks/References	Diagnostic Atlas of Renal Pathology, 4th Edition. 2021, Elsevior, Heptinstall's Pathology of the Kidney, 7th Edition, 2014, Wolters Kluwer,
Independent Study Outside of Class	Students should read reference books on the topic and research the latest literature.
Room	Pathology laboratory, the 4th floor of the East Bldg.
Special Note	Those unable to attend at the above times will be assigned a time slot 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	Prof. Hoshino and others	Epidemiology of chronic kidney diseases
2	Prof. Hoshino and others	Primary kidney disease of chronic kidney diseases
3	Prof. Hoshino and others	Procudures of renal biopsy
4	Prof. Hoshino and others	Renal pathyolgy, basic
5	Prof. Hoshino and others	Renal pathology, advanced
6	Prof. Hoshino and others	Differential diagnosis of the primary glomerulonephritis
7	Prof. Hoshino and others	Differential diagnosis of the secondary glomerulonephritis
8	Prof. Hoshino and others	Differential diagnosis of the tubulo-interstitial nephritis
9	Prof. Hoshino and others	Basic and clinical features of the hereditary kidney diseases
10	Prof. Hoshino and others	Kidney diseases associated with collagen diseases
11	Prof. Hoshino and others	Treatments of the nephrotic syndrome
12	Prof. Hoshino and others	Clinical features of the chronic kidney disease, pathological point of view
13	Prof. Hoshino and others	Recent advances of sciences in the chronic kidney disease
14	Prof. Hoshino and others	Group discussion, part 1
15	Prof. Hoshino and others	Group discussion, part 2
16	Prof. Hoshino and others	Review

(Department of Nephrology) Syllabus (3)

Syllabus Title	Recent Advances in the Treatment of Chronic Kidney Disease
Instructor	Prof. Hoshino, Asst. Prof. Manabe, Asst. Prof. Kataoka
Credit	2
Type of Class	Lecture and practice
Theme	Recent Advances in the Treatment of Chronic Kidney Disease
Schedule	Mon 8:30~9:30, Wed 9:00~10:00, 16:00~17:00, 17:00~18:00, Fri 8:30~9:00
Course Objective	The objective of this course is to understand recent advances in the treatment of each type of chronic kidney disease
Evaluation Methods	Attendance (50%), Submission of reports on lecture content (50%)
Grading Scale	There are five categories: 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 being passed and D being failed.
Textbooks/References	Internal Medicine Asakura Shoten, 2017, Evidence-based CKD Clinical Practice Guidelines 2018 Tokyo Igaku-sha, 2018, Evidence based clinical guideline for IgA nephropathy 2020, Evidence based clinical guideline for nephrotic syndrome 2020, Evidence based clinical guideline for polycystic kidney diseases 2020,
Independent Study Outside of Class	Students should read reference books on the topic and research the latest literature.
Room	Conference room, the 3rd floor of the first Bldg, Dialysis center, the 2nd floor of the frist Bldg. Staff room, the 5th floor of the south Bldg. Conference room, the 5th floor of the Tomoe Bldg.
Special Note	Those unable to attend at the above times will be assigned a time slot 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	Prof. Hoshino and others	IgA nephropathy
2	Prof. Hoshino and others	Membranous nephropathy
3	Prof. Hoshino and others	Focal segmental glomerulosclerosis
4	Prof. Hoshino and others	Rapidly progressive glomerulonephritis
5	Prof. Hoshino and others	Minimal change nephrotic syndrome
6	Prof. Hoshino and others	Nephrosclerosis
7	Prof. Hoshino and others	Lupus nephropathy
8	Prof. Hoshino and others	Polycystic kidney diseases
9	Prof. Hoshino and others	Interstitial nephritis
10	Prof. Hoshino and others	Amyloidosis
11	Prof. Hoshino and others	Chronic kidney diseases
12	Prof. Hoshino and others	Dialysis
13	Prof. Hoshino and others	Case conference 1
14	Prof. Hoshino and others	Case conference 2
15	Prof. Hoshino and others	Case conference 3
16	Prof. Hoshino and others	Review

(Department of Nephrology) Syllabus (4)

Syllabus Title	Experiments and practice for research		
Instructor	Prof. Hoshino, Asst. Prof. Manabe, Asst. Prof. Kataoka		
Credit	10		
Type of Class	Experiments and practice for research		
Theme	Conducting research on an issue and writing a thesis		
Schedule	Wed 9:00~10:10, 10:30~11:40, 14:30~15:40, 16:00~17:10		
Course Objective	1. Planning research hypotheses and research projects. Practice skills for implementation for the research. 2. Recording the researh contents and results accurately, and duscuss them. 3. Summarizing the research results. 4. Making a presentation at research meetings, and having appropriate discussions. 5. Submitting the reseach as a paper. Make prompt responses to the reviewers' comments.		
Evaluation Methods	Research reports (60%), Interview (10%), Research presentation and discussion (10%), Writing manuscripts (20%)		
Grading Scale	There are five categories: 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 being passed and D being failed.		
Textbooks/References	Original articles and Reviews in the area of research interests.		
Independent Study Outside of Class	Students should study and discuss the newest topics by attending academic meetings in the area of research interests		
Room	Conference room, the 3rd floor of the first Bldg, Dialysis center, the 2nd floor of the frist Bldg. Staff room, the 5th floor of the south Bldg. Conference room, the 5th floor of the Tomoe Bldg.		
Special Note	Those unable to attend at the above times will be assigned a time slot 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 ~ 90	Prof. Hoshino and others	Course objective 1-2
	91 ~ 120	Prof. Hoshino and others	Course objective 3-4
	121 ~ 150	Prof. Hoshino and others	Course objective 5

Hormonal Medicine and Bioregulatory Science

Ⅰ Educational Policy

Our department is responsible for the study of pathophysiology, diagnosis, management, treatment, and prevention based on hormones involved in blood pressure regulation and endocrinology.
1. To "cure" hypertension from a hormonal perspective for the 43 million hypertensive patients in Japan.
2. To create new treatment methods for traditional hormonal diseases (pituitary gland, thyroid gland, adrenal gland, etc.) by making full use of epigenetic analysis.
3. To discover new humoral factors derived from new hormonal organs (heart, kidney, fat, digestive system, etc.) and apply them to the treatment of lifestyle-related diseases.
We are devoting all our efforts to these missions in society. Our goal is to nurture graduates from our department who will be future recipients of the Nobel Prize in Physiology or Medicine.

Ⅱ Goals

1) Understand blood pressure regulation mechanisms and the pathology of various endocrine diseases, and acquire a wide range of knowledge related to the mechanisms of disease.
2) Master techniques for genetically modified mice and cell culture, as well as genomic and epigenetic techniques utilizing these.
3) Set advanced and original research themes in the basic and clinical fields of endocrinology, draw up experimental plans and conduct research in accordance with the plans.
4) Be able to appropriately and objectively evaluate results and present the contents of the evaluation.
5) Publish research results in a paper.
6) Possess a broad perspective and excellent communication skills, and is expected to play an active role internationally.
7) Acquire the ability to contribute to the development of medical education and research with a rich humanity and high sense of ethics.

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

Name and position	Research theme
Prof. Ichihara Assoc. Prof. Seki Assis. Prof. Watanabe Assis. Prof. Takano Assis. Prof. Kimura Assis. Prof. Hirata	(1) Study on the pathophysiological significance of growth hormone and insulin-like growth factors a. Study on the pathophysiological significance of GH in adults The pathophysiological significance of GH will be examined in vivo and in vitro in relation to visceral obesity and insulin resistance observed in adult GH deficiency. b. Study on the mechanism of hypoglycemia in IGF-II producing tumors (NICTH) that exhibit hypoglycemia Establish a sensitive and specific assay system for the biological action of large molecular weight IGF-II produced in NICTH. c. Study on the pathophysiological significance of IGF, IGF receptors, and IGFBPs in tumors To investigate the involvement of the IGF-I system in tumor formation and proliferation, we will use cancer cells to examine the activity of IGF-I, IGF-I receptors and their downstream signaling systems, and IGFBPs.
Prof. Ichihara Assoc. Prof. Seki Assis. Prof. Watanabe Assis. Prof. Takano Assis. Prof. Kimura Assis. Prof. Hirata	(2) Pituitary growth hormone control mechanism, etiology of pituitary tumors and gene therapy a. Hypothalamic hormone control mechanism The hypothalamus is an organ that plays a central role in maintaining the homeostasis of the endocrine system. This control by the hypothalamus is ingeniously performed by hypothalamic hormones and neuropeptides, so slight disruptions of the hypothalamus-pituitary-target organ axis may be related to various pathological conditions. In this study, we conduct neuroendocrine research on the control mechanism of growth hormone (GH), which has attracted attention in recent years as an anti-atherosclerosis and anti-aging factor. We focus on three hypothalamic hormones and peptides: GHRH, somatostatin, and Ghrelin (GH secretagogue), and conduct molecular biological and physiological research at the gene and protein levels, including the receptors of these factors. b. Elucidation of the causes of pituitary tumors The mechanism of onset of pituitary tumors is largely unknown. Only in 30-40% of cases of acromegaly, sustained activation of the GHRH receptor due to a point mutation in the Gs α protein has been identified. Pituitary tumors have a semi-autonomous nature and maintain responsiveness to physiological hypothalamic hormones. Moreover, this phenomenon persists regardless of the presence of overproduction of pituitary hormones or their target hormones. In other words, there is a possibility that sensitivity to feedback inhibitory mechanisms is reduced or absent. In this study, we will conduct physiological and molecular biological research on GH- or PRL-producing pituitary tumors to determine whether there are abnormalities in the receptors of hypothalamic hormones and target organ hormones, and the intracellular signal transduction mechanisms of post-receptors after the receptors. c. Basic research toward gene therapy for pituitary tumors Conventional treatments for pituitary tumors have limitations, and gene therapy is expected to overcome these limitations. The key to successful gene therapy is gene transfer, and we have already succeeded in tissue-specific gene transfer using recombinant adenovirus vectors. The purpose of this study is to develop a recombinant adenovirus vector that enables gene therapy for pituitary tumors. At this stage, we aim to enable specific and highly efficient gene transfer to pituitary tumors by focusing on improvements such as modifying Fiber, a structural protein that plays an important role in adenovirus gene transfer, and controlling the expression of the introduced gene with a tissue-specific promoter.

Prof. Ichihara Assoc. Prof. Seki Assis. Prof. Watanabe Assis. Prof. Takano Assis. Prof. Kimura Assis. Prof. Hirata	(3) Elucidation of the regulatory mechanism of thyroid cell proliferation and differentiation and fundamental studies on its clinical application a. Diagnosis and treatment of thyroid cancer targeting the invasiveness of thyroid tumor cells We will create cells transfected with activated Akt and mutant BRAF genes, which are intracellular signaling systems that determine the proliferation and invasiveness of thyroid tumor cells, and identify the newly activated genes in these cells using the microarray method. Using these newly identified genes, we will develop a genetic diagnostic method to determine highly invasive tumors. Furthermore, we will suppress the expression of these genes using RNA interference to explore the possibility of new thyroid tumor treatments. b. Establishment of a thyroid tissue reconstruction method using cell sheets and fundamental studies on clinical application We will apply the cell sheets developed by Professor Okano and others in a joint project with the Institute of Advanced Life Sciences to reconstruct cell polarity and three-dimensional structure from a monolayer of thyroid cells, create cultured tissue that can continuously secrete thyroid hormone, and implant it in the body. We plan to develop technologies such as cell sheet creation, induction of differentiation function, and microencapsulation, and conduct fundamental studies on clinical application.
Prof. Ichihara Assoc. Prof. Seki Assis. Prof. Watanabe Assis. Prof. Takano Assis. Prof. Kimura Assis. Prof. Hirata	(4) Elucidation of the pathophysiological role of steroid hormones in lifestyle-related diseases a. Aldosterone and lifestyle-related diseases Primary aldosteronism, a model pathology of aldosterone excess, causes hypertension, hypokalemia, cardiovascular hypertrophy, and fibrosis, leading to cerebrovascular disorders and heart failure. Recently, attention has been paid to the effect of aldosterone on non-epithelial tissues of the cardiovascular system in addition to its effect on renal tubules, and a relationship with aldosterone's organ damage has been suggested. In this study, we will study the pathophysiological role of aldosterone, including 1) the molecular biological mechanism of cardiac hypertrophy and cardiac fibrosis, 2) a comparison between non-genomic and genomic actions, and 3) differences with angiotensin II. b. Cortisol and lifestyle-related diseases Cushing's syndrome, a model pathology of cortisol excess, causes hypertension, diabetes, and hyperlipidemia, and is often accompanied by cardiovascular disease. The biological activity of cortisol is determined by 1) glucocorticoid receptors and 2) type 2 11β-hydroxysteroid dehydratase (11β HSD), which converts cortisone to active cortisol. In this study, we investigate the relationship between abnormalities of glucocorticoid receptors and type 2 11β HSD in the liver and adipose tissue and fatty liver and diabetes.
Prof. Ichihara Assoc. Prof. Seki Assis. Prof. Watanabe Assis. Prof. Takano Assis. Prof. Kimura Assis. Prof. Hirata	(5) Study on the role of prorenin and (pro)renin receptor (basic research) a. Study on the physiological and pathophysiological roles and control mechanisms of prorenin and (pro)renin receptor Using genetic engineering, molecular biology, pharmacology, and physiological techniques, we will study the physiological and pathophysiological roles and control mechanisms of prorenin and (pro)renin receptor. We will also study the role of prorenin and (pro)renin receptor in the tissue renin-angiotensin system. b. Study on the usefulness of (pro)renin receptor antagonists in various pathologies We will study the effectiveness of our self-developed (pro)renin receptor antagonist in various pathologies (hypertension, diabetes, obesity, etc.) and various organ disorders (heart, kidney, brain, vascular diseases, etc.). As a result, we will not only gain knowledge about the role of (pro)renin receptor in pathophysiology, but also develop drugs for clinical application in the future.
Prof. Ichihara Assoc. Prof. Seki Assis. Prof. Watanabe Assis. Prof. Takano Assis. Prof. Kimura Assis. Prof. Hirata	(6) Search for new blood pressure regulation mechanisms (clinical research) a. Study on the pathophysiology and treatment of hypertension caused by arterial compression of the rostral ventrolateral medulla (RVLM) We have reported that arterial compression of the RVLM, which is the control center of sympathetic nerve activity, can cause hypertension through increased sympathetic nerve activity, and that there are cases in which hypertension is cured by suppressing sympathetic nerve activity through compression release surgery. As a result, hypertension caused by arterial compression of the RVLM has come to be recognized as a new type of secondary hypertension. We will continue to study the pathophysiology of hypertension caused by RVLM compression and develop treatment methods. b. Study on the effectiveness of renal sympathetic nerve ablation in Japanese people In recent years, the effectiveness of renal sympathetic nerve ablation in hypertension has been reported overseas, but it has not yet been applied clinically in Japan. Therefore, we will perform renal sympathetic nerve ablation as a complete cure for hypertension, and verify the sympathetic nerve inhibition and antihypertensive effects in Japanese people. c. Renin/prorenin/soluble (pro)renin receptor analysis in renal sympathetic nerve ablation We will measure plasma renin activity, plasma and urinary prorenin and soluble (pro)renin receptors before and after renal sympathetic nerve ablation for hypertension, and examine the role of the renal sympathetic nerve on the renin-angiotensin system. d. Study of the effects of various lifestyle-related disease drugs on nerve and humoral factors and arteriosclerosis In our department, we have established a system in which plasma and urinary prorenin, soluble (pro)renin receptor analysis, vascular endothelial function tests, arteriosclerosis tests (CAVI, AI, carotid artery echo), 24-hour blood pressure measurements, sympathetic nerve activity evaluation, and visceral fat area measurements can be performed routinely in the outpatient department. For the time being, we will evaluate the effectiveness of various antihypertensive drugs, antidiabetic drugs, and lipid-lowering drugs currently in clinical use, but in the future we also plan to evaluate the effectiveness of newly developed drugs.

Ⅳ Syllabus （＊ ＝ for doctor's license holders）

Title	Instructor	Credit	Theme
Special Discussion on Blood Pressure Regulation and Endocrinology*	Prof. Ichihara, Assoc. Prof. Seki, Assis. Prof. Watanabe, Assis. Prof. Takano, Assis. Prof. Hirata, Assis. Prof. Kimura	1	Presentations and intensive discussions on blood pressure regulation and hormones
Blood Pressure Regulation and Applied Endocrinology*	Prof. Ichihara, Assoc. Prof. Seki, Assis. Prof. Watanabe, Assis. Prof. Takano, Assis. Prof. Hirata, Assis. Prof. Kimura	2	Blood pressure regulation and hormonal pathology learned from actual cases
Experimental Blood Pressure Regulation/Experimental Endocrinology*	Prof. Ichihara, Assoc. Prof. Seki, Assis. Prof. Watanabe, Assis. Prof. Takano, Assis. Prof. Hirata, Assis. Prof. Kimura	2	Understand and master basic experiments in blood pressure regulation and hormones
Experiments and training (problem research)*	Prof. Ichihara, Assoc. Prof. Seki, Assis. Prof. Watanabe, Assis. Prof. Takano, Assis. Prof. Hirata, Assis. Prof. Kimura	10	Conducting research and writing a thesis
Total credits		15	

Hormonal Medicine and Bioregulatory Science

Syllabus Title	Special Discussion on Blood Pressure Regulation and Endocrinology
Instructor	Prof. Ichihara, Assoc. Prof. Seki, Assis. Prof. Watanabe, Assis. Prof. Takano, Assis. Prof. Hirata, Assis. Prof. Kimura
Credit	1
Type of Class	Lectures and seminars
Theme	Presentations and intensive discussions on blood pressure regulation and hormones
Schedule	12 times a year, Thursday 17:00–18:20
Course Objective	Students will be able to appropriately and objectively evaluate results and present the content of those evaluations. They will have a broad perspective and strong communication skills, and will be able to play an active role internationally. They will have a rich humanity and high sense of ethics, and will acquire the ability to contribute to the development of medical education and research.
Evaluation Methods	Attendance (25%) Research report (25%) Oral discussion/clinical conference presentation (40%) Report submission (10%)
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), and D (less than 60 points). S, A, B, and C are considered passing grades, while D is a failing grade.
Textbooks/References	None
Independent Study Outside of Class	As your research progresses, you will work with your supervisor to prepare presentation materials and reports.
Room	Ward 1, 3rd floor conference room, Tomoe Research and Education Building
Special Note	If you are unable to attend the above times, we will decide on a different timetable. Questions will be accepted at any time. Feedback will be given at the final session.

Course Plan

Number	Instructor	Contents
1	Ichihara et. al	Guidance on presentations and discussions in the roundtable
2	Ichihara et. al	Presentations and discussions at intensive roundtables
3	Ichihara et. al	Presentations and discussions at intensive roundtables
4	Ichihara et. al	Presentations and discussions at intensive roundtables
5	Ichihara et. al	Presentations and discussions at intensive roundtables
6	Ichihara et. al	Presentations and discussions at intensive roundtables
7	Ichihara et. al	Presentations and discussions at intensive roundtables
8	Ichihara et. al	Presentations and discussions at intensive roundtables
9	Ichihara et. al	Presentations and discussions at intensive roundtables
10	Ichihara et. al	Presentations and discussions at intensive roundtables
11	Ichihara et. al	Presentations and discussions at intensive roundtables
12	Ichihara et. al	A summary of the presentations and discussions held throughout the year

Hormonal Medicine and Bioregulatory Science

Syllabus Title	Blood Pressure Regulation and Applied Endocrinology
Instructor	Prof. Ichihara, Assoc. Prof. Seki, Assis. Prof. Watanabe, Assis. Prof. Takano, Assis. Prof. Hirata, Assis. Prof. Kimura
Credit	2
Type of Class	Lectures and seminars
Theme	Blood pressure regulation and hormonal pathology learned from actual cases
Schedule	Thursday 8:30–9:30
Course Objective	Understand homeostasis and the pathology of various endocrine disorders, and acquire a wide range of knowledge related to the mechanisms of disease onset. Set advanced and original research themes in the basic and clinical fields of endocrinology, develop experimental plans, and carry out research in accordance with those plans.
Evaluation Methods	Attendance (50%) Oral Exam (25%) Discussion (25%)
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), and D (less than 60 points). S, A, B, and C are considered passing grades, while D is a failing grade.
Textbooks/References	Latest Endocrinology and Metabolism (Diagnosis and Treatment) Guidelines for Hypertension Treatment (Japanese Society of Hypertension) Guidelines for the Treatment of Pregnancy-Induced Hypertension Syndrome (Japanese Society of Hypertension in Pregnancy)
Independent Study Outside of Class	Read the reference books listed above. Be interested in the research content of other researchers and acquire a wide range of knowledge in interdisciplinary fields. materials and reports.
Room	Ward 1, 3rd floor, conference room
Special Note	If you are unable to attend the above times, we will decide on a different timetable. Questions will be accepted at any time. Feedback will be given at the final session.

Course Plan

Number	Instructor	Contents
1	Ichihara et. al	Orientation
2	Ichihara et. al	Homeostasis1
3	Ichihara et. al	Endocrinology1
4	Ichihara et. al	Homeostasis2
5	Ichihara et. al	Endocrinology2
6	Ichihara et. al	Homeostasis3
7	Ichihara et. al	Endocrinology3
8	Ichihara et. al	Homeostasis4
9	Ichihara et. al	Endocrinology4
10	Ichihara et. al	Homeostasis5
11	Ichihara et. al	Endocrinology5
12	Ichihara et. al	Homeostasis6
13	Ichihara et. al	Endocrinology6
14	Ichihara et. al	Homeostasis7
15	Ichihara et. al	Endocrinology7
16	Ichihara et. al	Homeostasis8
17	Ichihara et. al	Endocrinology8
18	Ichihara et. al	Homeostasis9
19	Ichihara et. al	Endocrinology9
20	Ichihara et. al	Homeostasis10
21	Ichihara et. al	Endocrinology10
22	Ichihara et. al	Homeostasis11
23	Ichihara et. al	Endocrinology11
24	Ichihara et. al	Homeostasis12
25	Ichihara et. al	Endocrinology12
26	Ichihara et. al	Homeostasis13
27	Ichihara et. al	Endocrinology13
28	Ichihara et. al	Homeostasis14
29	Ichihara et. al	Endocrinology14
30	Ichihara et. al	Summary

Hormonal Medicine and Bioregulatory Science

Syllabus Title	Experimental Blood Pressure Regulation/Experimental Endocrinology
Instructor	Prof. Ichihara, Assoc. Prof. Seki, Assis. Prof. Watanabe, Assis. Prof. Takano, Assis. Prof. Hirata, Assis. Prof. Kimura
Credit	2
Type of Class	Lectures and seminars
Theme	Understand and master basic experiments in blood pressure regulation and hormones
Schedule	Monday 7:50–8:50
Course Objective	Students will acquire skills in genetically modified mice and cell culture, as well as genome and epigenetic techniques that utilize these techniques.
Evaluation Methods	Attendance (50%), content of your own research presentation and discussion (20%), content of discussions regarding other people's research presentations (20%), and activeness in presentations and discussions (10%)
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), and D (less than 60 points). S, A, B, and C are considered passing grades, while D is a failing grade.
Textbooks/References	Reviews and original articles related to experimental medicine, blood pressure regulation, and endocrinology Treatment (Japanese Society of Hypertension) Guidelines for the Treatment of Pregnancy-Induced Hypertension Syndrome (Japanese Society of Hypertension in Pregnancy)
Independent Study Outside of Class	Read the reference books and related literature listed above. Be interested in the research content of other researchers and acquire a wide range of knowledge in interdisciplinary fields. researchers and acquire a wide range of knowledge in interdisciplinary fields. materials and reports.
Room	Tomoe Research and Education Building, Ward 1, 3rd floor, Conference Room
Special Note	If you are unable to attend the above times, we will decide on a different timetable. Questions will be accepted at any time. Feedback will be given at the final session.

Course Plan

Number	Instructor	Contents
1	Ichihara et. al	Basic Experiment Seminar on Blood Pressure Regulation and Endocrinology 1
2	Ichihara et. al	Basic Experiment Seminar on Blood Pressure Regulation and Endocrinology 2
3	Ichihara et. al	Basic Experiment Seminar on Blood Pressure Regulation and Endocrinology 3
4	Ichihara et. al	Basic Experiment Seminar on Blood Pressure Regulation and Endocrinology 4
5	Ichihara et. al	Basic Experiment Seminar on Blood Pressure Regulation and Endocrinology 5
6	Ichihara et. al	Basic Experiment Seminar on Blood Pressure Regulation and Endocrinology 6
7	Ichihara et. al	Basic Experiment Seminar on Blood Pressure Regulation and Endocrinology 7
8	Ichihara et. al	Basic Experiment Seminar on Blood Pressure Regulation and Endocrinology 8
9	Ichihara et. al	Basic Experiment Seminar on Blood Pressure Regulation and Endocrinology 9
10	Ichihara et. al	Basic Experiment Seminar on Blood Pressure Regulation and Endocrinology 10
11	Ichihara et. al	Basic Experiment Seminar on Blood Pressure Regulation and Endocrinology 11
12	Ichihara et. al	Basic Experiment Seminar on Blood Pressure Regulation and Endocrinology 12
13	Ichihara et. al	Basic Experiment Seminar on Blood Pressure Regulation and Endocrinology 13
14	Ichihara et. al	Basic Experiment Seminar on Blood Pressure Regulation and Endocrinology 14
15	Ichihara et. al	Basic Experiment Seminar on Blood Pressure Regulation and Endocrinology 15
16	Ichihara et. al	Basic Experiment Seminar on Blood Pressure Regulation and Endocrinology 16
17	Ichihara et. al	Basic Experiment Seminar on Blood Pressure Regulation and Endocrinology 17
18	Ichihara et. al	Basic Experiment Seminar on Blood Pressure Regulation and Endocrinology 18
19	Ichihara et. al	Basic Experiment Seminar on Blood Pressure Regulation and Endocrinology 19
20	Ichihara et. al	Basic Experiment Seminar on Blood Pressure Regulation and Endocrinology 20
21	Ichihara et. al	Basic Experiment Seminar on Blood Pressure Regulation and Endocrinology 21
22	Ichihara et. al	Basic Experiment Seminar on Blood Pressure Regulation and Endocrinology 22
23	Ichihara et. al	Basic Experiment Seminar on Blood Pressure Regulation and Endocrinology 23
24	Ichihara et. al	Basic Experiment Seminar on Blood Pressure Regulation and Endocrinology 24
25	Ichihara et. al	Basic Experiment Seminar on Blood Pressure Regulation and Endocrinology 25
26	Ichihara et. al	Basic Experiment Seminar on Blood Pressure Regulation and Endocrinology 26
27	Ichihara et. al	Basic Experiment Seminar on Blood Pressure Regulation and Endocrinology 27
28	Ichihara et. al	Basic Experiment Seminar on Blood Pressure Regulation and Endocrinology 28
29	Ichihara et. al	Basic Experiment Seminar on Blood Pressure Regulation and Endocrinology 29
30	Ichihara et. al	Basic Experiment Seminar on Blood Pressure Regulation and Endocrinology 30

Hormonal Medicine and Bioregulatory Science

Syllabus Title	Experiments and training (problem research)
Instructor	Prof. Ichihara, Assoc. Prof. Seki, Assis. Prof. Watanabe, Assis. Prof. Takano, Assis. Prof. Hirata, Assis. Prof. Kimura
Credit	10
Type of Class	Experiments and training (problem research)
Theme	Conducting research and writing a thesis
Schedule	Monday, Tuesday, Wednesday, Friday 9:00–12:00, 13:00–17:00 Thursday 15:00–17:00
Course Objective	1. Able to master the necessary experimental techniques and conduct research in accordance with the proposed research plan. 2. Able to correctly record and store experimental content and data. 3. Able to properly summarize experimental results in diagrams and charts. 4. Able to properly present the research content at external academic conferences and research meetings and be able to discuss the content. 5. Able to publish the research content as a paper and submit it. Appropriately respond to reviewers' comments and achieve publication.
Evaluation Methods	Laboratory notes and research reports (50%), chart creation (10%), research presentations and discussions (10%), academic conference presentations (10%), writing papers (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), and D (less than 60 points). S, A, B, and C are considered passing grades, while D is a failing grade.
Textbooks/References	How to write lab notes that science students should know (Yodosha), ethical guidelines for medical research involving human subjects, reviews and original papers related to research topics
Independent Study Outside of Class	We actively participate in and give presentations at related academic conferences, etc., to gather information and hold discussions.
Room	Tomoe Research and Education Building, etc.
Special Note	The period and time of the research will be decided through discussion. Questions will be accepted at any time.

Course Plan	Number	Instructor	Contents
	1 to 90	Ichihara et. al	Achievement of goals 1 and 2
	91 to 120	Ichihara et. al	Achievement of goals 3 and 4
	121 to 150	Ichihara et. al	Achievement of goal 5

Division of Cardiovascular Medicine

Ⅰ Educational Policy

The main research themes of the Department of Cardiovascular Medicine include basic research on myocardial regeneration, cellular immunology related to atherosclerosis, thrombocoagulation, and myocardial cell electrophysiology. All of these research themes are clinically based and aimed at clinical application. Myocardial regeneration is aimed at the clinical application of cell sheets using progenitor cells derived from cardiomyocytes to patients with severe heart failure. Thromboprophylaxis and immunology are also research themes aimed at preventing and treating ischemic heart disease.
Clinical research includes ischemic heart disease, heart failure, cardiomyopathy, arrhythmia, hypertension, and diagnostic imaging, as well as large-scale clinical studies by the Department of Cardiology and related facilities. Prospective cohort studies and randomized assignment studies of coronary artery disease and heart failure cases have been conducted to elucidate the characteristics of cardiovascular diseases in our country. These studies have allowed us to examine the long-term prognosis of patients with myocardial infarction, angina pectoris, and heart failure, the evolution of risk factors, and the effectiveness of drug therapy. Traditionally, guidelines for cardiovascular diseases have been based on Western evidence. Still, the clinical research of the Department of Cardiovascular Medicine aims to produce evidence-based guidelines that are unique to Japan.

Ⅱ Goals

First year: Acquire a broad knowledge of cardiovascular diseases and learn differential judgment methods, various procedures, and treatment methods.
Second year: In clinical research, students practice diagnosis, examination, and treatment methods and learn to perform treatment. In addition, students will formulate research themes. In basic research, students will be able to develop research methods and research plans.
Third year: Students conduct research following the research plan and make an interim report on the research results.
Fourth year: Students will write a thesis on their research results.

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

Name and position	Research theme
Junichi Yamaguchi Professeor and Head	(1) Studies on cardiac catheterization's usefulness, safety, and prognosis*. A. Study of Treatment Strategies for Patients Refractory to Percutaneous Coronary Angioplasty (PCI) PCI plays an essential role in the treatment system for coronary artery disease. The widespread use of drug-eluting stents (DES) has markedly reduced restenosis rates in recent years. However, a trend toward more severe disease has also been observed, and treatment-resistant patient groups (e.g., diabetics, dialysis patients, and the very elderly) have become evident. Since our institution has been treating many of these high-risk patients, we will conduct observational studies or prospective intervention trials for these patients, with cardiovascular events as the endpoint. These studies will clarify the reality of patients with poor prognoses in the current DES era and establish effective treatment strategies. B. Investigation of the usefulness and clinical outcomes of catheterization for valvular heart disease In recent years, catheterization for severe aortic stenosis and mitral regurgitation with high operative risk has become feasible, and its application is expanding to patients with low operative risk. However, the actual treatment and prognosis in Japan are still unclear. We have been actively performing both types of treatment. With the number of patients increasing, we are enrolling and monitoring all patients to determine the usefulness of these treatments, their potential for the future, and clinical outcomes. From these studies, we believe it is necessary to consider the future indications for therapy in Japan.
Morio Shoda Professor (Fixed Term)	(2) Analysis of arrhythmia mechanism using three-dimensional mapping and its application to ablation therapy*. In recent years, catheter ablation therapy for tachyarrhythmias has made remarkable progress, and while radical cure of WPW syndrome, atrioventricular node reentrant tachycardia, and typical atrial flutter can now be expected without fail, ventricular tachycardia and atrial tachycardia after open heart surgery are still challenging to treat. This study aims to establish a treatment method for such intractable arrhythmias. In addition to conventionally used methods, this study will focus on the clinical application of a newly developed cardiac mapping system. This system simultaneously analyzes morphological and electrical information in the cardiac cavity on a computer using an artificially created magnetic field around the patient and a magnetic sensor embedded in the tip of the catheter electrode. It can recognize the heart's anatomical morphology and excitation propagation pattern in real time through a 3D computer graphic display. The basic principle of this method is well established. Although the basic principles of this method are almost confirmed, the method for analyzing various arrhythmias is still incomplete, so we will develop software for this purpose, analyze complex arrhythmias with this mapping method, and study its application to ablation therapy.

Morio Shoda Professor (Fixed Term)	(3) Development of a New Pacing Method for Artificial Pacemaker Therapy*. It can be said that artificial pacemaker therapy as a pacing therapy for bradyarrhythmias such as sinus dysfunction, atrioventricular block, and bradycardic atrial fibrillation has already been established. This study will focus on the prevention of atrial fibrillation using an implantable artificial pacemaker, treatment of heart failure, and accurate diagnosis of Adams-Stokes The research will focus on the prevention of atrial fibrillation using implantable pacemakers, treatment of heart failure, and precise diagnosis of Adams-Stokes attacks in implantable slow fibrillation. In particular, artificial pacemaker therapy for preventing atrial fibrillation is still an ongoing research topic with the development of new technologies. In treating heart failure and diagnosing Adams-Stokes attacks, the development of new intracardiac sensors and basic research is ongoing at this stage, and research will be developed mainly for clinical applications.
Katsuhisa Matsuura Professor	(4) Research on the Development of novel therapies for heart failure A. Myocardial regeneration research using human iPS cell-derived myocardial tissue Human iPS cell-derived cardiac tissue is expected to be used not only for cardiac regenerative medicine but also to clarify disease mechanisms and drug discovery applications in various cardiovascular fields. Based on cell sheet engineering, we have constructed human cardiac tissue using cardiomyocytes, blood vessels, and stromal cells differentiated from human iPS cells. Many issues must be solved for the clinical use of such human myocardial tissues. One is tumor formation by residual iPS cells. We have recently discovered that methionine, an essential amino acid, is essential for the survival and proliferation of iPS cells. Still, more sensitive and specific technologies are needed for iPS cell removal and purification of cardiac component cells. Second, cardiomyocytes differentiated from iPS cells are very young, and it is essential to mature them to more closely resemble living myocardium. After various interventions, maturation will be assessed electrophysiologically and molecularly. Third, myocardial tissue transplantation into animal models of heart failure will be used to improve cardiac function and elucidate its mechanisms. We will develop next-generation regenerative medicine for severe heart failure by focusing on these three issues. B. Development of heart failure treatment by regulating cardiac stromal cell function Although myocardial cells make up the majority of the heart in terms of volume, it is said that interstitial cells account for about 70% of the total number of cells. After myocardial cell death due to myocardial infarction or other disorders, fibrosis develops due to the proliferation of interstitial cells and an increase in extracellular matrix, leading to heart failure. Recently, we have found that cardiac interstitial cells, unlike interstitial cells in other organs, have specific functions for cardiomyocytes and vascular cells. Therefore, we will characterize the molecular biology of cardiac interstitial cells and modify their functions on cardiomyocytes and vascular cells to develop new therapies for ischemic heart disease and heart failure by inhibiting cardiomyocyte death and promoting angiogenesis.
Tsuyoshi Shiga Visiting Professor	(5) Research on drug therapy in heart failure patients*. In recent years, drug therapy for heart failure has undergone a significant transformation, with the introduction of inotropic and ANP drugs in the acute phase and cardioprotective drugs such as beta-blockers and ACE inhibitors in the chronic phase, resulting in a significant improvement in prognosis. However, many unknowns exist, such as which drugs improve prognosis best for which conditions, optimal dosage, and administration methods. Therefore, we will conduct a prospective intervention study or an observational study of chronic heart failure patients with cardiac accidents as the endpoint. We will establish the most effective heart failure treatment strategy by examining these cases in detail.
Kagari Murasaki Professor	(6) Investigation of the Role of Platelets in Atherosclerotic Disease*. Ischemic heart disease is on the increase and is a significant cause of death among the Japanese population. It has already become clear that antiplatelet therapy is effective in primary and secondary prevention of ischemic heart disease, and the importance of platelet research in cardiovascular medicine is firmly recognized. Platelets are essential for thrombus formation, but recently, it has become clear that platelets are intensely involved in thrombus formation and inflammation. Inflammation is essentially a concerted defense response of the organism, but an excessive inflammatory response leads to damage to the organism's tissues. Inflammation is also central to the pathogenesis of atherosclerotic diseases, but the role of platelets in inflammation remains unclear. We have shown that neutrophils are activated via platelet Toll-like receptor four, and platelets themselves are primed in acute coronary syndromes. We will now examine the role of platelets in atherosclerotic disease, focusing on the cross-talk between platelets and leukocyte lineage cells.

Tsuyoshi Shiga Visiting Professor	(7) Pharmacokinetics and Pharmacodynamics of Cardiovascular Drugs With advances in microanalytical methods, the measurement and monitoring of drug blood concentrations (TDM) have been introduced, and drug blood concentration–effect relationships have been studied. Still, most of the studies are mass evaluations that are not useful in clinical practice, which targets individual patients. Drug effects are defined by pharmacokinetics in the body, including absorption, distribution, metabolism, excretion, and transfer to the effector organs, as well as affinity and sensitivity of the drug to the effector organs. Furthermore, these relationships differ significantly among races, individuals, disease states, and dosing times. This has led to the development of pharmacokinetic and pharmacodynamic changes in cardiovascular drugs (antiarrhythmic agents, inotropic agents, diuretics, antianginal agents, etc.) during heart failure, pharmacokinetic and pharmacodynamic changes during renal failure, the creation of intra-individual drug concentration–effect relationship models (PK–PD models), and the development of a model for drug metabolism enzymes and drug sensitivity among races, such as for β-blockers. We will examine differences in drug-metabolizing enzymes and drug sensitivity between races and the mechanisms underlying these differences.

Ⅳ Syllabus (＊ ＝ for doctor's license holders)

Title	Instructor	Credit	Theme
General Cardiology	Professor/Head Yamaguchi Professor(Fixed Term) Shoda Professor Murasaki Visiting Professor Shiga Associate Professor Minami Professor Arashi Lecturer Suzuki Lecturer Kikuchi Associate Lecturer Ueno	1	Diagnosis and Treatment of Cardiovascular Diseases
Diagnosis and Treatment of Cardiovascular Diseases	Professor/Head Yamaguchi Professor(Fixed Term) Shoda Professor Murasaki Visiting Professor Shiga Associate Professor Minami Professor Arashi Lecturer Suzuki Lecturer Kikuchi Associate Lecturer Ueno	2	Diagnosis and Treatment of Cardiovascular Diseases
Fundamentals and Clinical Applications of Cardiovascular Diseases	Professor/Head Yamaguchi Professor(Fixed Term) Shoda Professor Murasaki Visiting Professor Shiga Associate Professor Minami Professor Arashi Lecturer Suzuki Lecturer Kikuchi Associate Lecturer Ueno	2	Explanation and practice of the latest treatments and procedures for cardiovascular diseases
Experiments and practical training (research on an issue)	Professor/Head Yamaguchi Professor(Fixed Term) Shoda Professor Murasaki Visiting Professor Shiga Associate Professor Minami Professor Arashi Lecturer Suzuki Lecturer Kikuchi Associate Lecturer Ueno	10	Conducting research on an issue and writing a research paper
Total credits		15	

Division of Cardiovascular Medicine Syllabus 1

Syllabus Title	General Cardiology
Instructor	Professor/Head Junichi Yamaguchi Instructional Staff (Prof (Fixed Term) Shoda, Visiting Prof. Shiga, Prof. Murasaki, Associate Prof. Minami, Prof. Matsuura, Prof. Arashi, Lecturer Suzuki, Lecturer Kikuchi, Associate Lecturer Ueno)
Credit	1
Type of Class	Lectures and Exercises
Theme	Diagnosis and Treatment of Cardiovascular Diseases
Schedule	Monday 18:00–19:30
Course Objective	Explain and practice general diagnostic and therapeutic policies regarding the diagnosis and treatment of cardiovascular diseases.
Evaluation Methods	Attendance (50%) Report submission (50%)
Grading Scale	There are five categories: 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 being passed and D being failed.
Textbooks/References	Braunwald's Heart Disease
Independent Study Outside of Class	Research the literature and other materials on the theme of the lesson plan in advance. Study the literature and reference books listed in the study guide, etc.
Room	Cardiac Center Small Conference Room
Special Note	Those unable to attend at the above times will be assigned a time slot by mutual agreement. Questions, etc. may be submitted at any time.

Course Plan

Number	Instructor	Contents
1	Professor/Head Junichi Yamaguchi, and Instructional Staff	Developmental abnormalities of the heart
2	Professor/Head Junichi Yamaguchi, and Instructional Staff	Cause and Pathogenesis of Shock
3	Professor/Head Junichi Yamaguchi, and Instructional Staff	Causes and Pathogenesis of Hypertension
4	Professor/Head Junichi Yamaguchi, and Instructional Staff	Pathogenesis of Heart Failure
5	Professor/Head Junichi Yamaguchi, and Instructional Staff	EKG Basics
6	Professor/Head Junichi Yamaguchi, and Instructional Staff	Cause of arrhythmia
7	Professor/Head Junichi Yamaguchi, and Instructional Staff	Cardiac Imaging
8	Professor/Head Junichi Yamaguchi, and Instructional Staff	Cardiac Pharmacology

Division of Cardiovascular Medicine Syllabus 2

Syllabus Title	Diagnosis and Treatment of Cardiovascular Diseases
Instructor	Professor/Head Junichi Yamaguchi Instructional Staff (Prof (Fixed Term) Shoda, Visiting Prof. Shiga, Prof. Murasaki, Associate Prof. Minami, Prof. Matsuura, Prof. Arashi, Lecturer Suzuki, Lecturer Kikuchi, Associate Lecturer Ueno)
Credit	2
Type of Class	Lectures and Exercises
Theme	Diagnosis and Treatment of Cardiovascular Diseases
Schedule	Wednesday 10:00-11:30
Course Objective	To explain and practice advanced diagnostic and therapeutic strategies regarding the diagnosis and treatment of cardiovascular diseases.
Evaluation Methods	Attendance (50%) Report submission (50%)
Grading Scale	There are five categories: 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 being passed and D being failed.
Textbooks/References	Braunwald's Heart Disease/Essential Knowledge of Tests for Cardiologists – To Guide to Correct Diagnosis
Independent Study Outside of Class	Research the literature and other materials on the theme of the lesson plan in advance. Study the literature and reference books listed in the study guide, etc.
Room	Cardiac Center Small Conference Room
Special Note	Those unable to attend at the above times will be assigned a time slot by mutual agreement. Questions, etc. may be submitted at any time.

Course Plan	Number	Instructor	Contents
	1	Professor/Head Junichi Yamaguchi, and Instructional Staff	Diagnosis of ischemic heart disease
	2	Professor/Head Junichi Yamaguchi, and Instructional Staff	Ischemic Heart Disease Treatment
	3	Professor/Head Junichi Yamaguchi, and Instructional Staff	Interventional therapy for ischemic heart disease
	4	Professor/Head Junichi Yamaguchi, and Instructional Staff	Diagnosis of Heart Failure
	5	Professor/Head Junichi Yamaguchi, and Instructional Staff	Treatment of Heart Failure
	6	Professor/Head Junichi Yamaguchi, and Instructional Staff	Non-Pharmacologic Treatment of Heart Failure
	7	Professor/Head Junichi Yamaguchi, and Instructional Staff	Diagnosis of arrhythmia
	8	Professor/Head Junichi Yamaguchi, and Instructional Staff	Treatment of arrhythmias

Division of Cardiovascular Medicine Syllabus 3

Syllabus Title	Fundamentals and Clinical Applications of Cardiovascular Diseases
Instructor	Professor/Head Junichi Yamaguchi Instructional Staff (Prof (Fixed Term) Shoda, Visiting Prof. Shiga, Prof. Murasaki, Associate Prof. Minami, Prof. Matsuura, Prof. Arashi, Lecturer Suzuki, Lecturer Kikuchi, Associate Lecturer Ueno)
Credit	2
Type of Class	Lectures and Exercises
Theme	Explanation and practice of the latest treatments and procedures for cardiovascular diseases
Schedule	Friday 10:30 a.m. – 12:00 p.m.
Course Objective	The state-of-the-art diagnosis and treatment of cardiovascular diseases will be explained and practiced.
Evaluation Methods	Attendance (50%) Report submission (50%)
Grading Scale	There are five categories: 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 being passed and D being failed.
Textbooks/References	Molecular Biology of the Heart
Independent Study Outside of Class	Research the literature and other materials on the theme of the lesson plan in advance. Study the literature and reference books listed in the study guide, etc.
Room	Cardiac Center Small Conference Room
Special Note	Those unable to attend at the above times will be assigned a time slot by mutual agreement. Questions, etc. may be submitted at any time.

Course Plan

Number	Instructor	Contents
1	Professor/Head Junichi Yamaguchi, and Instructional Staff	Cardiomyopathy and genetic mutations
2	Professor/Head Junichi Yamaguchi, and Instructional Staff	Heart failure and genetic mutations
3	Professor/Head Junichi Yamaguchi, and Instructional Staff	Arrhythmias and genetic mutations
4	Professor/Head Junichi Yamaguchi, and Instructional Staff	Vascular growth factor
5	Professor/Head Junichi Yamaguchi, and Instructional Staff	Cardiomyocyte growth factor
6	Professor/Head Junichi Yamaguchi, and Instructional Staff	Myocardial regeneration 1
7	Professor/Head Junichi Yamaguchi, and Instructional Staff	Cardiac regeneration 2
8	Professor/Head Junichi Yamaguchi, and Instructional Staff	Application of iPS cells to heart disease 1

Division of Cardiovascular Medicine Syllabus 4

Syllabus Title	Experiments and practical training (research on an issue)
Instructor	Professor/Head Junichi Yamaguchi Instructional Staff (Prof (Fixed Term) Shoda, Visiting Prof. Shiga, Prof. Murasaki, Associate Prof. Minami, Prof. Matsuura, Prof. Arashi, Lecturer Suzuki, Lecturer Kikuchi, Associate Lecturer Ueno)
Credit	10
Type of Class	Experiments and practical training (research on an issue)
Theme	Conducting research on an issue and writing a research paper
Schedule	Saturday 10:30 a.m. – 12:00 p.m.
Course Objective	1. To be able to learn and conduct clinical and basic research methods according to the research plan. 2. To be able to accurately record and store research data in accordance with ethical guidelines. 3. To be able to summarize research results appropriately. 4. Present research results appropriately at conferences and research meetings. 5. to write and submit research papers.
Evaluation Methods	Research proposal (40%), presentation slides (40%), thesis (20%)
Grading Scale	There are five categories: 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 being passed and D being failed.
Textbooks/References	English Grammar for Writing Life Science Papers
Independent Study Outside of Class	Participation in related academic conferences
Room	BST
Special Note	Those unable to attend at the above times will be assigned a time slot by mutual agreement. Questions, etc. may be submitted at any time.

Course Plan	Number	Contents
	1	Achievement of Goals 1–2
	～	
	50	
	51	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 clinica researchl. 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 and novel research in gastroenterology
3. The ability to communicate with international researchers
4. High ethical standards in medical education and research

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

Name and position	Research theme
Assistant Professor Yonezawa,Assistant Professor Tani(Ito)	(1) Pathophysiology and treatment of severe ulcerative colitis＊ The number of patients with ulcerative colitis (UC) continues to increase each year, and although it is estimated that less than 10% of patients with UC have severe disease, its pahogenesis and risk factors are not fully elucidated. In addition, various molecular-targeted drugs have become available in recent years. Based on clinical data including endoscopy, pathology, and biomarkers, clinicopathological analyses will be conducted to elucidate clinicopathology and treatment strategy of severe UC.
Assistant Professor Yonezawa,Assistant Professor Tani(Ito)	(2) Investigation of the pathogenesis of inflammatory bowel disease (IBD)-related diseases ＊ There are various IBD-related diseases such as Behcet's disease (including simple ulcer), PSC-associated enteritis, FMV-associated enteritis, and post-transplant enteritis. Our research aims to elucidate pathophysiology, clinical characteristics and treatment outcomes of IBD-related diseases by biomarkers, gut microbiota, genetic tests as well as balloon-assisted enteroscopy.
Professor Nakamura	(3) Hemodynamics and treatment of gastric and esophageal varices＊ Endoscopic variceal banding, endoscopic injection sclerotherapy and balloon-occluded retrograde transvenous obliteration are performed for esophageal varices but standardization based on evidence-based medicine is warranted. Analyses of detailed hemodynamics by various imaging modalities such as doppler endosonography and 3D-CT and treatment strategies will be conducted.
Associate Professor Taniai,Senior Lecturer Kogiso	(4) Pathophysiology and prognosis of MASLD (metabolic dysfunction-related fatty liver disease)＊ The clinical profile of patients with MASLD will be analyzed to identify risk factors for complications and to prevent their development. The clinical profile of patients with MASLD will be analyzed to identify risk factors for complications and to study their prevention.
Associate Professor Taniai,Senior Lecturer Kogiso	(5) Analysis of the genetic background of liver diseases＊ Genetic background has been found to be a risk factor for liver diseases, and SNPs (single nucleotide polymorphisms) have been investigated. We aim to analyze the association between SNPs and clinical data, and to apply differences in SNPs to clinical practice.

Associate Professor Taniai,Senior Lecturer Kogiso	(6) Risk factors for liver fibrosis and hepatocellularcarcinoma risk and treatment of Fontan-related liver diseases＊ High venous pressure and low cardiac output after Fontan surgery result in hepatic congestion, and lead to progression of fibrosis and development of liver tumors, including hepatocellular carcinoma. However, standard diagnostic criteria have not been established, and noninvasive methods of assessing liver fibrosis are insufficient. Liver biopsy is often difficult due to antithrombotic therapy. Furthermore, the risk factors involved in liver fibrosis progression and the development of hepatocellular carcinoma are unknown, and no treatment to prevent fibrosis has been established. Therefore, we will analyze the clinical picture with the aim of establishing diagnostic criteria and evaluation methods for liver fibrosis.
Professor and Chair Nakai, Senior Lecturer Takayama,Senior Lecturer Hakuta	(7) Establishment of the dignostic strategy and biomarkers for early pancreatic cancer＊ The prognosis of pancreatic cancer is still poor and early diagnosis is essential to improve its prognosis. Recently some radiological findings such as pancreatic duct dilation and focal pancreatic parenchymal atrophy are reported as a potential clue to early pancreatic cancer. Biomarkers for pancreatic cancer are also developed. Multidimensional approaches using radiomics, endoscopy and biomarkers are conducted to establish the diagnostic strategy for early pancreatic cancer.
Professor and Chair Nakai, Senior Lecturer Takayama,Senior Lecturer Hakuta	(8) Long term outcomes and risk factros for recurrence in autoimmune pancreatitis＊ Autoimmune pancreatitis, one of IgG-4 related diseases, is responsive to steroid treatment but can be refractory. Due to consistent inflammation and fibrosis, pancreatic endocrine and exocrine insufficiency can affect long term outcomes. The analysis of long term outcomes will be conducted using our multicenter database.
Professor and Chair Nakai, Senior Lecturer Hakuta	(9) Development of novel endoscopy for pancreatobiliary diseases＊ Pancreatobiliary diseases vary from benign to malignant conditions and the diagnosis and treatment are currently performed by less invasive endoscopic procedures, but there are still some hurdles in their management. Research for development of novel techniques, devices and procedures for endoscopic procedures will be conducted to establish safe and effective endoscopic procedures for pancreatobiliary diseases.

Ⅳ Syllabus （＊ ＝ for doctor's license holders)

Title	Instructor	Credit	Theme
Review of Gastroenterology	Professor and Chair Nakai Professor Nakamura Professor Nonaka Associate Professor Taniai Associate Professor Kishino Senior Lecturer Kogiso Senior Lecturer Takayama Senior Lecturer Hakuta Senior Lecturer Misumi	1	Review of gastroenterology＊
Gastrointestinal Disorders	Professor Nakamura Professor Nonaka	2	Pathogenesis, diagnosis and treatment of gastrointestinal diseases＊
Hepato-pancreato-biliary Diseases	Professor and Chair Nakai Associated Professor Taniai Senior Lecturer Kogiso Senior Lecturer Takayama Senior Lecturer Hakuta	2	Pathogenesis, diagnosis and treatment of hepato-pancreato-biliary Diseases＊
Experiments and practical training (research projects)	Professor and Chair Nakai Professor Nakamura Professor Nonaka Associate Professor Taniai Associate Professor Kishino Senior Lecturer Kogiso Senior Lecturer Takayama Senior Lecturer Hakuta Senior Lecturer Misumi	10	Conducting research projects and writing research papers＊
計		15	

(Gastroenterology) Syllabus (1)

Syllabus Title	Review of Gastroenterology *
Instructor	Professor and Chair Nakai,Professor Nakamura,Professor Nonaka,Associate Professor Taniai,Associate Professor Kishino,Senior Lecturer Kogiso,Senior Lecturer Takayama,Senior Lecturer Hakuta,Senior Lecturer Misumi
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	Professor and Head Nakai, and other instructor	Anatomy and function of the digestive organs
	2	Professor and Head Nakai, and other instructor	Anatomy and function of the digestive organs
	3	Professor and Head Nakai, and other instructor	Anatomy and function of the digestive organs
	4	Professor and Head Nakai, and other instructor	Introduction to Gastrointestinal Diseases
	5	Professor and Head Nakai, and other instructor	Introduction to Gastrointestinal Diseases
	6	Professor and Head Nakai, and other instructor	Introduction to Liver, Biliary and Pancreatic Diseases
	7	Professor and Head Nakai, and other instructor	Introduction to Liver, Biliary and Pancreatic Diseases
	8	Professor and Head Nakai, and other instructor	Introduction to Liver, Biliary and Pancreatic Diseases

(Gastroenterology) Syllabus (2)

Syllabus Title	Alimentary canal disease ＊
Instructor	Prof. Nakamura,Prof Nonaka
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	Helicobacter pylori
14	Prof. Nakamura	Helicobacter pylori
15	Prof. Nakamura	Helicobacter pylori

(Gastroenterology) Syllabus (3)

Syllabus Title	Hepatic, Biliary, and Pancreatic Diseases *
Instructor	Professor and Chair Nakai,Associated Professor Taniai, Senior Lecturer Kogiso,Senior Lecturer Takayama,Senior Lecturer Hakuta
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	Professor and Chair Nakai	Pathogenesis, diagnosis, and treatment of pancreatic diseases
2	Professor and Chair Nakai	Pathogenesis, diagnosis, and treatment of pancreatic diseases
3	Professor and Chair Nakai	Pathogenesis, diagnosis, and treatment of pancreatic diseases
4	Professor and Chair Nakai	Pathogenesis, diagnosis, and treatment of pancreatic diseases
5	Senior Lecturer Takayama	Pathogenesis, diagnosis, and treatment of pancreatic diseases
6	Senior Lecturer Takayama	Pathogenesis, diagnosis, and treatment of biliary tract diseases
7	Senior Lecturer Takayama	Pathogenesis, diagnosis, and treatment of biliary tract diseases
8	Senior Lecturer Takayama	Pathogenesis, diagnosis, and treatment of biliary tract diseases
9	Senior Lecturer Hakuta	Pathogenesis, diagnosis, and treatment of biliary tract diseases
10	Senior Lecturer Hakuta	Pathogenesis, diagnosis, and treatment of biliary tract diseases
11	Senior Lecturer Kogiso	Pathogenesis, diagnosis, and treatment of liver diseases
12	Senior Lecturer Kogiso	Pathogenesis, diagnosis, and treatment of liver diseases
13	Associated Professor Taniai	Pathogenesis, diagnosis, and treatment of liver diseases
14	Associated Professor Taniai	Pathogenesis, diagnosis, and treatment of liver diseases
15	Associated Professor Taniai	Pathogenesis, diagnosis, and treatment of liver diseases

(Gastroenterology) Syllabus (4)

Syllabus Title	Experiments and practical training (research projects) *
Instructor	Professor and Chair Nakai,Professor Nakamura,Professor Nonaka,Associate Professor Taniai,Associate Professor Kishino,Senior Lecturer Kogiso,Senior Lecturer Takayama,Senior Lecturer Hakuta,Senior Lecturer Misumi
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	

Neurology

Ⅰ Educational Policy

The Department of Neurology conducts a wide range of medical treatment, education, and research activities covering all types of cranial nerve diseases. In particular, we are actively engaged in research and treatment of stroke, dementia, and Parkinson-related diseases, which are increasing in number as we enter an aging society.We also conduct neuroelectrophysiological tests and neurology tests to treat intractable neurological diseases such as neuroimmune diseases, motor neuron diseases, and peripheral nerve/muscle diseases. We provide high-level medical care using muscle biopsy tests.

Ⅱ Goals

・Acquire a clinical perspective on neurological diseases and acquire knowledge about currently available evidence and unresolved issues.
・Acquire an understanding of clinical test diagnosis and image diagnosis to explore the pathology of neurological diseases.
・Understand the basic experimental models necessary for elucidating the pathology of neurological diseases and developing treatments, and be able to formulate appropriate experimental plans.
・Able to appropriately graph the results obtained in clinical and basic research and use the statistical software necessary to analyze the results.
・Present research results at academic conferences and write papers
・Present your research results at international conferences, cultivate a broad perspective and communication skills, and be active internationally.
・Be broadly interested in not only your own research but also that of others, engage in useful discussions, and acquire the ability to provide guidance to younger researchers.

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

Name and position	Research theme
Kenichi Todo Professor Takao Hoshino Assistant Professor Sono Toi Assistant Professor	(1) Clinical Investigation of Acute Ischemic Stroke, Cerebral Small Vessel Disease, and the Association Between Lipid Management and Stroke We will examine the pathophysiology of patients with acute ischemic stroke, explores the relationships between cerebral small vessel disease and cognitive or gait function, and evaluates how lipid management influences the risk of stroke recurrence.
Yuko Shimizu Professor Ryotaro Ikeguchi Assistant Professor	(2) Pathological analysis of neuroimmune diseases We will study the functions of peripheral blood lymphocytes using flow cytometry, ELISA, and molecular biological techniques. Analyzing the pathology of multiple sclerosis and neuromyelitis optica using cerebrospinal fluid samples.
Mutsumi Iijima Professor	(3) Quantitative analysis of gait disorders in neurological diseases Using a mobile pedometer, we will quantitatively analyze gait conditions in patients with neurodegenerative diseases, cerebrovascular disorders, dementia, etc. We will also use neurophysiological tests to analyze the pathology of epilepsy, neuropathy, and motor neuron disease.
Hiroshi Yoshizawa Associate Professor	(4) Neuropsychological research in dementia We analyze the cognitive functions of various neurological diseases including dementia neuropsychologically and cognitively, and elucidate the symptoms symptomatically.
Hiroshi Yoshizawa Associate Professor	(5) Pathological analysis of neurological diseases using neurological functional images We analyze and research brain function in patients with various neurological diseases using cerebral blood flow SPECT, brain glucose metabolism PET, head MRI diffusion tensor images, MRI perfusion images, resting state functional MRI images, etc.
Masaki Kobayashi Assistant Professor	(6) Pathological analysis of peripheral nerve diseases ＊ We conduct pathological analysis of peripheral nerve diseases through electrophysiological testing and pathological examination of biopsy materials.

Ⅳ Syllabus (＊ ＝ for doctor's license holders)

Title	Instructor	Credit	Theme
Stroke	Kenichi Todo,Takao Hoshino,Sono Toi, Megumi Hosoya, Eiko Higuchi	2	Advances in diagnosis and treatment of stroke (main areas, elective areas)
Neuroimmunology Peripheral nervous system	Yuko Shimizu Ryotaro Ikeguchi Masaki Kobayashi Keiko Matsushima	1	Advances in diagnosis and treatment of neuroimmune diseases and peripheral neuropathy (main fields, elective fields)
Parkinson's disease related diseases, dementia, neuroelectrophysiology	Mutsumi Iijima Hiroshi Yoshizawa Misa Seki Megumi Hosoya	2	Advances in diagnosis and treatment of Parkinson's disease-related diseases, dementia, and epilepsy (main areas)
Experiments/practical training (problem research)	Kenichi Todo, Yuko Shimizu, Mutsumi Iijima, Hiroshi Yoshizawa,Ryotaro Ikeguchi, Takao Hoshino, Sono Toi,Megumi Hosoya, Keiko Matsushima, Misa Seki, Eiko Higuchi	10	Conducting research projects and writing research papers (main field)
Total credits		15	

Neurology Syllabus (1)

Syllabus Title	Neurology
Instructor	Professor Todo, Professor Shimizu, Professor Iijima, Associate Professor Yoshizawa, Assisstant Professor Ikeguchi, Hoshino, Toi, Seki, Higuchi, Hosoya, Matsushima
Credit	15
Type of Class	
Theme	
Schedule	
Course Objective	
Evaluation Methods	
Grading Scale	
Textbooks/References	
Independent Study Outside of Class	
Room	
Special Note	

Course Plan	Number	Instructor	Contents
	1		
	2		
	3		
	4		
	5		
	6		
	7		
	8		
	9		
	10		
	11		
	12		
	13		
	14		
	15		

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, immunotherapy, and cell therapy like hematopoietic stem cell transplantation or chimeric antigen receptor T-cell therapy. The field of hematology is suitable for translational research due to the relatively ease of collecting tumor cells, which provides possibilities for rapid clinical application.

The basic educational policy in our department is to pursue research that will more profoundly understand the pathogenesis of diseases and contribute toward the development of 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 epigenetics and genetic abnormalities in oncogenes and tumor suppressor genes for hematopoietic malignancies.
・Acquire knowledge of the immune response in hematopoietic cell transplantation.
・Propose and pursue a research plan based on acquired knowledge of hematological diseases.
1. Aquire the essential 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. Present and discuss the results at study groups or international conferences.
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 Seo	(1) a) Analysis of relathionship between host immunity and SNP in infections (especially viral infections) after hematopoietic cell transplantation. b) Correlation between acute lung injury and lung microbiome. c) Investigation of the best treatment for elderly patietns with acute myelid leukemia (including genetic evaluation).
Associate Professor Yoshinaga	(2) Analysis of genetic mutations causing pathological changes and effecting clinical course in myeloproliferative tumors, such as polycythemia vera, essential thrombocythemia, and myelofibrosis＊ Epidemiological investigation of causes, clinical symptoms, and complications in myeloproliferative tumors.
Assistant Professor Shinohara	(3) Research on the mechanisms of recurrence of hematological malignancies after hematopoietic cell transplantation (HCT)＊ Epidemiological research of HCT in Japan using nationwide data to improve outcomes of HCT.

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

Title	Supervisors	Credit	Theme
Diagnosis of Hematological Diseases	Professor Seo, Associate Professor Yoshinaga, Assistant Professor Shinohara	2	Seminars and discussion about the diagnosis of hematological diseases
Treatment of Hematological Diseases	Professor Seo, Associate Professor Yoshinaga, Assistant Professor Shinohara	2	Seminars and discussion about the treatment of hematological diseases
Pathophysiology of Hematological Diseases	Professor Seo, Associate Professor Yoshinaga, Assistant Professor Shinohara	1	Seminars and discussion about the pathophysiology of hematological diseases
Experiments and Practical Study (Project Study)	Professor Seo, Associate 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 Seo, Associate Professor Yoshinaga, Assistant Professor Shinohara
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%), Discussion among group members (50%)
Grading Scale	Five grades. S: 90 to 100 points. A: 80 to 89 points. B: 70 to 79 points. C: 60 to 69 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	Professor and other supervisors	Diagnosis of Hematological Diseases 1
2	Professor and other supervisors	Diagnosis of Hematological Diseases 2
3	Professor and other supervisors	Diagnosis of Hematological Diseases 3
4	Professor and other supervisors	Diagnosis of Hematological Diseases 4
5	Professor and other supervisors	Diagnosis of Hematological Diseases 5
6	Professor and other supervisors	Diagnosis of Hematological Diseases 6
7	Professor and other supervisors	Diagnosis of Hematological Diseases 7
8	Professor 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 Seo, Associate Professor Yoshinaga, Assistant Professor Shinohara		
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%), Discussion among group members (50%)		
Grading Scale	Five grades. S: 90 to 100 points. A: 80 to 89 points. B: 70 to 79 points. C: 60 to 69 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	Professor and other supervisors	Treatment of Hematological Diseases 1
	2	Professor and other supervisors	Treatment of Hematological Diseases 2
	3	Professor and other supervisors	Treatment of Hematological Diseases 3
	4	Professor and other supervisors	Treatment of Hematological Diseases 4
	5	Professor and other supervisors	Treatment of Hematological Diseases 5
	6	Professor and other supervisors	Treatment of Hematological Diseases 6
	7	Professor and other supervisors	Treatment of Hematological Diseases 7
	8	Professor 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 Seo, Associate Professor Yoshinaga, Assistant Professor Shinohara		
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 89 points. B: 70 to 79 points. C: 60 to 69 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	Professor and other supervisors	Pathophysiology of Hematological Diseases 1
	2	Professor and other supervisors	Pathophysiology of Hematological Diseases 2
	3	Professor and other supervisors	Pathophysiology of Hematological Diseases 3
	4	Professor and other supervisors	Pathophysiology of Hematological Diseases 4
	5	Professor and other supervisors	Pathophysiology of Hematological Diseases 5
	6	Professor and other supervisors	Pathophysiology of Hematological Diseases 6
	7	Professor and other supervisors	Pathophysiology of Hematological Diseases 7
	8	Professor 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 Seo, Associate Professor Yoshinaga, Assistant Professor Shinohara
Credit	10
Format of Class	Experiments and practice (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)	1. Aquire the essential 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. Present and discuss the results at study groups or international conferences. 5. Write an academic paper on research and 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 89 points. B: 70 to 79 points. C: 60 to 69 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
Yasuhiro Katsumata	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. 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. 3. Research on the pathogenesis, diagnosis, and treatment of vvasculitides: Identify novel blood biomarkers for disease activity in ANCA-associated vasculitis using proteomics. Additionally, conduct clinical and epidemiological studies utilizing our department's clinical database.
Yasushi Kawaguchi	Research on the pathology, diagnosis, and treatment of systemic sclerosis. 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	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 23 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. 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.
Takako Nunomura	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.
Yuko Okamoto	Research on the etiology and prevention of rheumatoid arthritis: Pathophysiological research on the development of rheumatoid arthritis will be conducted using clnical data and specimens obtained from individuals at high risk of developing the disease. Our study includes measurements of serum autoantibodies and protains, identification of genetic risk factors, profiling of peripheral blood immune cells, and characterize the oral and gut microbiota to identify novel targets for the prevention of rheumatoid arthritis onset.
Tomoaki Higuchi	1. Reseach on the pathogenesis, diagnosis, and treatment in systemic sclerosis. The reseach aims to clarify clinical characteristics and longitudial change after treatment using the database on Tokyo Women's Medical University. 2. Clinical epidemiological reseach on rheumatoid arthritis. Reseach aiming to resolve clinical questions using the IORRA cohort. 3. JPVAS prospective cohort study for vasculitis. Operate the JPVAS prospective cohort study for vasculitis, analyze data, and aim to elucidate the pathogenesis and treatment strategies of vasculitis.

Ⅳ Syllabus (＊ ＝ for doctor's license holders)

Title	Instructor	Credit	Theme
Rheumatoid arthritis	Eiichi Tanaka Yuko Okamaoto	1	Etiology, pathology, diagnosis and treatment for rheumatoid arthritis (RA) and RA-related diseases
Connective tissue diseases	Yasuhiro Katsumata Yasushi Kawaguchi Tomoaki Higuchi	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
Experiment, practical training (research task)	Yasuhiro Katsumata Yasushi Kawaguchi Eiichi Tanaka Takako Nunomura Yuko Okamoto Tomoaki Higuchi	11	Perform the research task and write the thesis
Total credits		15	

Rheumatology Syllabus (1)

Syllabus Title	Rheumatoid arthritis
Instructor	Eiichi Tanaka, Yuko Okamaoto
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	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	Yasuhiro Katsumata, Yasushi Kawaguchi, 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,Tomoaki Higuch: Thursday, 1:55 – 3:05 p.m.; Yasushi Kawaguchi: Thursday, 2:00 to 3:10 p.m
Course Objective	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	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	Yasuhiro Katsumata	Etiology and pathogenesis of systemic lupus erythematosus
2	Yasuhiro Katsumata	Diagnosis and treatment of systemic lupus erythematosus
3	Yasuhiro Katsumata, Yasushi Kawaguchi	Etiology and pathogenesis of polymyositis and dermatomyositis
4	Yasuhiro Katsumata, Yasushi Kawaguchi	Diagnosis and treatment of polymyositis and dermatomyositis
5	Yasuhiro Katsumata, Tomoaki Higuchi	Etiology and pathogenesis of vasculitides
6	Yasuhiro Katsumata, Tomoaki Higuchi	Diagnosis and treatment of vasculitides
7	Yasushi Kawaguchi, Tomoaki Higuchi	Etiology and pathogenesis of systemic sclerosis
8	Yasushi Kawaguchi, Tomoaki Higuchi	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	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, 8th (Elsevier), Guidelines for the Treatment of Autoinflammatory Diseases 2017
Independent Study Outside of Class	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.
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)

（＊ ＝ for doctor's license holders）

Syllabus Title	Experiment, practical training (research task)	
Instructor	Yasuhiro Katsumata, Yasushi Kawaguchi, Eiichi Tanaka, Takako Miyamae (Nunomura), Yuko Okamoto, Tomoaki Higuchi	
Credit	11	
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	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	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	

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
Associate Professor Oshibuchi	1) 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.
Associate Professor Oshibuchi	2) 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.
Associate Professor Oshibuchi	3) 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.

Ⅳ Syllabus (＊ ＝ Applicable to those with medical licenses)

Items	Instructors	Unit	Topics
Diagnostics in psychiatry	Associate Professor Oshibuchi	1	Symptoms and diagnosis of mental disorders
Therapeutics in psychiatry	Associate Professor Oshibuchi	2	Treatment of mental disorders (pharmacotherapy, non-pharmacotherapy)
Consultation-liaison psychiatry	Associate Professor Oshibuchi	2	Foundations and practices of consultation-liaison psychiatry
Experiments and practices (research work)	Associate Professor Oshibuchi	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	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 equvalent 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 Oshibuchi	General Principles of Psychiatry and Diagnosis
2	Associate Professor Oshibuchi	Psychiatric Symptomatology
3	Associate Professor Oshibuchi	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 Oshibuchi	Symptoms and Diagnoses of Stress-Related and Neurological Disorders
8	Associate Professor Oshibuchi	Symptoms and Diagnoses of Personality Disorders
9	Associate Professor Oshibuchi	Symptoms and Diagnoses of Developmental Disorders
10	Associate Professor Oshibuchi	Symptoms and Diagnoses of Intellectual Disabilities

Psychiatry Syllabus

(＊ ＝ Applicable to those with medical license)

Course title	Therapeutics in psychiatry
Instructors	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 to12:00 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	Associate Professor Oshibuchi	General Principles of Psychiatry and Therapeutics
2	Associate Professor Oshibuchi	Basis of Psychiatric Drug Therapy
3	Associate Professor Oshibuchi	Basis of Psychotherapy
4	Associate Professor Oshibuchi	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 Oshibuchi	Treatment of Stress-Related and Neurotic Disorders
10	Associate Professor Oshibuchi	Treatment of Personality Disorders
11	Associate Professor Oshibuchi	Treatment of Developmental Disorders
12	Associate Professor Oshibuchi	Treatment of Intellectual Disability

Psychiatry Syllabus

(＊ ＝ Applicable to those with medical license)

Course title	Consultation-liaison psychiatry
Instructors	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 to12:00 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 Oshibuchi	General Theory on Consultation-Liaison Psychiatry
2	Associate Professor Oshibuchi	Delirium
3	Associate Professor Oshibuchi	Depression and Adjustment Disorders
4	Associate Professor Oshibuchi	Team Medicine in Psychiatric Liaison
5	Associate Professor Oshibuchi	Psychocardiology
6	Associate Professor Oshibuchi	Psychonephrology
7	Associate Professor Oshibuchi	Psycho-Oncology
8	Associate Professor Oshibuchi	Model for Treating Depression Associated with Physical Disorders
9	Associate Professor Oshibuchi	Psychorheumatology
10	Associate Professor Oshibuchi	Consultation-Liaison Psychiatry in ICU
11	Associate Professor Oshibuchi	Consultation-Liaison Psychiatry in Critical Care Centers
12	Associate Professor Oshibuchi	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	Associate Professor Oshibuchi	
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	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	

Department of Pediatrics

Ⅰ Educational philosophy

The most distinctive feature of pediatrics is that it is the only clinical department that looks at the whole body rather than looking at individual organs. At the pediatrics department of Tokyo Women's Medical University, we see many patients with pediatric neurological disorders. However, neurology is also closely related to immunology and nutrition as well as pathology, genetics and physiology. The study of pediatrics is by no means confined to a single specialized field. If you look closely at ″diseases that are said to be incurable by modern medicine,″ most of them include ″areas that have not been studied much.″ We often feel that these unexplored areas may hold the key to unlocking the mysteries of these diseases.

The primary concept of the Department of Pediatrics at the Graduate School of Tokyo Women's Medical University is ″turning 'incurable' into 'curable'.″ For example, it used to be an important job to diagnose diseases with genetic abnormalities, and once diagnosed, people had to ″watch over″ them. It was only natural that a child with cerebral palsy due to perinatal problems would have to suffer a lifelong neurological deficit. For children with progressive neuromuscular disease, if swallowing becomes impossible, a gastrostomy is established, and if breathing becomes impossible, a tracheotomy and a respirator are laid out, and that was the norm. Over the last 10 years, diagnostic techniques such as genetic diagnosis have improved dramatically. However, treatment has changed little. There must be a way to solve ″intractable diseases″ such as molecular biological technology that prevents abnormal genes from being loaded and a dietary environment that has epigenetic effects. We invite you to join us in taking on these challenges.

Ⅱ Achievement goals

1. Acquire a wide range of knowledge, high-level research techniques, and application skills under a clear research theme that will lead to elucidation of the pathology and treatment of intractable diseases in children
2. Ability to self-learn advanced and original research and to guide others
3. Possess broad perspectives, rich communication skills, and high presentation skills, and can be expected to play an active role internationally, such as by presenting papers in international academic journals and presenting results at international academic conferences.
4. Possess the ability to contribute to the development of medical education and research with a strong sense of humanity and high ethical standards to conduct research for children suffering from intractable diseases.

Ⅲ Research advisors and research topics （＊ ＝ only students with a medical license are eligible）

Advisors	Topics
Assistant Professor Nakatsukasa	(4) Developmental characteristics of premature neonates and their disorders Examination of support necessary for promoting development Advances in neonatal prematurity medical care have made it possible to save the lives of ultra-premature infants, and the infant mortality rate has declined significantly. On the other hand, there are many cases of mild developmental disorders such as pervasive developmental disorders in infants who required intensive medical care in the perinatal period. We will investigate the actual conditions of those situations and examine intervention methods for them.
Associate Professor Ishigaki	(5) Examination of clinical symptoms and cytokines in childhood-onset myasthenia gravis Childhood-onset myasthenia gravis presents a clinical pattern different from that of the adult type, such as ocular muscle type, good response to treatment, and easy remission. However, it is rare, and the prognosis and involved cytokines have not been sufficiently analyzed. Cytokine analysis will be performed using patient record analysis and specimens from relapsed, remission, and refractory cases.
Associate Professor Ishigaki	(6)Study on sleep disturbance in Fukuyama congenital muscular dystrophy We focus on sleep disorders that are frequently associated with Fukuyama-type congenital muscular dystrophy and interfere with family QOL. We will examine the pattern, evaluate biomarkers in cerebrospinal fluid, blood, and identify the neurosubstances involved. Ultimately, based on the results of these investigations, we will consider the development of treatment methods.
Associate Professor Ishigaki	(7) Examination of appropriate nutritional management for patients with myological disease We will evaluate the nutritional status of myological disease patients who are prone to hypoglycemia and hyperketonemia due to low muscle mass. In addition, we will examine appropriate nutrition management when bedridden or tube-fed. We will also examine trace elements, markers of nutritional status, stool properties, and intestinal flora.
Associate Lecturer Ito	(8) Neurodevelopmental research in pediatric intractable epilepsy It is important to elucidate the developmental process of neurodevelopmental disorders in pediatric intractable epilepsy (epileptic encephalopathy) and to develop treatment methods. In order to achieve this purpose, we will conduct electroencephalography, neuroimaging, neuropsychological examination, etc. in this class. Furthermore, we examine the correlation between the clinical course, including epileptogenic focal site, seizure type, electroencephalographic findings, and treatment, and the type and progress of neurodevelopmental disorders.

Associate Lecturer Ito	(9) Sociological research on pediatric intractable epilepsy It is important to solve various sociological problems such as nursery school attendance and guardian employment for children with intractable epilepsy. In order to do so, we will carry out fact-finding surveys on a regular basis in collaboration with the epilepsy patient family associations, etc., and examine measures to extract problems and solve them.
Kaoru Eto, Lecturer	(10) Research on the clinical characteristics of neurometabolic diseases and the importance of early diagnosis and treatment Neurometabolic diseases, which are rare diseases, often have a wide variety of onset times and clinical symptoms even in the same disease. By understanding these characteristics, we will deepen our knowledge of novel therapeutic methods such as examination of markers useful for early diagnosis and evaluation of therapeutic effects, and gene therapy and chemical chaperone therapy.
Takayuki Kishi, Lecturer	Clinical research on diagnosis and treatment of pediatric connective tissue disease and pediatric neuroimmune disease Pediatric connective tissue diseases are rare diseases. In this class, we will examine factors related to the onset of diseases whose causes are unknown, confirm the effectiveness of molecular target drugs based on an understanding of the pathology, and examine the possibility of new therapeutic drugs. Childhood-onset neuroimmune disorders are also rare. There are differences from adult cases, such as laboratory findings and effective drugs, and sufficient understanding has not progressed. After compiling patient information, analysis of cerebrospinal fluid specimens and intestinal and oral microbiota will be performed.
,Assistant Professor Kihara	An investigation into stem cell therapy for muscular dystrophy Cell and gene therapies for muscular dystrophy are currently under development as part of ongoing research in this field. However, their efficacy and mechanisms of action remain insufficiently understood. Therefore, we propose to evaluate the effectiveness and underlying mechanisms of these therapies through preclinical studies using mesenchymal and other types of stem cells in mouse, rat, and pig models of muscular dystrophy.

Ⅳ Syllabus （＊ ＝ only students with a medical license are eligible)

Item	Faculty	Credits	Topics
Pediatric Developmental Medicine	Assistant Professor Nakatsukasa, Assistant Professor Yuya Sato, Assistant Professor Yanagishita	1	Development of children, especially very low birth weight infants, and interventions for diseases thereof
Principles of Pediatric Myology＊	Associate Professor Ishigaki, Assistant Professor Sato, Assistant Professor Murakami, Assistant Professor Shichiji, Assistant Professor Ishiguro	1	Clinical diagnosis and basic pathophysiology of pediatric myological disease
Pediatric Neurometabolic Disorders	Lecturer Eto, Assistant Professor Yuya Sato	1	Basic and clinical studies of pediatric neurometabolic disorders
Pediatric Epileptology	Assistant Professor Ito, Assistant Professor Nishikawa, Assistant Professor Yanagishita	1	Basic and clinical studies of pediatric epilepsy
Pediatric Rheumatic Diseases and Pediatric Neuroimmunology	Lecturer Kishi	1	Fundamental pathology, clinical diagnosis, and therapeutic intervention of pediatric rheumatic diseases and neuroimmune diseases
Experiments and Practica (Chosen research topic)	Associate Professor Ishigaki, Lecturer Kishi, Lecturer Eto, Assistant Professor Ito, Assistant Professor Sato, Assistant Professor Murakami, Assistant Professor Shichiji, Assistant Professor Nishikawa, Assistant Professor Nakatukasa, Assistant Professor Yuya Sato, Assistant Professor Yanagishita, Assistant Professor Isiguro, Assistant Professor Olawa, Assistant Professor Kihara, Assistant Professor Yamamoto	10	Implementation of chosen research study and creation of research paper
Total		15	

Department of Pediatrics Syllabus

（＊ ＝ only students with a medical license are eligible）

Syllabus Title	Pediatric Developmental Medicine
Instructor	Assistant Professor Nakatsukasa, Assistant Professor Yuya Sato, Assistant Professor Yanagishita
Credit	1
Type of Class	Lectures and lab sessions
Theme	Development of children, especially very low birth weight infants, and interventions for diseases thereof
Schedule	Lectures: Fridays 10:30—11:30 Lab sessions: Every other week（2nd and 4th Wednesdays, 13:30—14:30）
Course Objective	Evaluate development and developmental disorders in infants and devise intervention methods.
Evaluation Methods	Attendance: 60% Report on developmental assessment: 20% Proactive participation in discussions on planning intervention methods, etc.: 20%
Grading Scale	The following five grades will be assigned: S (100–90 points), A (89–80 points), B (79–70 points), C (69–60 points), and D (less than 60 points). S, A, B, and C are passing grades. D is a failing grade.
Textbooks/References	Will introduce as needed.
Independent Study Outside of Class	Understand the knowledge up to the present time from literature, etc. in advance regarding the topics in the lesson plan
Room	Education and research building 5th floor conference room or pediatric outpatient examination room
Special Note	Those who are unable to attend during the above times will decide on the timetable through consultation. Questions are welcome at any time. Give feedback in the final class.

Course Plan

Number	Supervising faculty	Lesson content
1	Assistant Professor Nakatsukasa	Overview of pediatric developmental medicine
2	Assistant Professor Nakatsukasa	Infant motor development
3	Assistant Professor Nakatsukasa	Abnormal motor development in infants: diagnosis of and interventions for cerebral palsy
4	Assistant Professor Nakatsukasa	Development of children with cerebral palsy and necessary interventions, causative diseases of cerebral palsy, complications, etc.
5	Assistant Professor Nakatsukasa	Very Low Birth Weight Infants and Congenital Defects: Genetic Issues
6	Assistant Professor Nakatsukasa	Pediatric Developmental Disorders: Autism Spectrum Disorders
7	Assistant Professor Nakatsukasa	Pediatric Developmental Disorders: ADHD, LD
8	Assistant Professor Nakatsukasa	Prematurity: risk and assessment of developmental disabilities in very low birth weight infants

Department of Pediatrics Syllabus

（＊ ＝ only students with a medical license are eligible）

Syllabus Title	Principles of Pediatric Myology＊
Instructor	Associate Professor Ishigaki, Assistant Professor Sato, Assistant Professor Murakami, Assistant Professor Shichiji, Assistant Professor Ishiguro
Credit	1
Type of Class	Lectures and lab sessions
Theme	Clinical diagnosis and basic pathophysiology of pediatric muscle disease
Schedule	Wednesdays 13:30–15:30
Course Objective	Learn how to diagnose, differentiate, and interpret skeletal muscle images for neuromuscular diseases in children. In addition, students will learn the basics of molecular genetics and pathology regarding the pathology of typical muscle diseases, as well as their examination methods. Students will be able to explain the mechanisms of recent newly developed therapeutic agents.
Evaluation Methods	Attendance (80%), submission of reports on lecture content (10%), active participation in presentations and discussions (10%)
Grading Scale	The following five grades will be assigned: S (100–90 points), A (89–80 points), B (79–70 points), C (69–60 points), and D (less than 60 points). S, A, B, and C are passing grades. D is a failing grade.
Textbooks/References	(1) Muscle pathology for clinical use 5th edition (2) Myology 3rd ed (3) Pediatric muscle disease treatment handbook Hirofumi Komaki (4) Muscle disease treatment handbook Masashi Aoki
Independent Study Outside of Class	Understand the knowledge up to the present time from literature etc. in advance about the topics in the lesson plan.
Room	Conference room on the 5th floor of the education and research building, or the pediatrics research room on the 2nd floor of the general research building
Special Note	Those who are unable to attend during the above times will decide on the timetable through consultation. Questions are welcome at any time. Give feedback in the final class.

Course Plan

Number	Supervising faculty	Lesson content
1	Associate Professor Ishigaki	Overview of muscle diseases
2	Associate Professor Ishigaki, Assistant Professor Sato	Molecular genetics in representative muscle diseases
3	Associate Professor Ishigaki, Assistant Professor Sato, Assistant Professor Shichiji	muscle pathology
4	Associate Professor Ishigaki, Assistant Professor Sato	Diagnosis of Pediatric Neuromuscular Diseases 1: Physical Examination in Infants
5	Associate Professor Ishigaki, Assistant Professor Murakami, Assistant Professor Sato	Diagnosis of pediatric neuromuscular disease 2: How to take physical examination after school age and characteristic findings
6	Associate Professor Ishigaki, Assistant Professor Ishiguro	Skeletal muscle imaging
7	Associate Professor Ishigaki, Assistant Professor Shichiji	Definitive diagnosis and genetic counseling
8	Associate Professor Ishigaki	Prospects for new therapies for muscle diseases

Department of Pediatrics Syllabus

（＊ ＝ only students with a medical license are eligible）

Syllabus Title	Pediatric Neurometabolic Disorders
Instructor	Lecturer Kaoru Eto, Assistant Professor Yuya Sato
Credit	1
Type of Class	Lectures and lab sessions
Theme	Clinical diagnosis and basic pathophysiology of pedatric neurometabolic disorders
Schedule	Thursdays 13:30–15:30
Course Objective	・Deepen knowledge of the basics of molecular genetics, biochemistry, and pathology in relation to the pathogenesis of neurometabolic diseases, which are rare diseases ・Understand the differential diseases, notable clinical symptoms and specific laboratory findings in neurometabolic diseases ・Acquisition of the process up to the diagnosis that considers the genetic background ・Be able to explain treatment methods for neurometabolic diseases and their problems
Evaluation Methods	Attendance (80%), submission of reports on lecture content (10%), active participation in presentations and discussions (10%)
Grading Scale	The following five grades will be assigned: S (100–90 points), A (89–80 points), B (79–70 points), C (69–60 points), and D (less than 60 points). S, A, B, and C are passing grades. D is a failing grade.
Textbooks/References	(1) Inherited Metabolic Disorder Handbook, Nakayama Shoten (2) Inherited Metabolic Disorders to Look Up, Diagnosis and Treatment Company (3) Lysosomal Diseases, Diagnosis and Treatment Company (4) Lysosomal and peroxisomal disease diagnostic guides, diagnosis and treatment company (5) Thompson & Thompson Genetic Medicine, Medical Science International, etc.
Independent Study Outside of Class	Understand the knowledge up to the present time from literature, etc. in advance regarding the topics in the lesson plan
Room	Education and research building 5th floor conference room
Special Note	Those who are unable to attend during the above times will decide on the timetable through consultation. Questions are welcome at any time. Give feedback in the final class.

Course Plan

Number	Supervising faculty	Lesson content
1	Lecturer Eto	Overview of neurometabolic diseases
2	Lecturer Eto	Molecular genetics in neurometabolic diseases
3	Lecturer Eto	Biochemical and pathological findings in neurometabolic diseases
4	Lecturer Eto, Assistant Professor Yuya Sato	Diagnosis of neurometabolic diseases 1: Characteristics of physical and laboratory findings mainly in infancy
5	Lecturer Eto, Assistant Professor Yuya Sato	Diagnostics of neurometabolic diseases 2: Characteristics of physical and laboratory findings after school age
6	Lecturer Eto	High screening for neurometabolic diseases
7	Lecturer Eto	Definitive diagnosis and genetic counseling
8	Lecturer Eto	Therapeutic Perspectives in Neurometabolic Diseases

Department of Pediatrics Syllabus

（＊ ＝ only students with a medical license are eligible）

Syllabus Title	Pediatric Epileptology
Instructor	Associate Lecturer Susumu Ito, Assistant Professor Nishikawa, Assistant Professor Yanagishita
Credit	1
Type of Class	Lectures and lab sessions
Theme	Basic and clinical studies of pediatric epilepsy
Schedule	Wednesdays 13:30–15:30
Course Objective	・Can explain the mechanism of epilepsy ・Can classify seizure symptoms ・Can read electroencephalography ・Can read brain imaging ・Can interpret chromosomal and genetic tests ・Explain diagnosis and treatment based on the International Classification of Epilepsy and international guidelines ・Understand various problems and efforts related to epilepsy
Evaluation Methods	Attendance (50%), Submission of report on lecture content (50%)
Grading Scale	The following five grades will be assigned: S (100–90 points), A (89–80 points), B (79–70 points), C (69–60 points), and D (less than 60 points). S, A, B, and C are passing grades. D is a failing grade.
Textbooks/References	1) Epilepsy Syndrome – Epilepsy in Infants, Children and Adolescents (original 6th edition), M Bureau et al. (eds.), Nakayama Shoten 2) Clinical epileptology, Kosuke Kanemoto et al. (Ed.), Igaku Shoin 3) Clinical EEG (6th edition), Teruo Okuma (Author), Igaku Shoin 4) Introduction to Informed Consent for Pediatric Epilepsy, Hirokazu Oguni (Author), Pharmaceutical Journal 5) Invitation to a Journey of Brain Waves – A fun and easy-to-understand introduction to brain waves (2nd edition), Tadahiko Ichikawa (Author), Seiwa Shoten
Independent Study Outside of Class	・Understand the basics of epilepsy and EEG by reading through reference books 4), 5), etc. ・Browse websites of patient-family organizations, pharmaceutical companies, medical institutions, etc. to understand various problems and initiatives related to epilepsy
Room	Conference room on the 5th floor of the education and research building, EEG room on the 1st floor of the central hospital ward
Special Note	Those who are unable to attend during the above times will decide on the timetable through consultation. Questions are welcome at any time. Give feedback in the final class.

Course Plan

Number	Supervising faculty	Lesson content
1	Assistant Professor Ito	Introduction to epilepsy
2	Assistant Professor Ito	Classification of seizure symptoms
3	Assistant Professor Ito, Assistant Professor Nishikawa	Interpretation of electroencephalography
4	Assistant Professor Ito	Brain imaging reading
5	Assistant Professor Ito, Assistant Professor Yanagishita	Interpretation of chromosomal/genetic tests
6	Assistant Professor Ito	Diagnosis based on the International Classification of Epilepsy
7	Assistant Professor Ito	Treatment based on international guidelines
8	Assistant Professor Ito	Epilepsy-Related Problems and Approaches

Department of Pediatrics Syllabus

（＊ ＝ only students with a medical license are eligible）

Syllabus Title	Pediatric Rheumatic Diseases and Pediatric Neuroimmunology		
Instructor	Lecturer Kishi		
Credit	1		
Type of Class	Lectures and lab sessions		
Theme	Fundamental pathology, clinical diagnosis, and therapeutic intervention of pediatric rheumatic diseases and neuroimmune diseases		
Schedule	Thursdays 14:00–16:30		
Course Objective	1. Understand and explain the differentiation, diagnosis, and treatment of pediatric rheumatic diseases 2. Understand and explain the differentiation, diagnosis, and treatment of pediatric neuroimmune diseases		
Evaluation Methods	Attendance (50%) Submitting reports on lecture content (30%) Active participation in presentations and discussions (20%)		
Grading Scale	The following five grades will be assigned: S (100–90 points), A (89–80 points), B (79–70 points), C (69–60 points), and D (less than 60 points). S, A, B, and C are passing grades. D is a failing grade.		
Textbooks/References	Textbook of pediatric rheumatology 8th edition (ELSEVIER), connective tissue disease/rheumatology treatment utilizing EBM 4th edition (Medical View), Immune neurological disease handbook (Nankodo), Multiple sclerosis/neuromyelitis optica treatment guideline 2023 (Igakushoin)		
Independent Study Outside of Class	In advance, understand the knowledge up to the present time from literature etc. about the topics in the lesson plan. Read the original papers that follow the above references and research topics, extract questions, and then come to class.		
Room	Education and research building 5th floor conference room		
Special Note	Those who are unable to attend during the above times will decide on the timetable through consultation. Questions are welcome at any time. Give feedback in the final class.		
Course Plan	Number	Supervising faculty	Lesson content
Lesson plan	1	Lecturer Kishi	Pediatric rheumatic diseases: an overview
	2	Lecturer Kishi	Pathogenesis, diagnosis and treatment of juvenile dermatomyositis and childhood-onset systemic lupus erythematosus
	3	Lecturer Kishi	Pediatric Sjögren's syndrome, scleroderma, and Behçet's disease pathology, diagnosis and treatment
	4	Lecturer Kishi	Pediatric neuroimmune diseases: an overview
	5	Lecturer Kishi	Pathogenesis, diagnosis and treatment of autoimmune-mediated encephalomyelitis, opsoclonic myoclonic syndrome, and central nervous system vasculitis
	6	Lecturer Kishi	Pediatric multiple sclerosis, acute disseminated encephalomyelitis, neuromyelitis optica pathophysiology, diagnosis and treatment

Department of Pediatrics Syllabus

（＊ ＝ only students with a medical license are eligible）

Syllabus Title	Experiments and Practica (Chosen research topic)
Instructor	Associate Professor Ishigaki,Lecturer Kishi, Lecturer Eto, Assistant Professor Ito, Assistant Professor Sato, Assistant Professor Murakami, Assistant Professor Shichiji, Assistant Professor Nishikawa, Assistant Professor Nakatsukasa, Assistant Professor Yuya Sato, Assistant Professor Yanagishita,Assistant Professor Isiguro,Assistant Professor Olawa,Assistant Professor Kihara,Assistant, Assistant Professor Yamamoto
Credit	10
Type of Class	Experiments and Practica (Chosen research topic)
Theme	Implementation of chosen research study and creation of research paper
Schedule	Mondays, Wednesdays 13:00-17:00
Course Objective	1. Acquire the necessary techniques and carry out research according to the planned research plan. 2. Be able to record and save research content and data correctly. 3. Be able to properly summarize research results in charts. 4. Be able to present research content appropriately at academic conferences and research meetings in Japan and overseas, and be able to discuss the content. 5. Write a paper on your research and submit it. Appropriately respond to reviewer comments and achieve publication. 6. Be able to teach knowledge and techniques related to own research to junior researchers.
Evaluation Methods	Experiment notebook/research report (60%) Chart creation (10%) Research presentation/discussion (10%) Paper writing (20%)
Grading Scale	The following five grades will be assigned: S (100-90 points), A (89-80 points), B (79-70 points), C (69-60 points), and D (less than 60 points). S, A, B, and C are passing grades. D is a failing grade.
Textbooks/References	Original papers and reviews related to the research topic
Independent Study Outside of Class	Actively participate in related academic societies, make presentations, gather information, and engage in discussions.
Room	Education and research building 5th floor: meeting room, pediatrics research room, etc.
Special Note	Those who are unable to attend during the above times will decide on the timetable through consultation. Questions are welcome at any time. Give feedback at any time.

Course Plan	Number	Lesson content
	1	Achievement of achievement goals 1-2
	-	
	90	
	91	Achievement of achievement goals 3-4
	-	
	120	
	121	Achievement of achievement 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.
Associate 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.
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	Associate Professor Fukuya	1	Understanding the normal structure and function and abnormal findings of the skin
Introduction to Skin Diseases	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
Instructor	Associate Professor Fukuya
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 ・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 times	Faculty in charge	Class content
	1	Associate Professor Fukuya	Structure and function of the epidermis
	2	Associate Professor Fukuya	Structure and function of the dermis
	3	Associate Professor Fukuya	Structure and function of the subcutaneous tissue
	4	Associate Professor Fukuya	Structure and function of skin appendages
	5	Associate Professor Fukuya	Structure and function of skin blood vessels
	6	Associate Professor Fukuya	Pigment cells and the mechanisms of melanogenesis
	7	Associate Professor Fukuya	Immunocompetent cells and functions in the skin
	8	Associate Professor Fukuya	Basic skin eruption and its formation
	9	Associate Professor Fukuya	Methods for describing skin eruptions
	10	Associate Professor Fukuya	Histopathology of the epidermis
	11	Associate Professor Fukuya	Histopathology of the dermis
	12	Associate Professor Fukuya	Histopathology of the subcutaneous tissue
	13	Associate Professor Fukuya	Histopathological images of skin appendages and blood vessels
	14	Associate Professor Fukuya	Correspondence between skin eruption and histopathology
	15	Associate Professor Fukuya	Review

Dermatological fields syllabus

Syllabus Title	Introduction to Skin Diseases
Instructor	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 ・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 times	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 Takenaka	Clinical and histopathological features of dysmetabolism and deposition disease
9	Assistant Professor Takenaka	Clinical and histopathological features of cutaneous benign tumors
10	Assistant Professor Takenaka	Clinical and histopathological features of cutaneous malignancies
11	Assistant Professor Takenaka	Clinical and histopathological features of bacterial infections
12	Assistant Professor Takenaka	Clinical and histopathological features of viral infections
13	Assistant Professor Takenaka	Clinical and histopathological features of mycosis
14	Assistant Professor Takenaka	Clinical and histopathological features of sexually transmitted diseases
15	Assistant Professor Takenaka	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	Develop competencies to 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 avairable. 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
Yaichiro Hashimoto (Professor and Head of division), Takayuki Kanai (Assistant Professor) , Sawa Kono (Assistant Professor), Miki Tujii (Assistant Professor), Kenta Ohmatsu (Assistant Professor)	(1) Study of minimally invasive arrhythmia treatment using external beam radiotherapy for refractory ventricular arrhythmia This study is a joint research with the Department of Cardiovascular Medicine to examine the safety and effectiveness of arrhythmia treatment using external beam radiotherapy for patients with refractory ventricular tachycardia. Basic research has shown that external beam radiotherapy has the potential to reduce arrhythmia by improving connections between diseased myocardium. If external beam radiotherapy can be shown to be effective for refractory and recurrent ventricular arrhythmias, it may be possible in the future for patients with ventricular tachycardia that are difficult to control with catheter ablation or antiarrhythmic drug treatments.

Yaichiro Hashimoto (Professor and Head of division) Sawa Kono (Assistant Professor)	(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.
Yaichiro Hashimoto (Professor and Head of division) Mayumi Fujita (Visiting Assistant Professor)	(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.
Yaichiro Hashimoto (Professor and Head of division) Mayumi Fujita (Visiting Assistant Professor)	(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.
Yaichiro Hashimoto (Professor and Head of division)	(5) Study on radiation therapy for the elderly people The aging of society is progressing, and the majority of patients receiving radiation therapy are elderly. Although guidelines for the treatment of the elderly are being established, the individual prediction of risks associated with radiation therapy remains a challenge. Our institution is currently participating in clinical research aimed at developing a prediction system for adverse events in elderly radiation therapy patients. Through this and similar efforts, we aim to establish optimal and safe radiation therapy strategies tailored to the condition of each individual patient.
Yaichiro Hashimoro (Professor and Head of division) Takayuki Kanai (Assistant Professor)	(6) Introduction of AI to radiation oncology By introducing AI into the radiation treatment plan, improve the accuracy and optimization of the treatment plan.
Yaichiro Hashimoto (Professor and Head of division) Takayuki Kanai (Assistant Professor) Miki Tujii (Assistant Professor)	(7) Research on the creation of a breathing guidance device using tactile stimulation and the evaluation and study of breathing guidance methods using that device. This research is a joint research with the University of Tokyo, and is based on a cushion-type device that has already been developed by the University of Tokyo research team. We will improve the device by examining the optimal shape and operation of the device for breathing guidance in a position with the arms raised. Specifically, we focused on the biomechanics of linking the movement of the arms and the opening of the chest, and by holding a device that expands and contracts between the raised arms, the arms and chest open periodically, drawing air into the lungs. We try to guide patient's breathing pace naturally.
Takayuki Kanai (Assistant Professor)	(8) Study to improve the accuracy of particle therapy using AI-technologies and multi-modality imaging Proton therapy can reduce the dose to normal tissues while achieving a highly conformal dose distribution to the tumor by utilizing the physical properties of proton beams, which have a large energy deposition at a certain depth inside the body, and it can realize "patient-friendly cancer treatment". On the other hand, proton beams are susceptible to changes in body shape and organ position during the treatment period, as well as to errors in CT images used for treatment planning. These are bottlenecks of the accuracy in proton therapy. Therefore, aiming to further improve the accuracy of proton beam therapy, we utlize AI-technologies to realize the integrated analysis of multi-modality images such as dual-energy CT, MRI, PET, and SPECT for more accurate simulation of the behavior of proton beams in the patient's body.
Takayuki Kanai (Assistant Professor)	(9) Development of compact proton therapy system To generalise a proton therpy widely, design of compact proton therapy system is necessaly (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 other research groups in Japan and proton therapy system vendors.

Ⅳ Syllabus (＊ ＝ for doctor's license holders)

Department of Radiation Oncology

Title	Instructor	Credit	Theme
Introduction to Radiation Oncology	Yaichiro Hashimoto (Professor and Head of division)	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	Yaichiro Hashimoto (Professor and Head of division) Mayumi Fujita (Visiting Assistant Professor)	2	Biological effects, basic biological processes, effects on the human body, factors involved in tumors and treatments
Radiation therapy physics Ⅰ	Takayuki Kanai (Assistant Professor)	1	Characteristics of radiation, Treatment system, Dose calibration, Treatment Planning System, Treatment Planning, Quarity Assurance
Experiment / Practice (Research)	Yaichiro Hashimoro (Professor and Head of division) Takayuki Kanai (Assistant Professor) Mayumi Fujita (Visiting Assistant Professor)	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	Yuhei Kikkawa (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	Yuhei Kikkawa (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	Yuhei Kikkawa (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	Yuhei Kikkawa (Assistant Professor)	2	Old quantum theory, Schrodinger equation, approximate solution, scattering problem, relativistic quantum mechanics
# Nuclear physics Lecture	Yuhei Kikkawa (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	Yuhei Kikkawa (Assistant Professor)	1	Linear Algebra, Differentiation and Integral, fourier Analysis, Differential and Integral Equations, Calculation of Numerical Values

# Radiation Physics Lecture	Takayuki Kanai (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	Takayuki Kanai (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 Ⅰ Training	Takayuki Kanai (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	Takayuki Kanai (Assistant 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	Takayuki Kanai (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	Takayuki Kanai (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	Takayuki Kanai (Assistant Professor)	1	Dosimetry, relative dose measurement technology, radiation energy measurement, radiation stopping power measurement, particle number measurement
# Radiation Measurement II Training	Takayuki Kanai (Assistant Professor)	1	Radiation energy measurement, radiation stopping power measurement, particle number measurement
Health physics / radiation protection Ⅰ Lecture/Training	Yaichiro Hashimoto (Professor and Head of division) Takayuki Kanai (Assistant 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.
Diagnostic radiology physics I Lecture/Training	Takayuki Kanai (Assistant Professor)	2	X-ray photography, fluoroscopy, X-ray CT, magnetic resonance, ultrasound, QA/QC
# Health physics / radiation protection Ⅱ Lecture	Yaichiro Hashimoto (Professor and Head of division) Takayuki Kanai (Assistant 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

# Diagnostic radiology physics II Lecture	Yaichiro Hashimoto (Professor and Head of division) Takayuki Kanai (Assistant Professor)	1	X-ray photography, fluoroscopy, X-ray CT, magnetic resonance, ultrasound, QA/QC
Nuclear Medicine Physics I Lecture/Training	Takayuki Kanai (Assistant Professor)	2	Radioisotope, radiopharmaceuticals, measuring instrument, image processing, tracer measurement & analysis, QA/QC of imaging device
# Nuclear Medicine Physics II Lecture	Takayuki Kanai (Assistant Professor)	1	Perfermance assessment of gamma camera, SPECT(SPECT/CT) and PET(PET/CT), QA/QC of imaging device, Dose assessment of the internal radiation exposure
# Medical Imaging and Information (Lecture)	Takayuki Kanai (Assistant Professor)	1	Information theory, signal processing, image engineering, medical informatics etc.
Medical Imaging and Information (Training)	Takayuki Kanai (Assistant Professor)	1	Information theory, signal processing, image engineering, medical informatics etc.
# Laws and Regulations, Recommendation, Medical Ethics in Radiation Lecture	Yaichiro Hashimoto (Professor and Head of division) Takayuki Kanai (Assistant 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 and Medical Statistics (Syllabus: Public Health) Lecture	Ken Masamune (Professor) Takako Miki (Assistant Professor) Daiki Nagamine (Assistant Professor)	2	Lecture on Epidemiology and Medical Statistics required for epidemiological studies
# Lecture on human anatomy (Syllabus: neuromolecular morphology)	Hiroki Fujieda (Professor)	2	Structure of the human body
# General Pathology (Syllabus: Human Pathology & Pathological Neuroscience Syllabus) Lecture	Hirotsugu Hashimoto (Associate Professor)	1	Cytopatholgy and tumor pathology
# Introduction to diagnostic imaging (Syllabus: diagnostic imaging and nuclear medicine) Lecture	Shuji Sakai(Professor)	1	Practical clinical application of various tests
# Introduction to Nuclear Medicine (Syllabus: diagnostic imaging and nuclear medicine) Lecture	Koichiro Kaneko (Associate Professor)	1	Medical use of radionuclides
# Clinical Physiology (Lecture)	Yaichiro Hashimoto (Professor and Head of division) Takayuki Kanai (Assistant Professor)	1	Learning the fundamental physiology required for clinical practice

Radiation oncology (Training)	Yaichiro Hashimoto (Professor and Head of division)	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
Radiation Oncology (Lecture)	Yaichiro Hashimoto (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)	Yaichiro Hashimoto (Professor and Head of division) Mayumi Fujita (Assistant Professor)	1	Biological reaction and basic process, effect on human body, factors on the radiotherpy
Radiation Biology (Lecture)	Yaichiro Hashimoto (Professor and Head of division) Mayumi Fujita (Assistant Professor)	2	Biological reaction and basic process, effect on human body, factors on the radiotherpy
Basic Medical Science (anatomy, physiology, tumor pathology) Lecture	Yaichiro Hashimoto (Professor and Head of division)	2	Fundamentals of the medical physics
# English for Science	Takayuki Kanai (Assistant Professor)	1	English expression, presentation sturcture, writing english paper, english presentation with your research results
## Medical physicist clinical Training	Takayuki Kanai (Assistant Professor)	4	Dose measurement, dose calculation, plan optimization, QA/QC of the dose and a machine, conference
Total credits		54	

Radiation Oncology

（＊ ＝ for medical doctor）

Syllabus Title	Introduction to Radiation Oncology
Instructor	Yaichiro Hashimoto (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	・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 2023 (Gakken Medical Shujunsha), Textbook of Radiation Oncology (Elsevier), Perez and Brady ’s Principles and Practice of Radiation Oncology (Lippincott Williams & Wilkins), Radiotherapy Planning Guidelines 2024 (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 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	Yaichiro Hashimoto (Professor and Head of division)	History and characteristics of radiotherapy, basic philosophy
	2	Yaichiro Hashimoto (Professor and Head of division)	Radiotherapy facility structure and QC
	3	Yaichiro Hashimoto (Professor and Head of division)	Adverse effects of radiotherapy
	4	Yaichiro Hashimoto (Professor and Head of division)	Radiotherapy techniques and methods
	5	Yaichiro Hashimoto (Professor and Head of division)	Brain tumor
	6	Yaichiro Hashimoto (Professor and Head of division)	Head and Neck tumor
	7	Yaichiro Hashimoto (Professor and Head of division)	Respiratory tumor
	8	Yaichiro Hashimoto (Professor and Head of division)	Breast tumor
	9	Yaichiro Hashimoto (Professor and Head of division)	Digestive tumor
	10	Yaichiro Hashimoto (Professor and Head of division)	Urinary tumor
	11	Yaichiro Hashimoto (Professor and Head of division)	Gynecologic tumor
	12	Yaichiro Hashimoto (Professor and Head of division)	Bone and soft tissue tumor
	13	Yaichiro Hashimoto (Professor and Head of division)	Hematological tumor
	14	Yaichiro Hashimoto (Professor and Head of division)	Pediatric tumor
	15	Yaichiro Hashimoto (Professor and Head of division)	Metastatic tumor, benign disease

Radiation Oncology

（＊ ＝ for medical doctor）

Syllabus Title	Radiation Biology
Instructor	Yaichiro Hashimoto (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	・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 2023 (Gakken Medical Shujunsha), Basic Radiation Medicine (Kinhodo)、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 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

回数	Instructor	Contents
1	Yaichiro Hashimoto(Professor and Head of division)	Physical process of expression of biological action
2	Yaichiro Hashimoto(Professor and Head of division)	Chemical process of expression of biological action
3	Yaichiro Hashimoto(Professor and Head of division)	Expression of biological effects
4	Yaichiro Hashimoto(Professor and Head of division), Mayumi Fujita(Part-time lecturer)	Action on DNA / chromosome
5	Yaichiro Hashimoto(Professor and Head of division), Mayumi Fujita(Part-time lecturer)	Action on cells
6	Yaichiro Hashimoto(Professor and Head of division), Mayumi Fujita(Part-time lecturer)	Radiation sensitivity, relative biological effectiveness
7	Yaichiro Hashimoto(Professor and Head of division), Mayumi Fujita(Part-time lecturer)	Action on organs and tissues
8	Yaichiro Hashimoto(Professor and Head of division), Mayumi Fujita(Part-time lecturer)	Action on individual level
9	Yaichiro Hashimoto(Professor and Head of division), Mayumi Fujita(Part-time lecturer)	Radiation protection biology
10	Yaichiro Hashimoto(Professor and Head of division), Mayumi Fujita(Part-time lecturer)	Radiation injury and recovery
11	Yaichiro Hashimoto(Professor and Head of division), Mayumi Fujita(Part-time lecturer)	Action on tumors and normal tissues
12	Yaichiro Hashimoto(Professor and Head of division), Mayumi Fujita(Part-time lecturer)	Radiation Sensitive Employment Physical Factors
13	Yaichiro Hashimoto(Professor and Head of division), Mayumi Fujita(Part-time lecturer)	Combination therapy biology
14	Yaichiro Hashimoto(Professor and Head of division), Mayumi Fujita(Part-time lecturer)	Applied Exercise 1
15	Yaichiro Hashimoto(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	Takayuki Kanai (Assistant Professor)
Credit	1
Type of Class	Lecture
Theme	Characteristics of radiation, Treatment system, Dose calibration, Treatment Planning System, Treatment Planning, Quarity Assurance
Schedule	Wednesday 9:00～10：30、10:40～12：10
Course Objective	・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	Takayuki Kanai(Assistant Professor)	Radiation characteristics I
2	Takayuki Kanai(Assistant Professor)	Radiation characteristics II
3	Takayuki Kanai(Assistant Professor)	radiation therapy related equipment
4	Takayuki Kanai(Assistant Professor)	dose calibration I
5	Takayuki Kanai(Assistant Professor)	dose calibration II
6	Takayuki Kanai(Assistant Professor)	radiation therapy planning system
7	Takayuki Kanai(Assistant Professor)	radiation therapy planning method
8	Takayuki Kanai(Assistant Professor)	dose distribution verification I

Radiation Oncology

（＊ ＝ for medical doctor）

Syllabus Title	Experiment / Practice (Research)
Instructor	Yaichiro Hashimoto (Professor and Head of division), Takayuki Kanai (Assistant Professor), Mayumi Fujita (Visiting 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	1. Decide the research theme, then implement with the technique and analysis skills you obtained. 2. Dicuss 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 disucuss 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	Achive course obsectives1-2
	～	
	90	
	91	Achive course obsectives3-4
	～	
	120	
	121	Achive course obsectives5
	～	
	150	

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	Mechanics Lecture
Instructor	Yuhei Kikkawa (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	・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 fot 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	Yuhei Kikkawa (Assistant Professor)	Mechanics and motion,
	2	Yuhei Kikkawa (Assistant Professor)	Solution of equation of motion Ⅰ
	3	Yuhei Kikkawa (Assistant Professor)	Solution of equation of motion Ⅱ
	4	Yuhei Kikkawa (Assistant Professor)	The law of conservation of energy Ⅰ
	5	Yuhei Kikkawa (Assistant Professor)	The law of conservation of energy Ⅱ
	6	Yuhei Kikkawa (Assistant Professor)	Angular momentum Ⅰ
	7	Yuhei Kikkawa (Assistant Professor)	Angular momentum Ⅱ
	8	Yuhei Kikkawa (Assistant Professor)	The law of universal gravitation Ⅰ
	9	Yuhei Kikkawa (Assistant Professor)	The law of universal gravitation Ⅱ
	10	Yuhei Kikkawa (Assistant Professor)	Rigid body motion Ⅰ
	11	Yuhei Kikkawa (Assistant Professor)	Rigid body motion Ⅱ
	12	Yuhei Kikkawa (Assistant Professor)	Analytical mechanics Ⅰ
	13	Yuhei Kikkawa (Assistant Professor)	Analytical mechanics Ⅱ
	14	Yuhei Kikkawa (Assistant Professor)	Special relativity theory Ⅰ
	15	Yuhei Kikkawa (Assistant Professor)	Special relativity theory Ⅱ

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	Electromagnetism Lecture
Instructor	Yuhei Kikkawa (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	・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	Yuhei Kikkawa (Assistant Professor)	Electric field and potential I
	2	Yuhei Kikkawa (Assistant Professor)	Electric field and potential II
	3	Yuhei Kikkawa (Assistant Professor)	magnetic field I
	4	Yuhei Kikkawa (Assistant Professor)	magnetic field II
	5	Yuhei Kikkawa (Assistant Professor)	electromagnetic induction I
	6	Yuhei Kikkawa (Assistant Professor)	electromagnetic induction II
	7	Yuhei Kikkawa (Assistant Professor)	Maxwell's equations I
	8	Yuhei Kikkawa (Assistant Professor)	Maxwell's equations II
	9	Yuhei Kikkawa (Assistant Professor)	Maxwell's equations III
	10	Yuhei Kikkawa (Assistant Professor)	electromagnetic field energy I
	11	Yuhei Kikkawa (Assistant Professor)	electromagnetic field energy II
	12	Yuhei Kikkawa (Assistant Professor)	electrostatic field associated with conductor
	13	Yuhei Kikkawa (Assistant Professor)	circuit
	14	Yuhei Kikkawa (Assistant Professor)	dielectric and magnetic material
	15	Yuhei Kikkawa (Assistant Professor)	contact potential and electrode potential

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	Thermodynamics and Statistical Mechanics
Instructor	Yuhei Kikkawa (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	・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	Yuhei Kikkawa (Assistant Professor)	Temperature and state equations Ⅰ
	2	Yuhei Kikkawa (Assistant Professor)	Temperature and state equations Ⅱ
	3	Yuhei Kikkawa (Assistant Professor)	thermodynamic processes Ⅰ
	4	Yuhei Kikkawa (Assistant Professor)	thermodynamic processes Ⅱ
	5	Yuhei Kikkawa (Assistant Professor)	equilibrium conditions and macroscopic state quantities Ⅰ
	6	Yuhei Kikkawa (Assistant Professor)	equilibrium conditions and macroscopic state quantities Ⅱ
	7	Yuhei Kikkawa (Assistant Professor)	mechanics and probability Ⅰ
	8	Yuhei Kikkawa (Assistant Professor)	mechanics and probability Ⅱ
	9	Yuhei Kikkawa (Assistant Professor)	Boltzmann distribution and partition function Ⅰ
	10	Yuhei Kikkawa (Assistant Professor)	Boltzmann distribution and partition function Ⅱ
	11	Yuhei Kikkawa (Assistant Professor)	chemical reaction
	12	Yuhei Kikkawa (Assistant Professor)	phase transition
	13	Yuhei Kikkawa (Assistant Professor)	superconductivity and magnetic field, quantum statistical mechanics
	14	Yuhei Kikkawa (Assistant Professor)	quantum statistical mechanics Ⅰ
	15	Yuhei Kikkawa (Assistant Professor)	quantum statistical mechanics Ⅱ

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	Quantum Mechanics Lecture
Instructor	Yuhei Kikkawa (Assistant Professor)
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	・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	Yuhei Kikkawa (Assistant Professor)	Old quantum theory I
2	Yuhei Kikkawa (Assistant Professor)	Old quantum theory II
3	Yuhei Kikkawa (Assistant Professor)	Old quantum theory III
4	Yuhei Kikkawa (Assistant Professor)	Schrodinger equation I
5	Yuhei Kikkawa (Assistant Professor)	Schrodinger equation II
6	Yuhei Kikkawa (Assistant Professor)	Schrodinger equation III
7	Yuhei Kikkawa (Assistant Professor)	approximate solution I
8	Yuhei Kikkawa (Assistant Professor)	approximate solution II
9	Yuhei Kikkawa (Assistant Professor)	approximate solution III
10	Yuhei Kikkawa (Assistant Professor)	scattering problem I
11	Yuhei Kikkawa (Assistant Professor)	scattering problem III
12	Yuhei Kikkawa (Assistant Professor)	scattering problem III
13	Yuhei Kikkawa (Assistant Professor)	relativistic quantum mechanics I
14	Yuhei Kikkawa (Assistant Professor)	relativistic quantum mechanics II
15	Yuhei Kikkawa (Assistant Professor)	relativistic quantum mechanics III

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	Nuclear Physics Lecture
Instructor	Yuhei Kikkawa (Assistant Professor)
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	・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	Yuhei Kikkawa (Assistant Professor)	Global nature of nuclei I
	2	Yuhei Kikkawa (Assistant Professor)	Global nature of nuclei II
	3	Yuhei Kikkawa (Assistant Professor)	nuclear force and two-body problem I
	4	Yuhei Kikkawa (Assistant Professor)	nuclear force and two-body problem II
	5	Yuhei Kikkawa (Assistant Professor)	nuclear force and two-body problem III
	6	Yuhei Kikkawa (Assistant Professor)	nuclear structure I
	7	Yuhei Kikkawa (Assistant Professor)	nuclear structure II
	8	Yuhei Kikkawa (Assistant Professor)	nuclear structure III
	9	Yuhei Kikkawa (Assistant Professor)	nuclear reaction I
	10	Yuhei Kikkawa (Assistant Professor)	nuclear reaction II
	11	Yuhei Kikkawa (Assistant Professor)	nuclear reaction III
	12	Yuhei Kikkawa (Assistant Professor)	lifetime and decay of nuclei I
	13	Yuhei Kikkawa (Assistant Professor)	lifetime and decay of nuclei II
	14	Yuhei Kikkawa (Assistant Professor)	fission and fusion I
	15	Yuhei Kikkawa (Assistant Professor)	fission and fusion II

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	Physical Mathematics Lecture
Instructor	Yuhei Kikkawa (Assistant Professor)
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	・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	Yuhei Kikkawa (Assistant Professor)	Linear Algebra
2	Yuhei Kikkawa (Assistant Professor)	Differentiation and Integral
3	Yuhei Kikkawa (Assistant Professor)	Fourier Analysis I
4	Yuhei Kikkawa (Assistant Professor)	Fourier Analysis II
5	Yuhei Kikkawa (Assistant Professor)	Differential and Integral Equations I
6	Yuhei Kikkawa (Assistant Professor)	Differential and Integral Equations II
7	Yuhei Kikkawa (Assistant Professor)	Calculation of Numerical Values I
8	Yuhei Kikkawa (Assistant Professor)	Calculation of Numerical Values II

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	Radiation Physics Lecture
Instructor	Takayuki Kanai (Assistant Professor)
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	・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	Takayuki Kanai (Assistant Professor)	Structure of atoms and nuclei
2	Takayuki Kanai (Assistant Professor)	History of radiation
3	Takayuki Kanai (Assistant Professor)	Classification of radiation
4	Takayuki Kanai (Assistant Professor)	Units of radiation field
5	Takayuki Kanai (Assistant Professor)	Generation of X-rays
6	Takayuki Kanai (Assistant Professor)	Interaction between photons and materials
7	Takayuki Kanai (Assistant Professor)	Attenuation of photon flux
8	Takayuki Kanai (Assistant Professor)	Electron beam
9	Takayuki Kanai (Assistant Professor)	Interaction between electron beam and matter
10	Takayuki Kanai (Assistant Professor)	Charged particle beams
11	Takayuki Kanai (Assistant Professor)	Interaction of charged particles and materials
12	Takayuki Kanai (Assistant Professor)	Neutron rays
13	Takayuki Kanai (Assistant Professor)	Neutron-material interaction
14	Takayuki Kanai (Assistant Professor)	Radioactive decay
15	Takayuki Kanai (Assistant Professor)	Charged particle equilibrium and radiation equilibrium

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	Radiation Therapy Physics I Lecture
Instructor	Takayuki Kanai (Assistant 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	・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	Takayuki Kanai (Assistant Professor)	Radiation characteristics I
2	Takayuki Kanai (Assistant Professor)	Radiation characteristics II
3	Takayuki Kanai (Assistant Professor)	radiation therapy related equipment
4	Takayuki Kanai (Assistant Professor)	dose calibration I
5	Takayuki Kanai (Assistant Professor)	dose calibration II
6	Takayuki Kanai (Assistant Professor)	radiation therapy planning system
7	Takayuki Kanai (Assistant Professor)	radiation therapy planning method
8	Takayuki Kanai (Assistant Professor)	dose distribution verification I

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	Radiation Therapy Physics I(Training)	
Instructor	Takayuki Kanai (Assistant 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 13:00～16:00	
Course Objective	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	Achive course obsectives1
	3～4	Achive course obsectives2
	5～6	Achive course obsectives3
	7～8	Achive course obsectives4
	9～10	Achive course obsectives5

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	Radiation Therapy Physics II Lecture
Instructor	Takayuki Kanai (Assistant 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	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	Takayuki Kanai (Assistant Professor)	Radiation characteristics III
	2	Takayuki Kanai (Assistant Professor)	Radiation characteristics IV
	3	Takayuki Kanai (Assistant Professor)	radiation therapy related equipment II
	4	Takayuki Kanai (Assistant Professor)	dose calibration III
	5	Takayuki Kanai (Assistant Professor)	dose calibration IV
	6	Takayuki Kanai (Assistant Professor)	radiation therapy planning system II
	7	Takayuki Kanai (Assistant Professor)	radiation therapy planning method II
	8	Takayuki Kanai (Assistant Professor)	dose distribution verification II

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	Radiation Therapy Physics II Training
Instructor	Takayuki Kanai (Assistant 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 13:00〜16:00
Course Objective	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	Achive course obsectives1
	3〜4	Achive course obsectives2
	5〜6	Achive course obsectives3
	7〜8	Achive course obsectives4
	9〜10	Achive course obsectives5

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	Radiation Measurement I （Training/Lecture）
Instructor	Takayki Kanai (Assistant Professor)
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	Wedonesday 9:00～10：30、10:40～12：10、13:00～16:00
Course Objective	lecture 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. training 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	Takayki Kanai (Assistant Professor)	Dosimetry
2	Takayki Kanai (Assistant Professor)	calorimeter dosimetry
3	Takayki Kanai (Assistant Professor)	chemical dosimeter
4	Takayki Kanai (Assistant Professor)	cavity theory
5	Takayki Kanai (Assistant Professor)	ionization chamber
6	Takayki Kanai (Assistant Professor)	dose calibration
7	Takayki Kanai (Assistant Professor)	relative dosimetry technology
8	Takayki Kanai (Assistant Professor)	pulse mode detector, counting / statistics

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	Radiation Measurement II
Instructor	Takayuki Kanai (Assistant Professor)
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	Takayuki Kanai (Assistant Professor)	Dose calibration II
	2	Takayuki Kanai (Assistant Professor)	Relative dose measurement II
	3	Takayuki Kanai (Assistant Professor)	Radiation energy measurement I
	4	Takayuki Kanai (Assistant Professor)	Radiation energy measurement II
	5	Takayuki Kanai (Assistant Professor)	Radiation stopping power measurement I
	6	Takayuki Kanai (Assistant Professor)	Radiation stopping power measurement II
	7	Takayuki Kanai (Assistant Professor)	Particle number measurement I
	8	Takayuki Kanai (Assistant Professor)	Particle number measurement II

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	Radiation Measurement Ⅱ(Training)	
Instructor	Takayuki Kanai (Assistant Professor)	
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 calculationof 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	Yaichiro Hashimoto (Professor and Head of division), Takayuki Kanai (Assistant 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	Yaichiro Hashimoto (Professor and Head of division), Takayuki Kanai (Assistant Professor)	Introduction and History
2	Yaichiro Hashimoto (Professor and Head of division), Takayuki Kanai (Assistant Professor)	Protection-related organizations
3	Yaichiro Hashimoto (Professor and Head of division), Takayuki Kanai (Assistant Professor)	Radiation sources and application
4	Yaichiro Hashimoto (Professor and Head of division), Takayuki Kanai (Assistant Professor)	Radiation biological effects and risk
5	Yaichiro Hashimoto (Professor and Head of division), Takayuki Kanai (Assistant Professor)	Dose classification
6	Yaichiro Hashimoto (Professor and Head of division), Takayuki Kanai (Assistant Professor)	Radiation protection system
7	Yaichiro Hashimoto (Professor and Head of division), Takayuki Kanai (Assistant Professor)	Radiation protection management, Protection-related regulations
8	Yaichiro Hashimoto (Professor and Head of division), Takayuki Kanai (Assistant Professor)	Medical radiation protection and management, etc.

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	Diagnostic Radiology Physics I （Lecture andTraining）
Instructor	Takayuki Kanai (Assistant Professor)
Credit	2
Type of Class	Lecture andTraining
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 chracteristics 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. Practical training 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	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	Takayuki Kanai (Assistant Professor)	X-ray photography, fluoroscopy I
	2	Takayuki Kanai (Assistant Professor)	X-ray photography, fluoroscopy II
	3	Takayuki Kanai (Assistant Professor)	X-ray CT I
	4	Takayuki Kanai (Assistant Professor)	X-ray CT II
	5	Takayuki Kanai (Assistant Professor)	Magnetic resonance I
	6	Takayuki Kanai (Assistant Professor)	Magnetic resonance II
	7	Takayuki Kanai (Assistant Professor)	Ultrasound
	8	Takayuki Kanai (Assistant Professor)	QA/QC

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	Health Physics and Radiation Protection II Lecture
Instructor	Yaichiro Hashimoto (Professor and Head of division), Takayuki Kanai (Assistant 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
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	Yaichiro Hashimoto (Professor and Head of division), Takayuki Kanai (Assistant Professor)	Radiation protection system
2	Yaichiro Hashimoto (Professor and Head of division), Takayuki Kanai (Assistant Professor)	external exposure evaluation
3	Yaichiro Hashimoto (Professor and Head of division), Takayuki Kanai (Assistant Professor)	internal exposure evaluation
4	Yaichiro Hashimoto (Professor and Head of division), Takayuki Kanai (Assistant Professor)	shielding design
5	Yaichiro Hashimoto (Professor and Head of division), Takayuki Kanai (Assistant Professor)	medical radiation protection and management
6	Yaichiro Hashimoto (Professor and Head of division), Takayuki Kanai (Assistant Professor)	environmental radiation protection
7	Yaichiro Hashimoto (Professor and Head of division), Takayuki Kanai (Assistant Professor)	reduction of patient exposure dose
8	Yaichiro Hashimoto (Professor and Head of division), Takayuki Kanai (Assistant Professor)	storage and management of radioactive waste

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	Diagnostic Radiology Physics II Lecture
Instructor	Yaichiro Hashimoto(Professor and Head of division), Takayuki Kanai (Assistant Professor)
Credit	1
Type of Class	Lecture andTraining
Theme	X-ray photography, fluoroscopy, X-ray CT, magnetic resonance, ultrasound, QA/QC
Schedule	Wednesday 9:00～10：30、10:40～12：10
Course Objective	Lecture 1. Learn and understand the chracteristics 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	Yaichiro Hashimoto(Professor and Head of division), Takayuki Kanai (Assistant Professor)	X-ray photography, fluoroscopy III
2	Yaichiro Hashimoto(Professor and Head of division), Takayuki Kanai (Assistant Professor)	X-ray photography, fluoroscopy IV
3	Yaichiro Hashimoto(Professor and Head of division), Takayuki Kanai (Assistant Professor)	X-ray CT III
4	Yaichiro Hashimoto(Professor and Head of division), Takayuki Kanai (Assistant Professor)	X-ray CT IV
5	Yaichiro Hashimoto(Professor and Head of division), Takayuki Kanai (Assistant Professor)	Magnetic resonance III
6	Yaichiro Hashimoto(Professor and Head of division), Takayuki Kanai (Assistant Professor)	Magnetic resonance IV
7	Yaichiro Hashimoto(Professor and Head of division), Takayuki Kanai (Assistant Professor)	Ultrasound II
8	Yaichiro Hashimoto(Professor and Head of division), Takayuki Kanai (Assistant Professor)	Ultrasound III

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	Nucelar Medicine Physics Ⅰ (Training)
Instructor	Takayuki Kanai (Assistant Professor)
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	Lecture 1. Understanding the nuclear medicine diagnosis device from the fundermental 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 Training 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	Nucelar Medicine Physics（Kokusai Bunken Ltd.）, Cancer・Radiotherapy2017（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	Takayuki Kanai (Assistant Professor)	Radioisotope
2	Takayuki Kanai (Assistant Professor)	Radiopharmaceuticals
3	Takayuki Kanai (Assistant Professor)	Measuring instrument Ⅰ
4	Takayuki Kanai (Assistant Professor)	Measuring instrument Ⅱ
5	Takayuki Kanai (Assistant Professor)	Image processing Ⅰ
6	Takayuki Kanai (Assistant Professor)	Image processing Ⅱ
7	Takayuki Kanai (Assistant Professor)	Tracer measurement & analysis
8	Takayuki Kanai (Assistant Professor)	QA/QC of imaging device

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	Nucelar Medicine Physics Ⅱ (Lecture)		
Instructor	Takayuki Kanai (Assistant Professor)		
Credit	1		
Type of Class	Lecture & Training		
Theme	Perfermance 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	・Understanding the nuclear medicine diagnosis device from the fundermental 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	Nucelar 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	Takayuki Kanai (Assistant Professor)	Perfermance assessment of gamma camera Ⅰ
	2	Takayuki Kanai (Assistant Professor)	Perfermance assessment of gamma camera Ⅱ
	3	Takayuki Kanai (Assistant Professor)	Perfermance assessment of SPECT(SPECT/CT) Ⅰ
	4	Takayuki Kanai (Assistant Professor)	Perfermance assessment of SPECT(SPECT/CT)Ⅱ
	5	Takayuki Kanai (Assistant Professor)	Perfermance assessment of PET(PET/CT) Ⅰ
	6	Takayuki Kanai (Assistant Professor)	Perfermance assessment of PET(PET/CT) Ⅱ
	7	Takayuki Kanai (Assistant Professor)	QA/QC of imaging device
	8	Takayuki Kanai (Assistant Professor)	Dose assessment of the internal radiation exposure

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	Medical Imaging and Information (Lecture)
Instructor	Takayuki Kanai (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	・Understanding the medical imaging device from the fundermental 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・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	Takayuki Kanai (Assistant Professor)	Information theory Ⅰ
2	Takayuki Kanai (Assistant Professor)	Information theory Ⅱ・signal processing Ⅰ
3	Takayuki Kanai (Assistant Professor)	Signal processing Ⅱ
4	Takayuki Kanai (Assistant Professor)	Image engineering Ⅰ
5	Takayuki Kanai (Assistant Professor)	Image engineering Ⅱ
6	Takayuki Kanai (Assistant Professor)	Medical informatics Ⅰ
7	Takayuki Kanai (Assistant Professor)	Medical informatics Ⅱ
8	Takayuki Kanai (Assistant Professor)	Extra

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	Medical Imaging and Information (Training)
Instructor	Takayuki Kanai (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	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・Radiotherapy2017（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	Yaichiro Hashimoto(Professor and Head of division), Takayuki Kanai (Assistant 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	・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・Radiotherapy2023（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	Yaichiro Hashimoto(Professor and Head of division), Takayuki Kanai (Assistant Professor)	Act on Prevention of Radiation Hazards Ⅰ
2	Yaichiro Hashimoto(Professor and Head of division), Takayuki Kanai (Assistant Professor)	Act on Prevention of Radiation Hazards Ⅱ
3	Yaichiro Hashimoto(Professor and Head of division), Takayuki Kanai (Assistant Professor)	Medical care act & enforcement regulation
4	Yaichiro Hashimoto(Professor and Head of division), Takayuki Kanai (Assistant Professor)	Industrial safety and health law & ordinance on prevention of ionizing radiation hazards
5	Yaichiro Hashimoto(Professor and Head of division), Takayuki Kanai (Assistant Professor)	Other relevent laws and regulations
6	Yaichiro Hashimoto(Professor and Head of division), Takayuki Kanai (Assistant Professor)	Recommendation & standard
7	Yaichiro Hashimoto(Professor and Head of division), Takayuki Kanai (Assistant Professor)	Medical ethics
8	Yaichiro Hashimoto(Professor and Head of division), Takayuki Kanai (Assistant Professor)	Research ethics

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	Epidemiology and Medical Statistics(Syllabus: Department of Hygiene, Public Health) (Lecture)
Instructor	Ken Masamune, Takako Miki, Daiki Nagamine
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	・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 from mathematical perspectives 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 FATS, ABMES in TWIns, 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	Ken Masamune,Takako Miki, Daiki Nagamine	Introduction: Examples of Epidemiology and Statistics
2	Ken Masamune,Takako Miki, Daiki Nagamine	Epidemiological Research Design I (Descriptive Epidemiological Studies, Cross-Sectional Studies, Ecological Studies)
3	Ken Masamune,Takako Miki, Daiki Nagamine	Epidemiological Research Design II (Case-Control Studies, Cohort Studies, Intervention Studies)
4	Ken Masamune,Takako Miki, Daiki Nagamine	Data Analysis Basics I (Data Processing with Excel, Data Mean and Variance)
5	Ken Masamune,Takako Miki, Daiki Nagamine	Data Analysis Basics II (Frequency Distribution)
6	Ken Masamune,Takako Miki, Daiki Nagamine	Data Analysis Basics III (Correlation)
7	Ken Masamune,Takako Miki, Daiki Nagamine	Data Analysis Basics IV (Random Numbers)
8	Ken Masamune,Takako Miki, Daiki Nagamine	Data Analysis Basics V (Binomial Distribution)
9	Ken Masamune,Takako Miki, Daiki Nagamine	Data Analysis Basics VI (Normal Distribution)
10	Ken Masamune,Takako Miki, Daiki Nagamine	Estimation and Testing I
11	Ken Masamune,Takako Miki, Daiki Nagamine	Estimation and Testing II
12	Ken Masamune,Takako Miki, Daiki Nagamine	Estimation and Testing III
13	Ken Masamune,Takako Miki, Daiki Nagamine	Statistical Processing Based on Data Types and Patterns
14	Ken Masamune,Takako Miki, Daiki Nagamine	Multidimensional Data Analysis (Multiple Regression Analysis, Logistic Regression Analysis, etc.)
15	Ken Masamune,Takako Miki, Daiki Nagamine	Data Analysis and Machine Learning

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	Human anatomy(Syllabus: Department of Anatomy and neurobiology) (Lecture)
Instructor	Hiroki Fujieda (Professor)
Credit	2
Type of Class	Lecture & Training
Theme	Structure of the human body
Schedule	
Course Objective	
Evaluation Methods	
Grading Scale	
Textbooks/References	
Independent Study Outside of Class	
Room	Conference Room, Practice Room
Special Note	

Course Plan	Number	Instructor	Contents
	1		
	2		
	3		
	4		
	5		
	6		
	7		
	8		

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	General pathology(Syllabus: Department of Pathological Neuroscience) (Lecture)
Instructor	Hashimoto
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	Hashimoto	Cellular adaptation and degeneration
2	Hashimoto	Molecular mechanism of cell death
3	Hashimoto	Overview of cell cycle
4	Hashimoto	Aberrant cell cycle and diseases
5	Hashimoto	Morphological features of tumor cells
6	Hashimoto	Functional features of tumor cells
7	Hashimoto	Carcinogenic agents
8	Hashimoto	Cancer genetics

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	Introduction to Diagnostic Imaging(Syllabus: Department of Diagnostic Imaging and Nuclear Medicine) (Lecture)
Instructor	Shuji Sakai (Professor)
Credit	1
Type of Class	Lecture
Theme	Practical clinical application of various tests
Schedule	Thursday 13:00-14:30
Course Objective	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.
Evaluation Methods	Report submission (50%) Verbal questioning (50%)
Grading Scale	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.
Textbooks/References	Standard Radiology (Medical School), Practice of MR-From Basic to Reading-(Medical Science Co.), MDCT Fundamentals-Power Test-(MDESI)
Independent Study Outside of Class	Referring to the above textbook, the items related to radiography, CT, MRI, and IT should be understood.
Room	Ambulatory Center Ground Floor 1 Image Browsing Room
Special Note	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.

Course Plan

Number	Instructor	Contents
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-Band
7	Shuji Sakai	Application of IT: Computer-aided diagnosis using remote imaging and AI
8	Shuji Sakai	Overview and Verbal Examination

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	Introduction to nuclear medicine(Syllabus: Department of Diagnostic Imaging and Nuclear Medicine) (Lecture)
Instructor	Koichiro Kaneko
Credit	1
Type of Class	Lecture
Theme	Medical use of radionuclides
Schedule	Tuesday 10:00–12:00
Course Objective	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.
Evaluation Methods	Attendance (60%) Practice (10%) Test (30%)
Grading Scale	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.
Textbooks/References	Latest clinical nuclear medicine (Kanehara Publishing), nuclear medicine examination engineering (Nanyamado) and nuclear medicine notebook (Kanehara Publishing)
Independent Study Outside of Class	Read the above references and relevant literature.
Room	Outpatient Center Ground Floor 1 Nuclear Medicine PET Laboratory
Special Note	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.

Course Plan

Number	Instructor	Contents
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 PETs
4	Koichiro Kaneko	Cardiac Nuclear Medicine 1: Diagnosing Thallium, Fatty Acid Metabolism, and Sympathetic Imaging by SPECT.
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

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	Clinical Physiology (Lecture)
Instructor	Yaichiro Hashimoto (Professor and Head of division), Takayuki Kanai (Assistant Professor)
Credit	1
Type of Class	Lecture
Theme	Learning the fundamental physiology required for clinical practice
Schedule	Wednesday 13:00～16:00
Course Objective	・Learning the fundamental physiology required for clinical practice ・Reconfirmating the missing part of your study in thenundergraduate or master course comparing with the JBMP education guideline. ・Obtaining the knowledge of the physiology 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	Physiology(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	Yaichiro Hashimoto (Professor and Head of division), Takayuki Kanai (Assistant Professor)	General Cell Physiology
2	Yaichiro Hashimoto (Professor and Head of division), Takayuki Kanai (Assistant Professor)	Neuronal Excitability, Signal Conduction, and the Peripheral Nervous System
3	Yaichiro Hashimoto (Professor and Head of division), Takayuki Kanai (Assistant Professor)	The Central Nervous System
4	Yaichiro Hashimoto (Professor and Head of division), Takayuki Kanai (Assistant Professor)	Muscle and Skeletal Physiology
5	Yaichiro Hashimoto (Professor and Head of division), Takayuki Kanai (Assistant Professor)	Sensory Physiology
6	Yaichiro Hashimoto (Professor and Head of division), Takayuki Kanai (Assistant Professor)	Hematology
7	Yaichiro Hashimoto (Professor and Head of division), Takayuki Kanai (Assistant Professor)	Cardiac Function and Circulatory Physiology
8	Yaichiro Hashimoto (Professor and Head of division), Takayuki Kanai (Assistant Professor)	Respiratory Physiology and Gas Transport

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	Radiation Oncology（Training）
Instructor	Yaichiro Hashimoto (Professor and Head of division)
Credit	1
Type of Class	Lecture & Training
Theme	Radiation oncology for medical physics
Schedule	Friday 13:00~16:00
Course Objective	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・Radiotherapy2023（Gakken Medical Shyubun Ltd.）, Guidelines 2024 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	Radiation Oncology (Lecture)	
Instructor	Yaichiro Hashimoto (Professor and Head of division)	
Credit	2	
Type of Class	Lecture	
Theme	Acquire the basics of radiation oncology necessary for conducting research	
Schedule	Friday 13:00～16：00	
Course Objective	・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 2023 (Gakken Medical Shujunsha), Textbook of Radiation Oncology (Elsevier), Perez and Brady ’s Principles and Practice of Radiation Oncology (Lippincott Williams & Wilkins), Radiotherapy Planning Guidelines 2024 (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 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
	3～5	Achievement of Goal 2
	6～10	Achievement of Goal 3

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	Radiation Biology (Training)
Instructor	Yaichiro Hashimoto(Professor and Head of division), Mayumi Fujita (Assistant Professor)
Credit	1
Type of Class	Lecture & Training
Theme	Radiation biology for radiation oncology
Schedule	Wednesday 13:00~16:00
Course Objective	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・Radiotherapy2023（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 (Lecture)	
Instructor	Yaichiro Hashimoto(Professor and Head of division), Mayumi Fujita(Assistant Professor)	
Credit	2	
Type of Class	Lecture	
Theme	Acquire the basics of radiobiology necessary for radiation oncology	
Schedule	Wednesday 13:00～16:00	
Course Objective	・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 2023 (Gakken Medical Shujunsha), Basic Radiation Medicine (Kinhodo)、Textbook of Radiation Oncology (Elsevier)、Perez and Brady's Principles and Practice of Radiation Oncology (Lippincott Williams & Wilkins) 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	回数	Contents
	1～2	Achievement of Goal 1
	3～5	Achievement of Goal 2
	6～10	Achievement of Goal 3

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	Basic Medical Science
Instructor	Yaichiro Hashimoto(Professor and Head of division)
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	・Reconfirmating the missing part of your study in thenundergraduate 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	Yaichiro Hashimoto(Professor and Head of division)	Anatomy extra classe Ⅰ
2	Yaichiro Hashimoto(Professor and Head of division)	Anatomy extra classe Ⅱ
3	Yaichiro Hashimoto(Professor and Head of division)	Anatomy extra classeⅢ
4	Yaichiro Hashimoto(Professor and Head of division)	Anatomy extra classeⅣ
5	Yaichiro Hashimoto(Professor and Head of division)	Anatomy extra classeⅤ
6	Yaichiro Hashimoto(Professor and Head of division)	Physiology extra classe Ⅰ
7	Yaichiro Hashimoto(Professor and Head of division)	Physiology extra classe Ⅱ
8	Yaichiro Hashimoto(Professor and Head of division)	Physiology extra classeⅢ
9	Yaichiro Hashimoto(Professor and Head of division)	Physiology extra classeⅣ
10	Yaichiro Hashimoto(Professor and Head of division)	Physiology extra classeⅤ
11	Yaichiro Hashimoto(Professor and Head of division)	Neoplastic pathology extra classe Ⅰ
12	Yaichiro Hashimoto(Professor and Head of division)	Neoplastic pathology extra classe Ⅱ
13	Yaichiro Hashimoto(Professor and Head of division)	Neoplastic pathology extra classeⅢ
14	Yaichiro Hashimoto(Professor and Head of division)	Neoplastic pathology extra classeⅣ
15	Yaichiro Hashimoto(Professor and Head of division)	Neoplastic pathology extra classeⅤ

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	English for Science
Instructor	Takayuki Kanai (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	・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	Takayuki Kanai (Assistant Professor)	English expression Ⅰ
2	Takayuki Kanai (Assistant Professor)	English expression Ⅱ
3	Takayuki Kanai (Assistant Professor)	Presentation sturcture Ⅰ
4	Takayuki Kanai (Assistant Professor)	Presentation sturcture Ⅱ
5	Takayuki Kanai (Assistant Professor)	Writing english paper Ⅰ
6	Takayuki Kanai (Assistant Professor)	Writing english paper Ⅱ
7	Takayuki Kanai (Assistant Professor)	English presentation with the research results Ⅰ
8	Takayuki Kanai (Assistant Professor)	English presentation with the research results Ⅱ

Department of Medical Physics (Medical Physics Training Course)

Syllabus Title	Medical Physicist Clinical Training	
Instructor	Takayuki Kanai (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	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	Radiotherpy physics（Kokusai Bunken Ltd.）, Cancer・Radiotherapy2023（Gakken Medical Shyubun Ltd.）, The standard measurement method of the water absorbed dose for external radiotherapy（Japan society of medical physics）, Guidelines 2024 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 and Head (of division) 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.
Associate Professor Kaneko	Research on the Application of Nuclear Medicine Fusion Images to Therapeutic Strategies in Oncologic Diseases. 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.
Assistant Professor 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.
Assistant Professor 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. In addition, advanced brain MRI imageing including cerebral flow analysis, MR spectroscopy, functional MRI will be discussed.

IV Syllabus (* = Physician Licensing Subject)

Item	Teaching faculty	Unit	Theme
Introduction to Diagnostic Imaging	Professor and Head (of division) Sakai	1	Practical clinical application of various tests
Special theory of chest imaging	Professor and Head (of division) Sakai	1	Advanced Image Processing and State-of-the-Art Diagnostic Theory for Respiratory and Mediastinal Diseases.
Introduction to Nuclear Medicine	Associate Professor Kaneko	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 and Head (of division) Sakai Associate Professor Nagao Associate Professor Kaneko Assistant Professor Morita Assistant Professor 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 period, etc.	Thursday 13:00-14:30		
Target to be achieved	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-Band
	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	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

(* = 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	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 PETs
	4	Koichiro Kaneko	Cardiac Nuclear Medicine 1: Diagnosing Thallium, Fatty Acid Metabolism, and Sympathetic Imaging by SPECT.
	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	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	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

(* = 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	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 and Head (of division) Sakai, Associate Professor Nagao, Associate Professor Kaneko, Assistant Professor Morita, Assistant Professor Suzuki,
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	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 studiy 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
Yoji Nagashima, Professor	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.
Tomoko Yamamoto, Associate Professor	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.
Sekiko Taneda, Associate Professor	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.
Saeko Yoshizawa, Associate Professor	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, Assistant Professor	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.
Atsuko Seki, Assistant Professor	Clinicopathological study on renal neoplasms and other diseases

Title	Instructor	Credit	Theme
New Findings in Pathological Research	Yoji Nagashima, Sekiko Taneda, Saeko Yoshizawa, Naoko Ito、 Atsuko Seki	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, Atsuko Seki	1	Make presentation of ongoing research project and discuss with the faculties
Research Project	Yoji Nagashima, Tomoko Yamamoto, Sekiko Taneda, Saeko Yoshizawa, Naoko Ito, Atsuko Seki	10	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, Sekiko Taneda, Saeko Yoshizawa, Naoko Ito, Atuko Seki
Credit	2
Type of Class	Lecture and Seminar
Theme	Pathology (Especially Oncological, Cardiovascular, and Nephrological Pathology)
Schedule	Tuesday, 13:00～14:30
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, 11th ed: English articles presented by the lecturers
Independent Study Outside of Class	Read th above textbook and articles by oneelf 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	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	Dr. Seki	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, 9:00～10:30
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, 11th 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 inconvinient, adjustment is possible.

Course Plan	Number	Instructor	Contents
	1	All fuculties	Journal Club
	2	All fuculties	Journal Club
	3	All fuculties	Journal Club
	4	All fuculties	Journal Club
	5	All fuculties	Journal Club
	6	All fuculties	Journal Club
	7	All fuculties	Journal Club
	8	All fuculties	Journal Club
	9	All fuculties	Journal Club
	10	All fuculties	Journal Club
	11	All fuculties	Journal Club
	12	All fuculties	Journal Club
	13	All fuculties	Journal Club
	14	All fuculties	Journal Club
	15	All fuculties	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 lectuers
Course Objective	Upgrade the skill of discussion in patrholoical 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 inconvinient, adjustment is possible.

Course Plan	Number	Instructor	Contents
	1	All fuculties	Presentation and Discussion
	2	All fuculties	Presentation and Discussion
	3	All fuculties	Presentation and Discussion
	4	All fuculties	Presentation and Discussion
	5	All fuculties	Presentation and Discussion
	6	All fuculties	Presentation and Discussion
	7	All fuculties	Presentation and Discussion
	8	All fuculties	Presentation and Discussion
	9	All fuculties	Presentation and Discussion
	10	All fuculties	Presentation and Discussion
	11	All fuculties	Presentation and Discussion
	12	All fuculties	Presentation and Discussion
	13	All fuculties	Presentation and Discussion
	14	All fuculties	Presentation and Discussion
	15	All fuculties	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 ablity via presentation and preparation of articles		
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 ～ 90	All faculties	Objectives 1～3
	91 ～ 120	All faculties	Objectives 3～4
	121 ～ 150	All faculties	Objectives 5

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 and Head 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 redearch and academic writing	Professor Wakabayashi	1	Clinical Research Design and Academic Writing
Experiments and practical training (research projects)	Professor Wakabayashi, Professor Furiya, Associate Professor Nagai, Assistant Professor Mizuno	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	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	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 Pharmacotherapyl 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

Number	Instructor	Contents
1	Hidetaka Wakabayashi	Concept of Rehabilitation Pharmacotherapy
2	Hidetaka Wakabayashi	Rehabilitation Pharmacotherapyl 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 Pharmacotherapyl Management by setting 1
6	Hidetaka Wakabayashi	Rehabilitation Pharmacotherapyl Management by setting 2
7	Hidetaka Wakabayashi	Case Report of Rehabilitation Pharmacotherapyl Management 1
8	Hidetaka Wakabayashi	Case Report of Rehabilitation Pharmacotherapyl 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

Number	Instructor	Contents
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'sdementia 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 redearch 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

Number	Instructor	Contents
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, Takako Nagai, Satoko Mizuno
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	1. Understand the global position of the given research topic. 2. 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	Number	Contents
	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
Masato Kanzaki, Professor and Head and Takako Matsumoto, Associate Professor	1. Improvements of the simulation and navigation at the level of the segment / 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.
Masato Kanzaki, Professor and Head and Takako Matsumoto, Associate Professor	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.
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 Shota Mitsuboshi.	2	Advancements of diagnosis and treatment for pulmonary diseases cured by thoracic surgery
General remarks of thoracic surgical oncology	Masato Kanzaki, Tamami Isaka, Takako Matsumoto, Shota Mitsuboshi, and Akira Ogihara	2	Factors indicating the surgical treatment of lung cancer
Regenerative medicine of respiratory organs with tissue-engineering techniques	Masato Kanzaki Tamami Isaka, and Shota Mitsuboshi.	1	Thoracic surgical treatment with biomaterials
Experiment and practice (theme-oriented research)	Masato Kanzaki, Tamami Isaka, Takako Matsumoto, Shota Mitsuboshi, and Akira Ogihara	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 Shota Mitsuboshi.
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 arteries
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, Shota Mitsuboshi, and Akira Ogihara
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, Tamami Isaka, and Shota Mitsuboshi
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	Saiseiiryososho, 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, Shota Mitsuboshi, and Akira Ogihara
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	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 addend 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 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 ~ 90	Masato Kanzaki, Tamami Isaka, Takako Matsumoto, Shota Mitsuboshi, and Akira Ogihara	Achieving the attainment target No. 1 and 2
	91 ~ 120	Masato Kanzaki, Tamami Isaka, Takako Matsumoto, Shota Mitsuboshi, and Akira Ogihara	Achieving the attainment target No. 3 and 4
	121 ~ 150	Masato Kanzaki, Tamami Isaka, Takako Matsumoto, Shota Mitsuboshi, and Akira Ogihara	Achieving the attainment target No. 5

Endocrine Surgery

Ⅰ Educational Policy

Learners should learn through the higher education;
(1) To contribute advancing knowledge in the ares of their expertise
(2) To adopt thoughtful thinking and caring attitude in research as well as clinical practice
(3) To appreciate the value of active learning as contemporaries

Ⅱ Goals

(1) To pose a relevant, answerable research question
(2) To summerize current knowledge following critically appraising relevabnt literature
(3) To prepare an appropriate research plan
(4) To discuss validity and reliability of observations in clinical research
(5) To appraise the logics in clinical research
(6) To make a easy-to-understaand presentation
(7) To use evidence appropriateley in clinical practice

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

Name and position	Research theme
Associate Professor Horiuchi Kiyomi	OUTCOMES RESEARCH IN ENDOCRINE SURGERY Carrying out a cutting edge research is a key to make a contribution in clinical medicine. To do so, it is important for learners to find unresolved questions in their professional expertise areas.
Associate Professor Horiuchi Kiyomi	MOLECULAR MECHANISMS OF PARATHYROID CARCINOMA Metastatic parathyroid carcinoma can be intractable or even lethal due to severe hypercalcemia. Identifying molecular mechanisms of the tumor may be a clue to develop new strategies beyond surgical interventions for the condition.
Assistant Professor Omi Yoko	IDENTIFYING BIOMARKERS IN THE DIFFERENTIAL DIAGNOSIS OF FOLLICULAR THYROID NEOPLASM Prepoerative diagnosis of follicular thyroid carcinoma has been quite difficult. To explore the potential biomarkers in the differential diagnosis using surgical materials as well as thyroid cancer cell lines would provide useful.

Ⅳ Syllabus (＊ ＝ for doctor's license holders)

Title	Instructor	Credit	Theme
Clinical Epidemiology & Clinical Research Design	Associate Professor Horiuchi Kiyomi	1	Undestanding threats to validity in clinical epidemiology Undestanding threats to design issues in clinical research
Health Measurement	Associate Professor Horiuchi Kiyomi	1	Undestanding & performing measurements in clinical research
Pathology and Molecular Genetics of Endocrine Tumours	Associate Professor Horiuchi Kiyomi	1	Undestanding of Pathology and Molecular Genetics of Endocrine Tumours
Research agenda in endocrine surgery	Associate Professor Horiuchi Kiyomi	1	Unresolved issues in endocrine surgery practice
Molecular biology of endocrine neoplasms	Assistant Professor Omi Yoko	1	Molecular mechanisms of endocrine tumors
Thesis	Associate Professor Horiuchi Kiyomi	10	Preparing thesis
Total credits		15	

(Endocrine Surgery) Syllabus (1)

Syllabus Title	Clinical Epidemiology＆Clinical Research Design
Instructor	Associate Professor Horiuchi Kiyomi
Credit	1 credit
Type of Class	Lecure & practice
Theme	Undestanding threats to validity in clinical epidemiology
Schedule	Thursday, 70 min
Course Objective	Upon completing this course, the learner should be able to （1）Explain the internal validity in clinical research （2）Explain the external validity in clinical research （3）Explain threats to the internal validity （4）Explain threats to the external validity
Evaluation Methods	attendance（50%）、discussion in lecture & practice（40%）、assignment（10%）
Grading Scale	Grade: S（90 – 100 points）、A（80 – 89 points）、B（70 – 79 points）、C（60 – 69 points）、D（< 60 points） Pass: S, A, B, C / Failure: D
Textbooks/References	Fletcher GS. Clinical Epidemiology: The Essentials. 6th Ed. Lippincott Williams & Wilkins, 2020 Haynes RB, Sackett DL, Guyatt GH, Tugwell P. Clinical Epidemiology: How to Do Clinical Practice Research. 3rd Ed. Lippincott Williams & Wilkins, 20011
Independent Study Outside of Class	Read the materials specified in advance and attend lectures and practical training
Room	TBA
Special Note	

Course Plan	Number	Instructor	Contents
	1	Associate Professor Horiuchi Kiyomi	Clinical Epidemiology: Lecture（1）
	2	Associate Professor Horiuchi Kiyomi	Clinical Epidemiology: Lecture（2）
	3	Associate Professor Horiuchi Kiyomi	Clinical Epidemiology: Lecture（3）
	4	Associate Professor Horiuchi Kiyomi	Clinical Epidemiology: Lecture（4）
	5	Associate Professor Horiuchi Kiyomi	Clinical Epidemiology: Lecture（5）
	6	Associate Professor Horiuchi Kiyomi	Clinical Epidemiology: Lecture（6）
	7	Associate Professor Horiuchi Kiyomi	Clinical Epidemiology: Lecture（7）
	8	Associate Professor Horiuchi Kiyomi	Clinical Epidemiology: Lecture（8）
	9	Associate Professor Horiuchi Kiyomi	Clinical Epidemiology: Practice（1）
	10	Associate Professor Horiuchi Kiyomi	Clinical Epidemiology: Practice（2）
	11	Associate Professor Horiuchi Kiyomi	Clinical Epidemiology: Practice（3）
	12	Associate Professor Horiuchi Kiyomi	Clinical Epidemiology: Practice（4）
	13	Associate Professor Horiuchi Kiyomi	Clinical Epidemiology: Practice（5）
	14	Associate Professor Horiuchi Kiyomi	Clinical Epidemiology: Practice（6）
	15	Associate Professor Horiuchi Kiyomi	Clinical Epidemiology: Practice（7）
	16	Associate Professor Horiuchi Kiyomi	Clinical Epidemiology: Practice（8）
	17	Associate Professor Horiuchi Kiyomi	Clinical Epidemiology: Practice（9）
	18	Associate Professor Horiuchi Kiyomi	Clinical Epidemiology: Practice（10）
	19	Associate Professor Horiuchi Kiyomi	Clinical Epidemiology: Practice（11）
	20	Associate Professor Horiuchi Kiyomi	Clinical Epidemiology: Practice（12）
	21	Associate Professor Horiuchi Kiyomi	Clinical Epidemiology: Practice（13）
	22	Associate Professor Horiuchi Kiyomi	Clinical Epidemiology: Practice（14）
	23	Associate Professor Horiuchi Kiyomi	Clinical Epidemiology: Practice（15）
	24	Associate Professor Horiuchi Kiyomi	Clinical Epidemiology: Practice（16）
	25	Associate Professor Horiuchi Kiyomi	Clinical Epidemiology: Practice（17）
	26	Associate Professor Horiuchi Kiyomi	Clinical Epidemiology: Practice（18）

(Endocrine Surgery) Syllabus (2)

Syllabus Title	Health Measurement
Instructor	Associate Professor Horiuchi Kiyomi
Credit	1 credit
Type of Class	Lecure & practice
Theme	Undestanding & performing measurements in clinical research
Schedule	Thursday, 70 min
Course Objective	Upon completing this course, the learner should be able to （1）Explain significance of observations & measurements in clinical research （2）Explain validity issues of measurements in clinical research （3）Explain reliability issues of measurements in clinical research （4）Use appropriate instruments to measure intended attributes in clinical research
Evaluation Methods	attendance（50%）、discussion in lecture & practice（40%）、assignment（10%）
Grading Scale	Grade: S（90 – 100 points）、A（80 – 89 points）、B（70 – 79 points）、C（60 – 69 points）、D（< 60 points） Pass: S, A, B, C / Failure: D
Textbooks/References	Streiner DL, Norman GR. Health Measurement Scales: a practical guide to their development and use. 5h Ed. Oxford, 2015
Independent Study Outside of Class	Read the materials specified in advance and attend lectures and practical training
Room	TBA
Special Note	

Course Plan	Number	Instructor	Contents
	1	Associate Professor Horiuchi Kiyomi	Health measurement: Lecture（1）
	2	Associate Professor Horiuchi Kiyomi	Health measurement: Lecture（2）
	3	Associate Professor Horiuchi Kiyomi	Health measurement: Lecture（3）
	4	Associate Professor Horiuchi Kiyomi	Health measurement: Lecture（4）
	5	Associate Professor Horiuchi Kiyomi	Health measurement: Lecture（5）
	6	Associate Professor Horiuchi Kiyomi	Health measurement: Lecture（6）
	7	Associate Professor Horiuchi Kiyomi	Health measurement: Lecture（7）
	8	Associate Professor Horiuchi Kiyomi	Health measurement: Lecture（8）
	9	Associate Professor Horiuchi Kiyomi	Health measurement: Practice（1）
	10	Associate Professor Horiuchi Kiyomi	Health measurement: Practice（2）
	11	Associate Professor Horiuchi Kiyomi	Health measurement: Practice（3）
	12	Associate Professor Horiuchi Kiyomi	Health measurement: Practice（4）
	13	Associate Professor Horiuchi Kiyomi	Health measurement: Practice（5）
	14	Associate Professor Horiuchi Kiyomi	Health measurement: Practice（6）
	15	Associate Professor Horiuchi Kiyomi	Health measurement: Practice（7）
	16	Associate Professor Horiuchi Kiyomi	Health measurement: Practice（8）
	17	Associate Professor Horiuchi Kiyomi	Health measurement: Practice（9）
	18	Associate Professor Horiuchi Kiyomi	Health measurement: Practice（10）
	19	Associate Professor Horiuchi Kiyomi	Health measurement: Practice（11）
	20	Associate Professor Horiuchi Kiyomi	Health measurement: Practice（12）
	21	Associate Professor Horiuchi Kiyomi	Health measurement: Practice（13）
	22	Associate Professor Horiuchi Kiyomi	Health measurement: Practice（14）
	23	Associate Professor Horiuchi Kiyomi	Health measurement: Practice（15）
	24	Associate Professor Horiuchi Kiyomi	Health measurement: Practice（16）
	25	Associate Professor Horiuchi Kiyomi	Health measurement: Practice（17）
	26	Associate Professor Horiuchi Kiyomi	Health measurement: Practice（18）

(Endocrine Surgery) Syllabus (3)

Syllabus Title	Pathology and Molecular Genetics of Endocrine Tumours
Instructor	Associate Professor Horiuchi Kiyomi
Credit	1 credit
Type of Class	Lecure
Theme	Undestanding of Pathology and Molecular Genetics of Endocrine Tumours
Schedule	Thursday, 70 min
Course Objective	Undestanding of Pathology and Molecular Genetics of Endocrine Tumours (Thyroid, Parathyroid, and Adrenal tumours)
Evaluation Methods	attendance（50%）、discussion in lecture & practice（40%）、assignment（10%）
Grading Scale	Grade: S（90 – 100 points）、A（80 – 89 points）、B（70 – 79 points）、C（60 – 69 points）、D（< 60 points） Pass: S, A, B, C / Failure: D
Textbooks/References	Yuri E. Nikiforo, Diagnostic Pathology and Molecular Genetics of the Thyroid Lippincott Williams & Wilkins WHO Classification of Tumours・5th Edition, Endocrine and Neuroendocrine Tumours
Independent Study Outside of Class	Read the materials specified in advance and attend lectures and practical training
Room	TBA
Special Note	

Course Plan	Number	Instructor	Contents
	1	Associate Professor Horiuchi Kiyomi	Pathology and Molecular Genetics of Endocrine Tumours: Lecture（1）
	2	Associate Professor Horiuchi Kiyomi	Pathology and Molecular Genetics of Endocrine Tumours: Lecture（2）
	3	Associate Professor Horiuchi Kiyomi	Pathology and Molecular Genetics of Endocrine Tumours: Lecture（3）
	4	Associate Professor Horiuchi Kiyomi	Pathology and Molecular Genetics of Endocrine Tumours: Lecture（4）
	5	Associate Professor Horiuchi Kiyomi	Pathology and Molecular Genetics of Endocrine Tumours: Lecture（5）
	6	Associate Professor Horiuchi Kiyomi	Pathology and Molecular Genetics of Endocrine Tumours: Lecture（6）
	7	Associate Professor Horiuchi Kiyomi	Pathology and Molecular Genetics of Endocrine Tumours: Lecture（7）
	8	Associate Professor Horiuchi Kiyomi	Pathology and Molecular Genetics of Endocrine Tumours: Lecture（8）
	9	Associate Professor Horiuchi Kiyomi	Pathology and Molecular Genetics of Endocrine Tumours: Lecture（9）
	10	Associate Professor Horiuchi Kiyomi	Pathology and Molecular Genetics of Endocrine Tumours: Lecture（10）
	11	Associate Professor Horiuchi Kiyomi	Pathology and Molecular Genetics of Endocrine Tumours: Lecture（11）
	12	Associate Professor Horiuchi Kiyomi	Pathology and Molecular Genetics of Endocrine Tumours: Lecture（12）
	13	Associate Professor Horiuchi Kiyomi	Pathology and Molecular Genetics of Endocrine Tumours: Lecture（13）
	14	Associate Professor Horiuchi Kiyomi	Pathology and Molecular Genetics of Endocrine Tumours: Lecture（14）
	15	Associate Professor Horiuchi Kiyomi	Pathology and Molecular Genetics of Endocrine Tumours: Lecture（15）
	16	Associate Professor Horiuchi Kiyomi	Pathology and Molecular Genetics of Endocrine Tumours: Lecture（16）
	17	Associate Professor Horiuchi Kiyomi	Pathology and Molecular Genetics of Endocrine Tumours: Lecture（17）
	18	Associate Professor Horiuchi Kiyomi	Pathology and Molecular Genetics of Endocrine Tumours: Lecture（18）
	19	Associate Professor Horiuchi Kiyomi	Pathology and Molecular Genetics of Endocrine Tumours: Lecture（19）
	20	Associate Professor Horiuchi Kiyomi	Pathology and Molecular Genetics of Endocrine Tumours: Lecture（20）
	21	Associate Professor Horiuchi Kiyomi	Pathology and Molecular Genetics of Endocrine Tumours: Lecture（21）
	22	Associate Professor Horiuchi Kiyomi	Pathology and Molecular Genetics of Endocrine Tumours: Lecture（22）
	23	Associate Professor Horiuchi Kiyomi	Pathology and Molecular Genetics of Endocrine Tumours: Lecture（23）
	24	Associate Professor Horiuchi Kiyomi	Pathology and Molecular Genetics of Endocrine Tumours: Lecture（24）
	25	Associate Professor Horiuchi Kiyomi	Pathology and Molecular Genetics of Endocrine Tumours: Lecture（25）
	26	Associate Professor Horiuchi Kiyomi	Pathology and Molecular Genetics of Endocrine Tumours: Lecture（26）

(Endocrine Surgery) Syllabus (4)

Syllabus Title	Research agenda in endocrine surgery
Instructor	Associate Professor Horiuchi Kiyomi
Credit	1 credit
Type of Class	tutorial
Theme	Unresolved issues in endocrine surgery practice
Schedule	Tuesday, 70min
Course Objective	Upon completing this course, the learner should be able to （1）Explain surgical indications for endocrine disorders （2）Pose unanswered questions in clinical practice of thyroid neoplasms （3）Pose unanswered questions in clinical practice of parathyroid thyroid neoplasms （4）Pose unanswered questions in clinical practice of adrenal neoplasms （5）Pose unanswered questions in clinical practice of familial neoplasms （6）Propose to resarch plans to resolve an unresolved question
Evaluation Methods	attendance（50%）、discussion in lecture & practice（40%）、assignment（10%）
Grading Scale	Grade: S（90 – 100 points）、A（80 – 89 points）、B（70 – 79 points）、C（60 – 69 points）、D（< 60 points） Pass: S, A, B, C / Failure: D
Textbooks/References	Randolph: Surgery of the Thyroid and Parathyroid Glands, Elsvevier Saunders
Independent Study Outside of Class	Read the materials specified in advance and attend tutorial sessions
Room	TBA
Special Note	

Course Plan

Number	Instructor	Contents
1	Associate Professor Horiuchi Kiyomi	Endocrine Surgery: General remarks （1）
2	Associate Professor Horiuchi Kiyomi	Endocrine Surgery: General remarks （2）
3	Associate Professor Horiuchi Kiyomi	Endocrine Surgery：Thyroid diseases（1）
4	Associate Professor Horiuchi Kiyomi	Endocrine Surgery：Thyroid diseases（2）
5	Associate Professor Horiuchi Kiyomi	Endocrine Surgery：Thyroid diseases（3）
6	Associate Professor Horiuchi Kiyomi	Endocrine Surgery：Primary hyperparathyroidism（1）
7	Associate Professor Horiuchi Kiyomi	Endocrine Surgery：Primary hyperparathyroidism（2）
8	Associate Professor Horiuchi Kiyomi	Endocrine Surgery：Secondary hyperparathyroidism
9	Associate Professor Horiuchi Kiyomi	Endocrine Surgery：Adrenal diseases（1）
10	Associate Professor Horiuchi Kiyomi	Endocrine Surgery：Adrenal diseases（2）
11	Associate Professor Horiuchi Kiyomi	Endocrine Surgery：Adrenal diseases（3）
12	Associate Professor Horiuchi Kiyomi	Endocrine Surgery：Familial disorders
13	Associate Professor Horiuchi Kiyomi	Endocrine Surgery：Unresolved issues Thyroid diseases
14	Associate Professor Horiuchi Kiyomi	Endocrine Surgery：Unresolved issues Parathyroid diseases
15	Associate Professor Horiuchi Kiyomi	Endocrine Surgery：Unresolved issues Adrenal diseases
16	Associate Professor Horiuchi Kiyomi	Endocrine Surgery：Unresolved issues Familial neoplasms
17	Associate Professor Horiuchi Kiyomi	Endocrine Surgery：Approaches to unresolved issues
18	Associate Professor Horiuchi Kiyomi	Endocrine Surgery：Approaches to unresolved issues
19	Associate Professor Horiuchi Kiyomi	Endocrine Surgery：Approaches to unresolved issues
20	Associate Professor Horiuchi Kiyomi	Endocrine Surgery：Approaches to unresolved issues
21	Associate Professor Horiuchi Kiyomi	Endocrine Surgery：Approaches to unresolved issues
22	Associate Professor Horiuchi Kiyomi	Endocrine Surgery：Approaches to unresolved issues
23	Associate Professor Horiuchi Kiyomi	Endocrine Surgery：Approaches to unresolved issues
24	Associate Professor Horiuchi Kiyomi	Endocrine Surgery：Approaches to unresolved issues
25	Associate Professor Horiuchi Kiyomi	Endocrine Surgery：Approaches to unresolved issues
26	Associate Professor Horiuchi Kiyomi	Presentation

(Endocrine Surgery) Syllabus (5)

Syllabus Title	Molecular biology of endocrine neoplasms
Instructor	Assistant Professor Omi Yoko
Credit	1 credit
Type of Class	tutorial
Theme	Molecular mechanisms of endocrine tumors
Schedule	Tuesday, 70min
Course Objective	Upon completing this course, the learner should be able to （1）Explain surgical indications for endocrine disorders （2）Pose unanswered questions in molecular mechanisms of thyroid neoplasms （3）Pose unanswered questions in molecular mechanisms of parathyroid thyroid neoplasms （4）Pose unanswered questions in molecular mechanisms of adrenal neoplasms （5）Pose unanswered questions in molecular mechanisms of familial neoplasms （6）Propose to resarch plans to resolve an unresolved question
Evaluation Methods	attendance（50%）、discussion in lecture & practice（40%）、assignment（10%）
Grading Scale	Grade: S（90 – 100 points）、A（80 – 89 points）、B（70 – 79 points）、C（60 – 69 points）、D（< 60 points） Pass: S, A, B, C / Failure: D
Textbooks/References	WHO Classification of Tumours of Endocrine Organs, WHO 2017
Independent Study Outside of Class	Read the materials specified in advance and attend tutorial sessions
Room	TBA
Special Note	

Course Plan	Number	Instructor	Contents
	1	Assistant Professor Omi Yoko	Endocrine neoplasms: General remarks （1）
	2	Assistant Professor Omi Yoko	Endocrine neoplasms: General remarks （2）
	3	Assistant Professor Omi Yoko	Endocrine neoplasms：Thyroid diseases（1）
	4	Assistant Professor Omi Yoko	Endocrine neoplasms：Thyroid diseases（2）
	5	Assistant Professor Omi Yoko	Endocrine neoplasms：Thyroid diseases（3）
	6	Assistant Professor Omi Yoko	Endocrine neoplasms：Primary hyperparathyroidism（1）
	7	Assistant Professor Omi Yoko	Endocrine neoplasms：Primary hyperparathyroidism（2）
	8	Assistant Professor Omi Yoko	Endocrine neoplasms：Secondary hyperparathyroidism
	9	Assistant Professor Omi Yoko	Endocrine neoplasms：Adrenal diseases（1）
	10	Assistant Professor Omi Yoko	Endocrine neoplasms：Adrenal diseases（2）
	11	Assistant Professor Omi Yoko	Endocrine neoplasms：Adrenal diseases（3）
	12	Assistant Professor Omi Yoko	Endocrine neoplasms：Familial disorders
	13	Assistant Professor Omi Yoko	Endocrine neoplasms：Unresolved issues Thyroid diseases
	14	Assistant Professor Omi Yoko	Endocrine neoplasms：Unresolved issues Parathyroid diseases
	15	Assistant Professor Omi Yoko	Endocrine neoplasms：Unresolved issues Adrenal diseases
	16	Assistant Professor Omi Yoko	Endocrine neoplasms：Unresolved issues Familial neoplasms
	17	Assistant Professor Omi Yoko	Endocrine neoplasms：Approaches to unresolved issues
	18	Assistant Professor Omi Yoko	Endocrine neoplasms：Approaches to unresolved issues
	19	Assistant Professor Omi Yoko	Endocrine neoplasms：Approaches to unresolved issues
	20	Assistant Professor Omi Yoko	Endocrine neoplasms：Approaches to unresolved issues
	21	Assistant Professor Omi Yoko	Endocrine neoplasms：Approaches to unresolved issues
	22	Assistant Professor Omi Yoko	Endocrine neoplasms：Approaches to unresolved issues
	23	Assistant Professor Omi Yoko	Endocrine neoplasms：Approaches to unresolved issues
	24	Assistant Professor Omi Yoko	Endocrine neoplasms：Approaches to unresolved issues
	25	Assistant Professor Omi Yoko	Endocrine neoplasms：Approaches to unresolved issues
	26	Assistant Professor Omi Yoko	Presentation

(Endocrine Surgery) Syllabus (6)

Syllabus Title	Thesis
Instructor	Associate Professor Horiuchi Kiyomi
Credit	10 credits
Type of Class	Practice of clinical research
Theme	Preparing thesis
Schedule	as needed
Course Objective	At the end of this course, the learner should be able to （1）Pose a relevant, answerable research question （2）Propose a research plan to solve the question （3）Submit the manuscript to a relevant journal （4）Survive thesis defense
Evaluation Methods	（1）Paper submission、（2）Thesis defense
Grading Scale	Grade: S（90 – 100 points）、A（80 – 89 points）、B（70 – 79 points）、C（60 – 69 points）、D（< 60 points） Pass: S, A, B, C / Failure: D
Textbooks/References	depends on the topic
Independent Study Outside of Class	depends of the topic
Room	as needed
Special Note	

Course Plan	Number	Contents
	1	Preparing and presenting research proporsal
	～	
	90	
	91	Conducting clinical research
	～	
	120	
	121	Writing & submission of manuscript, thesis defense
	～	
	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 and Head Sadako Akashi, Assistant professor Hiroko Tsukada	(1) Study on the VOCs for the diagnosis of breast cancer patients (2) Study on the biomarkers for triple negative breast cancer subtype classifiction using VHH antibody
Professor and Head Sadako Akashi, Assistant professor Eiichirou Noguchi	(3) Study the assessment of breast cancer patients' QOL. Risk-reducing Prophylactic Mastectomy in Patients with BRCA1/2 Mutation-positive Breast Cancer: Quality of Life and Satisfaction after Surgery (4)Study on the improvement of cosmetic appearance in partial mastectomy using the Suture Scaffold Technique (SST)". Suture Scaffold Technique (SST) to improve the cosmetic appearance of partial mastectomy (5)risk model calculation of breast cancer using big data

Ⅳ Syllabus (＊ ＝ for doctor's license holders)

Title	Instructor	Credit	Theme
General Remarks on Breast Surgery	Professor and Head Sadako Akashi	1	Breast oncology
Details of Breast Surgery 1	Professor and Head Sadako Akashi & teaching staff	2	Diagnosis of breast cancer
Details of Breast Surgery 2	Professor and Head Sadako Akashi & teaching staff	2	Treatment of breast cancer
Experiment / Practice	Professor and Head Sadako Akashi & 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 and Head Sadako Akashi
Credit	1 credit
Type of Class	Lecture / Practice
Theme	Breast oncology
Schedule	Monday afternoon, 70 minutes
Course Objective	Students will be able to: ・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 TWMU 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 and Head Sadako Akashi	Lecture (1)
	2	Professor and Head Sadako Akashi	Lecture (2)
	3	Professor and Head Sadako Akashi	Lecture (3)
	4	Professor and Head Sadako Akashi	Lecture (4)
	5	Professor and Head Sadako Akashi	Lecture (5)
	6	Professor and Head Sadako Akashi	Lecture (6)
	7	Professor and Head Sadako Akashi	Lecture (7)
	8	Professor and Head Sadako Akashi	Lecture (8)

Breast Surgery

Syllabus Title	Details of Breast Surgery 1
Instructor	Professor and Head Sadako Akashi; Assistant Professor Eiichirou Noguchi; Assistant Professor Kei Aoyama; Assistant Professor Aya Nakagawa; Assistant Professor Hiroko Tsukada; Assistant Professor Mako Nogami
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 TWMU 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 and Head Sadako Akashi, teaching staff	Diagnosis of breast cancer: lecture / practice (1)
2	Professor and Head Sadako Akashi, teaching staff	Diagnosis of breast cancer: lecture / practice (2)
3	Professor and Head Sadako Akashi, teaching staff	Diagnosis of breast cancer: lecture / practice (3)
4	Professor and Head Sadako Akashi, teaching staff	Diagnosis of breast cancer: lecture / practice (4)
5	Professor and Head Sadako Akashi, teaching staff	Diagnosis of breast cancer: lecture / practice (5)
6	Professor and Head Sadako Akashi, teaching staff	Diagnosis of breast cancer: lecture / practice (6)
7	Professor and Head Sadako Akashi, teaching staff	Diagnosis of breast cancer: lecture / practice (7)
8	Professor and Head Sadako Akashi, teaching staff	Diagnosis of breast cancer: lecture / practice (8)
9	Professor and Head Sadako Akashi, teaching staff	Diagnosis of breast cancer: lecture / practice (9)
10	Professor and Head Sadako Akashi, teaching staff	Diagnosis of breast cancer: lecture / practice (10)
11	Professor and Head Sadako Akashi, teaching staff	Diagnosis of breast cancer: lecture / practice (11)
12	Professor and Head Sadako Akashi, teaching staff	Diagnosis of breast cancer: lecture / practice (12)
13	Professor and Head Sadako Akashi, teaching staff	Diagnosis of breast cancer: lecture / practice (13)
14	Professor and Head Sadako Akashi, teaching staff	Diagnosis of breast cancer: lecture / practice (14)
15	Professor and Head Sadako Akashi, teaching staff	Diagnosis of breast cancer: lecture / practice (15)

Breast Surgery

Syllabus Title	Details of Breast Surgery 2
Instructor	Professor and Head Sadako Akashi; Assistant Professor Eiichirou Noguchi; Assistant Professor Kei Aoyama; Assistant Professor Aya Nakagawa, Assistant Professor Hiroko Tsukada; Assistant Professor Mako Nogami
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 TWMU 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 and Head Sadako Akashi, teaching staff	Treatment of breast cancer: lecture / practice (1)
	2	Professor and Head Sadako Akashi, teaching staff	Treatment of breast cancer: lecture / practice (2)
	3	Professor and Head Sadako Akashi, teaching staff	Treatment of breast cancer: lecture / practice (3)
	4	Professor and Head Sadako Akashi, teaching staff	Treatment of breast cancer: lecture / practice (4)
	5	Professor and Head Sadako Akashi, teaching staff	Treatment of breast cancer: lecture / practice (5)
	6	Professor and Head Sadako Akashi, teaching staff	Treatment of breast cancer: lecture / practice (6)
	7	Professor and Head Sadako Akashi, teaching staff	Treatment of breast cancer: lecture / practice (7)
	8	Professor and Head Sadako Akashi, teaching staff	Treatment of breast cancer: lecture / practice (8)
	9	Professor and Head Sadako Akashi, teaching staff	Treatment of breast cancer: lecture / practice (9)
	10	Professor and Head Sadako Akashi, teaching staff	Treatment of breast cancer: lecture / practice (10)
	11	Professor and Head Sadako Akashi, teaching staff	Treatment of breast cancer: lecture / practice (11)
	12	Professor and Head Sadako Akashi, teaching staff	Treatment of breast cancer: lecture / practice (12)
	13	Professor and Head Sadako Akashi, teaching staff	Treatment of breast cancer: lecture / practice (13)
	14	Professor and Head Sadako Akashi, teaching staff	Treatment of breast cancer: lecture / practice (14)
	15	Professor and Head Sadako Akashi, teaching staff	Treatment of breast cancer: lecture / practice (15)

Breast Surgery

Syllabus Title	Experiment / Practice (Research subject)
Instructor	Professor and Head Sadako Akashi; Assistant Professor Eiichirou Noguchi; Assistant Professor Kei Aoyama; Assistant Professor Aya Nakagawa; ,Assistant Professor Hiroko Tsukada; Assistant Professor Mako Nogami
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	Students will be able to: 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 and Head Sadako Akashi, teaching staff	Attainment of goals 1–2
	91–120	Professor and Head Sadako Akashi, teaching staff	Attainment of goals 3–4
	121–150	Professor and Head Sadako Akashi, teaching staff	Attainment of goals 5–6

Division of Cardiovascular Surgery

Ⅰ Educational Policy

The main research themes of the Department of Cardiovascular Surgery include basic research on myocardial regeneration, cellular immunology related to translant rejection. All of these research themes are clinically based and aimed at clinical application. Myocardial regeneration is aimed at clinical application of cell sheets using progenitor cells derived from cardiomyocytes to patients with severe heart failure. Immunesuppresion and myocardial preservation technology are also research themes aimed at appropriate rejection control after heart transplantation.
Clinical research includes surgical treatment of ischemic heart disease, valvular heart disease, heart failure, aortic aneurysm as well as large-scale clinical studies by the Department of Cardiolovascular Surgery and related facilities. Prospective cohort studies and randomized assignment studies of coronary artery byapss grafting cases have been conducted to elucidate the characteristics of cardiovascular diseases in our country. These studies have allowed us to examine the long-term prognosis of patients after cornary artery bypass grafting with myocardial infarction, the evolution of risk factors, and the effectiveness of CABG with arterial graft . Traditionally, guidelines for cardiovascular diseases have been based on Western evidence, but the clinical research of the Department of Cardiovascular Surgery aims to produce evidence-based guidelines that are unique to our society.

Ⅱ Goals

First year: Acquire a broad knowledge of cardiovascular surgery and learn differential judgment methods, various procedures, and surgical technique methods.
Second year: In clinical research, students practice diagnosis, examination, and treatment methods, and learn to performsurgery . In addition, students will formulate research themes. In basic research, students will be able to formulate research methods and research plans.
Third year: Students conduct research in accordance with the research plan and make an interim report on the research results.
Fourth year: Students will write a thesis on their research results.

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

Name and position	Research theme
Professor Hiroshi Niinami	(1) Studies on the usefulness, safety and prognosis of coronary artery bypass grafting (CABG) A. Study of Treatment Strategies for Patients Refractory to Percutaneous Coronary Aretry Bypass Grafting(CABG) CABG plays an important role in the treatment system for coronary artery disease. In recent years, the widespread use of Off Pump Coronary Artery Bypass Grafting (OPCABG) has markedly reduced surgical invasiveness. However, a trend toward more severe disease has also been observed, and treatment difficult patient groups (e.g., diabetics, dialysis patients, and the LV dusfuntion) have become evident. Since our institution has been treating many of these high-risk patients, we will conduct observational studies or prospective intervention trials for these patients, with cardiovascular events as the endpoint. These studies will clarify the reality of patients with poor prognosis in the current OPCABGera and establish effective treatment strategies. B. Investigation of the usefulness and clinical outcomes of OPCABG wit total arterial graft. In recent years, OPCABG with total arteria lgraft for severe coronary artert lesion has become feasible, and its application is expanding to patients with more complex and complicated higher operative risk. However, the actual long term efficacy and prognosis in Japan are still unclear. We have been actively performing this types of treatment, and with the number of patients increasing, we are enrolling and monitoring all patients to determine the usefulness of these treatments, their potential for the future, and their clinical outcomes.
Endosed Professor Nunoda	Analysis of immunne suppression treatment for heart transplant recipients .
Professor Shinkawa	Advanced surgical treatment for Adult Congenital Heart Disease
Visiting Professor Nishinaka	Research on the Mechanical Circulatory Support for Severe Heart Failure
Associate Professor Saito	Research on the surgical treatment for Severe Heart Failure

Ⅳ Syllabus (＊ ＝ for doctor's license holders)

Title	Instructor	Credit	Theme
General Cardiovascular Surgery	Professor/Head Hiroshi Niinami Professor Shinkawa, Professor Nunoda, Visiting Professor Nishinaka Associate Professor Saito Associate Professor Hamazaki Associate Professor Azuma Associate Professor Domoto Lecturer Kikuchi Lecturer Ichihara	1	Diagnosis and Surgical Treatment of Cardiovascular Diseases
Diagnosis and Treatment of Cardiovascular Diseases	Professor/Head Hiroshi Niinami Professor Shinkawa, Professor Nunoda, Visiting Professor Nishinaka Associate Professor Saito Associate Professor Hamazaki Associate Professor Azuma Associate Professor Domoto Lecturer Kikuchi Lecturer Ichihara	2	Diagnosis and Treatment of Cardiovascular Diseases
Fundamentals and Clinical Applications of Cardiovascular Surgery	Professor/Head Hiroshi Niinami Professor Shinkawa, Professor Nunoda, Visiting Professor Nishinaka Associate Professor Saito Associate Professor Hamazaki Associate Professor Azuma Associate Professor Domoto Lecturer Kikuchi Lecturer Ichihara	2	Explanation and practice of the latest treatments and procedures for cardiovascular diseases
Experiments and practical training (research on an issue)	Professor/Head Hiroshi Niinami Professor Shinkawa, Professor Nunoda, Visiting Professor Nishinaka Associate Professor Saito Associate Professor Hamazaki Associate Professor Azuma Associate Professor Domoto Lecturer Kikuchi Lecturer Ichihara	10	Conducting research on an issue and writing a research paper
Total credits		15	

Division of Cardiovascular Medicine Syllabus 1

Syllabus Title	Cardiovascular Surgery		
Instructor	Professor/Head Hiroshi Niinami Instructional Staff (Prof. Shinkawa, prof.Nunoda, Visiting Prof. Nishinaka, Associate Prof. Saito, Associate Prof. Hamasaki, Associate Prof. Azuma, Associate Prof. Domoto, Lecturer Kikuchi, Lecturer Ichihara)		
Credit	1		
Type of Class	Lectures and Exercises		
Theme	Diagnosis and Surgical Procesdure of Cardiovascular Diseases		
Schedule	Monday 18:00–19:30		
Course Objective	Explain and practice general diagnostic and therapeutic policies regarding the diagnosis and surgical procedures of cardiovascular diseases.		
Evaluation Methods	Attendance (50%) Report submission (50%)		
Grading Scale	There are five categories: 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 being passed and D being failed.		
Textbooks/References	Kirklin / Barroto-Boyce Cardiac Surgery,4th Edition		
Independent Study Outside of Class	Research the literature and other materials on the theme of the lesson plan in advance. Study the literature and reference books listed in the study guide, etc.		
Room	Cardiac Center Small Conference Room		
Special Note	Those unable to attend at the above times will be assigned a time slot by mutual agreement. Questions, etc. may be submitted at any time.		
Course Plan			
	1	Professor/Head Hiroshi Niinami, and Instructional Staff	Surgical anatomy for congenital heart disease
	2	Professor/Head Hiroshi Niinami, and Instructional Staff	Surgery for ischemic heart disease
	3	Professor/Head Hiroshi Niinami, and Instructional Staff	Surgery for valvular heart disease
	4	Professor/Head Hiroshi Niinami, and Instructional Staff	Surgery for aortic disease
	5	Professor/Head Hiroshi Niinami,, and Instructional Staff	Surgery for severe heart faiure
	6	Professor/Head Hiroshi Niinami, and Instructional Staff	Endovascular repair for aortic aneurtsm
	7	Professor/Head Hiroshi Niinami,, and Instructional Staff	Endocasular treatment for structural heart disease
	8	Professor/Head Hiroshi Niinami,, and Instructional Staff	Surgical treatment with regenerative medicine

Cardiovascular SurgerySyllabus 2

Syllabus Title	Baisc and clinical aspects of cardiovascular surgery
Instructor	Professor/Head Hiroshi Niinami Instructional Staff (Prof. Shinkawa, prof.Nunoda, Visiting Prof. Nishinaka, Associate Prof. Saito, Associate Prof. Hamasaki, Associate Prof. Azuma, Associate Prof. Domoto, Lecturer Kikuchi, Lecturer Ichihara)
Credit	2
Type of Class	Lectures and Exercises
Theme	Diagnosis and Treatment of Cardiovascular Diseases
Schedule	Monday–Friday, 09:00–12:00,13:00–17:00
Course Objective	To explain and practice advanced surgical anatomy ,pathophysiology , diagnostic and therapeutic strategies regarding the diagnosis and treatment of cardiovascular diseases.
Evaluation Methods	Attendance (50%) Report submission (50%)
Grading Scale	There are five categories: 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 being passed and D being failed.
Textbooks/References	Kirklin / Barroto-Boyce Cardiac Surgery,4th Edition, Braunwald's Heart Disease
Independent Study Outside of Class	Research the literature and other materials on the theme of the lesson plan in advance. Study the literature and reference books listed in the study guide, etc.
Room	Cardiac Center Small Conference Room
Special Note	Those unable to attend at the above times will be assigned a time slot by mutual agreement. Questions, etc. may be submitted at any time.

Course Plan

Number	Instructor	Contents
1	Professor/Head Hiroshi Niinami, and Instructional Staff	Surgical anatomy for congenital heart disease
2	Professor/Head Hiroshi Niinami, and Instructional Staff	Surgery for ischemic heart disease
3	Professor/Head Hiroshi Niinami, and Instructional Staff	Surgery for valvular heart disease
4	Professor/Head Hiroshi Niinami, and Instructional Staff	Surgery for aortic disease
5	Professor/Head Hiroshi Niinami, and Instructional Staff	Surgery for severe heart faiure
6	Professor/Head Hiroshi Niinami, and Instructional Staff	Endovascular repair for aortic aneurysm
7	Professor/Head Hiroshi Niinami, and Instructional Staff	Endovascular treatment for structural heart disease
8	Professor/Head Hiroshi Niinami, and Instructional Staff	Surgical treatment with regenerative medicine

Cardiovascular Surgery Syllabus 3

Syllabus Title	Basic and clinical science of cardiovascular surgery
Instructor	Professor/Head Hiroshi Niinami Instructional Staff (Prof. Shinkawa, prof.Nunoda, Visiting Prof. Nishinaka, Associate Prof. Saito, Associate Prof. Hamasaki, Associate Prof. Azuma, Associate Prof. Domoto, Lecturer Kikuchi, Lecturer Ichihara)
Credit	2
Type of Class	Lectures and Exercises
Theme	Explanation and practice of the latest surgery and procedures for cardiovascular diseases
Schedule	Friday 10:30 a.m. – 12:00 p.m.
Course Objective	The novel therapeutic options and experiments for cardiovascular diseases will be explained and practiced.
Evaluation Methods	Attendance (50%) Report submission (50%)
Grading Scale	There are five categories: 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 being passed and D being failed.
Textbooks/References	Kirklin/Barrattt-Boyes Cardiac Surgery, Research literature, and Molecular Biology of the Heart
Independent Study Outside of Class	Research the literature and other materials on the theme of the lesson plan in advance. Study the literature and reference books listed in the study guide, etc.
Room	Cardiac Center Small Conference Room
Special Note	Those unable to attend at the above times will be assigned a time slot by mutual agreement. Questions, etc. may be submitted at any time.

Course Plan

Number	Instructor	Contents
1	Professor/Head Hiroshi Niinami, and Instructional Staff	Surgical anatomy for congenital heart disease
2	Professor/Head Hiroshi Niinami, and Instructional Staff	Surgery for ischemic heart disease
3	Professor/Head Hiroshi Niinami, and Instructional Staff	Surgery for valvular heart disease
4	Professor/Head Hiroshi Niinami, and Instructional Staff	Surgery for aortic disease
5	Professor/Head Hiroshi Niinami, and Instructional Staff	Surgery for severe heart faiure
6	Professor/HeadHiroshi Niinami, and Instructional Staff	Endovascular repair for aortic aneurysm
7	Professor/Head Hiroshi Niinami, and Instructional Staff	Endovascular treatment for structural heart disease
8	Professor/Head Hiroshi Niinami, and Instructional Staff	Endovascular treatment for structural heart disease

Cardiovascular Surgery Syllabus 4

Syllabus Title	Experiments and practical training (research on an issue)
Instructor	Professor/Head Hiroshi Niinami Instructional Staff (Prof. Shinkawa, prof.Nunoda, Visiting Prof. Nishinaka, Associate Prof. Saito, Associate Prof. Hamasaki, Associate Prof. Azuma, Associate Prof. Domoto, Lecturer Kikuchi, Lecturer Ichihara)
Credit	10
Type of Class	Experiments and practical training (research on an issue)
Theme	Conducting research on an issue and writing a research paper
Schedule	Friday 10:30 a.m. – 12:00 p.m.
Course Objective	1. To be able to learn and conduct clinical and basic research methods according to the research plan. 2. To be able to accurately record and store research data in accordance with ethical guidelines. 3. To be able to summarize research results appropriately. 4. Present research results appropriately at conferences and research meetings. 5. to write and submit research papers.
Evaluation Methods	Research proposal (%), presentation slides (%), thesis (%)
Grading Scale	There are five categories: 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 being passed and D being failed.
Textbooks/References	English Grammar for Writing Life Science Papers
Independent Study Outside of Class	Participation in related academic conferences
Room	BST
Special Note	Those unable to attend at the above times will be assigned a time slot by mutual agreement. Questions, etc. may be submitted at any time.

Course Plan	Number	Contents
	1	Achievement of Goals 1-2
	～	
	50	
	51	Achievement of Goals 3-5
	～	
	150	

Hepatobiliary and Pancreatic Surgery

Ⅰ Educational Policy

Since the Tokyo Women's Medical University Gastroenterology Center was established in 1965 with Professor Emeritus Komei Nakayama as the first director, our centre has been a driving force in gastroenterological surgery and gastroenterological medicine in Japan. Although there is a second-stage training system to acquire a wide range of surgical and clinical examination techniques for all aspects of gastrointestinal surgery, the graduate school emphasizes exploration of specialized fields and advanced medical research. In the department of hepato-biliary-pancreatic surgery of TWMU, advanced medicine, which are liver transplantation, pancreatic transplantation, regenerative medicine, cell therapy, gene therapy, and minimally invasive surgery, is performed. Also the most suitable comprehensive treatment strategy is being assembled according to the analysis of immune and metabolic status, and molecular genetic analysis of each individual. . We look forward to the participation of enthusiastic young surgeons who will be responsible for gastrointestinal surgery in the 21st century.

Ⅱ Goals

1. To have ability to set research designs and consider their feasibility and limitations
2. To acquire cutting-edge knowledge and to have ability to evaluate and criticize original papers
3. To acquire the knowledge and skills necessary for research
4. To have ability to instruct young researchers
5. To have high ethical standards and to be enthusiastic about contributing to medical education and research

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

Name and position	Research theme
Chief Prof. Goro Honda	The peritoneum, which consists of connective tissue and a single layer of mesothelial cells, would be easily damaged not only by crushing and scraping but also by desiccation. On the other hand, during the laparoscopic surgery, a moist environment is maintained because the operation is performed in a closed space inside the abdominal cavity. Oxygen, which accounts for about 20% of the atmosphere, is cytotoxic when it changes to reactive oxigen, but the carbon dioxide gas, which is used for pneumoperitoneum, has buffereing effect because it become bicarbonate (HCO3-) by combining with water. The pneumoperitoneum with carbon dioxide gas can have the effect of protecting cells from various viewpoints, and there is a possibility that carbon dioxide gas protects not only normal cells but also tumor cells. The surgical support robot ″da Vinci″ made it possible to perform more difficult surgery with less invasiveness because the robot has multi-joint functions and stereoscopic effects, which overcome the weakness of conventional laparoscopic surgery. Using a surgical assistant robot would improve the accuracy of lymph node dissection, and would achieve function preserving surgery in gastrointestinal surgery such as surgeries of esophagus, stomach, and colon. Graduate school students in our departments aims to be a surgeon with advanced surgical techniques in robotic surgery as well as to be qualified as a technically certificated surgeon of the Japanese Society of Endoscopic Surgery.
Associate Prof. Shunichi Ariizumi	Various advanced imaging systems have made remarkable progress, and are now being applied as preoperatibe surgical simulations, and their usefulness is recognized in clinical settings. However, there is no established navigation system during actual surgery. The purpose of this study is to construct a surgical navigation system that can be applied to actual surgery using advanced imaging systems and advanced technology. As for IVR therapy, therapeutic effect determination is currently impossible during IVR therapy, and sometimes the insufficient therapeutic effect would be detected by imaging after treatment. We will construct an image supporting system that can determine the treatment effect during IVR therapy. In the emergency room, we will construct more simple and compact imaging system than CT scan, which is essential at the present time. Monitoring arterial and venous blood flow is necessary after liver transplantation, but continuous monitoring is currently impossible. We will construct a simpler system that enables continuous monitoring.

Ⅳ Syllabus (＊ ＝ for doctor's license holders)

Title	Instructor	Credit	Theme
Overview of hepato-biliary-pancreatic surgery	Prof. Honda, Associate Prof. Matsunaga	1	Surgical indication, diagnostic imaging, examination of surgical technique
Diagnostic imaging, IVR, and ablation in hepato-biliary-pancreatic surgery	Prof. Honda, Associate Prof. Ariizumi	1	Learn about imaging and non-invasive treatment of hepatobiliary pancreatic disease
Hepatobiliary pancreatic surgery and its perioperative management	Prof. Honda, Associate Prof. Ariizumi	1	Learn hepatobiliary pancreatic surgery and perioperative management
Minimal invasive hepatobiliary pancreatic surgery	Prof. Honda, Associate Prof. Ome, Associate Prof. Kawamoto, Associate Prof. Matsunaga	2	Learn minimally invasive hepato-biliary-pancreatic surgery
Experiments and practical training (Agenda research)	Prof. Honda, Associate Prof. Ariizumi, Assistant Prof. Ome, Assistant Prof. Kawamoto, Assistant Prof. Matsunaga	10	Conducting research assignments and writing research papers
Total credits		15	

(Hepatobiliary and Pancreatic Surgery) Syllabus 1

Syllabus Title	Overview of hepato-biliary-pancreatic surgery
Instructor	Professor Honda, Assistant professor Matsunaga
Credit	1
Type of Class	Lectures, Case conference
Theme	Surgical indication, diagnostic imaging, discussing adaptation of surgical procedure
Schedule	Mon.－Fri.、9:00－12:00 Tue.・Thu. 7:30－8:30
Course Objective	Understanding the structure, function, and pathophysiology of the liver, biliary tract, and pancreas, imaging diagnosis of hepatobiliary and pancreatic diseases, surgical planning, and acquisition of basic surgical techniques
Evaluation Methods	Attendance (50%), report submission (50%)
Grading Scale	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) There are 5 types, S, A, B, and C are accepted, and D is rejected.
Textbooks/References	消化器外科手術 2005 へるす出版、肝胆膵高難度外科手術 2015 医学書院
Independent Study Outside of Class	Participate in case review meetings and understand actual patients. Learn perioperative management and preoperative diagnostic imaging through discussions with attending physicians.
Room	West Ward A2F Conference Room, Central Operating Room
Special Note	Those who are unable to attend during the above times will decide on the timetable through consultation. Questions are welcome at any time. Give feedback at the final round.

Course Plan

Number	Instructor	Contents
1	Prof. Honda & other instructors	Structure and function of liver, biliary tract and pancreas
2	Prof. Honda & other instructors	Pathophysiology of hepatobiliary pancreatic disease
3	Prof. Honda & other instructors	Pathology of hepato-biliary-pancreatic malignant tumors
4	Prof. Honda & other instructors	Imaging diagnosis of hepatobiliary pancreatic disease
5	Prof. Honda & other instructors	Multidisciplinary treatment of hepato-biliary-pancreatic malignant tumors
6	Prof. Honda & other instructors	Perioperative management of hepatobiliary pancreatic surgery
7	Prof. Honda & other instructors	Hepatobiliary pancreatic surgery planning
8	Prof. Honda & other instructors	Group Discussion
9	Prof. Honda & other instructors	Summary

(Hepatobiliary and Pancreatic Surgery) Syllabus 2

Syllabus Title	Diagnostic imaging, IVR, and ablation in hepato-biliary-pancreatic surgery
Instructor	Professor Honda, Associate Professor Ariizumi
Credit	1
Type of Class	lectures, exercises
Theme	Learn about imaging and non-invasive treatment of hepatobiliary pancreatic disease
Schedule	Mon. 8:30－9:30 Tue. 7:30－18:00 Wed. 8:30－13:00 Thu. 7:30－18:00 Fri. 8:30－18:00 Sat. 8:30－13:00
Course Objective	Understanding the characteristics of hepato-biliary-pancreas images. Creating 3D images of liver vessels. Pointing out the abnormal biliary structure in cholangiogram such as abnormal posterior segmental bile duct branching and maljunction of the pancreatic bile duct. Drawning the image of an accurate surgical simulation sketch. Differenciating the pancreatic tumors and cystic diseases in CT and MRI images. Understanding the principles of liver embolization and RFA.
Evaluation Methods	Attendance (50%), report submission (50%)
Grading Scale	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) There are 5 types, S, A, B, and C are accepted, and D is rejected.
Textbooks/References	画像診断ガイドラン2013年度版。肝細胞癌の早期診断：画像と分子マーカー,アークメディア2012 。肝癌診療Q&A, 中外医学社、2013
Independent Study Outside of Class	Those who are unable to attend during the above times will decide on the timetable through consultation. Questions are welcome at any time. Give feedback at the final round.
Room	West Ward A Angiography Room, CT Room, Central Operating Room
Special Note	Those who are unable to attend during the above times will decide on the timetable through consultation. Questions are welcome at any time. Give feedback at the final round.

Course Plan

Number	Instructor	Contents
1	Prof. Honda & other instructors	CT image diagnosis, MRI image diagnosis
2	Prof. Honda & other instructors	Diagnosis of abnormal biliary tract
3	Prof. Honda & other instructors	3DCT image construction of liver and calculation of resected liver volume
4	Prof. Honda & other instructors	Differential diagnosis of pancreatic tumors and cysts
5	Prof. Honda & other instructors	Principle of hepatic artery embolization
6	Prof. Honda & other instructors	Principles of RFA
7	Prof. Honda & other instructors	Observation of clinical technique
8	Prof. Honda & other instructors	Group Discussion
9	Prof. Honda & other instructors	Summary

(Hepatobiliary and Pancreatic Surgery) Syllabus 3

Syllabus Title	Hepatobiliary pancreatic surgery and its perioperative management
Instructor	Prof. Honda, Associate Prof. Ariizumi
Credit	1
Type of Class	Lecture, and exercise
Theme	Learning hepatobiliary pancreatic surgery and perioperative management
Schedule	Fri. 9:00–12:00
Course Objective	Understanding the concept of liver capacity and learn how to plan the liver resection. Understanding the concept and method of liver resection using Glissonian approach. Understanding and practiceing the basic technique of liver parenchyma transection using CUSA. Understanding and practiceing standard cholecystectomy with SS-Inner exposing technique. Understanding and practiceing the standard surgical procedure of laparoscopic distal pancreatectomy. Understanding and practiceing the key points of nutrition management after pancreatic resection.
Evaluation Methods	Attendance (50%), report submission (50%)
Grading Scale	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) There are 5 types, S, A, B, and C are accepted, and D is rejected.
Textbooks/References	イラストでわかる外科手術基本テクニック 原著第6版　R.M. Kirk (著) / 幕内 雅敏 (監訳)　エルゼビア・ジャパン
Independent Study Outside of Class	Participating the HPB surgery, and making it as a chance of understanding the clinical problem and obtaining the solution of the problem
Room	Office of gastroenterology centre
Special Note	Those who are unable to attend during the above times will decide on the timetable through consultation. Questions are welcome at any time. Give feedback at the final round.

Course Plan

Number	Instructor	Contents
1	Prof. Honda & other instructors	Planining of liver resection
2	Prof. Honda & other instructors	Concept and technique of systematic liver resection by Glissonian approach
3	Prof. Honda & other instructors	Basic concept of liver resection "excavation" and proper use of CUSA
4	Prof. Honda & other instructors	Anatomical knowledge and appropriate standard techniques for safe Cholecystectomy
5	Prof. Honda & other instructors	Pathophysiology of congenital biliary dilatation and appropriate surgical technique
6	Prof. Honda & other instructors	Surgical anatomy around the pancreas for pancreatic resection
7	Prof. Honda & other instructors	Standard surgical technique for laparoscopic pancreatectomy
8	Prof. Honda & other instructors	Key point of nutrition management after pancreatic resection
9	Prof. Honda & other instructors	Overview of hepato-biliary-pancreatic surgery (required by highly skilled specialists) and group discussion
10	Prof. Honda & other instructors	Summery

(Hepatobiliary and Pancreatic Surgery) Syllabus 4

Syllabus Title	Minimal invasive hepatobiliary pancreatic surgery
Instructor	Prof. Honda, Assistant Prof. Ome, Assistant Prof. Matsunaga, Assistant Prof. Kawamoto
Credit	2
Type of Class	Lecture, and exercise
Theme	Learning minimally invasive hepato-biliary-pancreatic surgery
Schedule	Fri. 9:00-12:00
Course Objective	Learning and practicing the basic knowledge to safely perform laparoscopic hepatectomy, laparoscopic distal pancreatectomy, laparoscopic cholecystectomy, and laparoscopic surgery for congenital biliary dilatation. Recognizing that the only merit in laparoscopic pancreaticoduodenectomy is smaller wounds, and there are more demerits.
Evaluation Methods	Attendance (50%), report submission (50%)
Grading Scale	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) There are 5 types, S, A, B, and C are accepted, and D is rejected.
Textbooks/References	腹腔鏡下肝切除術ガイド. 金子弘真/若林剛編, 南江堂:2019、内視鏡外科手術 役立つテクニック100. 宮澤光男(編), 医学書院:2020、ラパコレを究める. 森俊幸/梅澤昭子編, 南江堂:2020
Independent Study Outside of Class	Participating the transplantation surgery, and making it as a chance of understanding the clinical problem and obtaining the solution of the problem
Room	Gastroenterology center office
Special Note	Those who are unable to attend during the above times will decide on the timetable through consultation. Questions are welcome at any time. Give feedback at the final round.

Course Plan

Number	Instructor	Contents
1	Prof. Honda & other instructors	Overview of Minimally Invasive Hepato-Biliary-Pancreatic Surgery
2	Prof. Honda & other instructors	Laparoscopic liver resection 1 (position, port placement, pringle manuever)
3	Prof. Honda & other instructors	Laparoscopic hepatectomy 2 (hemorrhage control by adjusting pneumoperitoneum pressure, central venous pressure, and airway pressure)
4	Prof. Honda & other instructors	Laparoscopic hepatectomy 3 (Actual surgical technique utilizing laparoscopic field of view)
5	Prof. Honda & other instructors	Standard surgical technique for laparoscopic pancreatectomy
6	Prof. Honda & other instructors	Laparoscopic cholecystectomy for difficult cases
7	Prof. Honda & other instructors	Laparoscopic surgery for congenital biliary dilatation
8	Prof. Honda & other instructors	The practice of laparoscopic choledojejunostomy, pancreaticojejunostomy
9	Prof. Honda & other instructors	Group discussion
10	Prof. Honda & other instructors	Summary

(Hepatobiliary and Pancreatic Surgery) Syllabus 5

Syllabus Title	Experiments and practical training (Agenda research)		
Instructor	Prof. Honda, Associate Prof. Ariizumi, Assistant Prof. Ome, Assistant Prof. Matsunaga, Assistant Prof. Kawamoto		
Credit	10		
Type of Class	Experiments and practical training (problem research)		
Theme	Conducting research assignments and writing research papers		
Schedule	Thu. 9:00 – 12:00, Tue, Thu. 7:00 – 8:30		
Course Objective	1. Ability to set research designs and consider their feasibility and limitations 2. Ability to acquire cutting-edge knowledge and evaluate and criticize original papers 3. Acquire the knowledge and skills necessary for research 4. Summarizing research results and report at external research meetings and academic conferences 5. Discussing the research results and write a thesis. 6. Responding appropriately to reviewer comments		
Evaluation Methods	Research report (70%), research presentation (10%), paper submition (30%)		
Grading Scale	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) There are 5 types, S, A, B, and C are accepted, and D is rejected.		
Textbooks/References	Papers concerning research theme		
Independent Study Outside of Class	Attending the related conferences, attending gastrointestinal surgery case review meetings		
Room	Conference room at west ward 2nd floor, central operation theatre, etc.		
Special Note	Those who are unable to attend during the above times will decide on the timetable through consultation. Questions are welcome at any time. Give feedback at the final round.		
Course Plan	Number	Lecture or practice	Contents
	1	Lecture	Achievement of goal 1-2
	～	Lecture	
	90	Lecture	
	91	Lecture	Achievement of goal 3
	～	Lecture	
	120	Lecture	
	121	Lecture	Achievement of goal 4-5
	～	Lecture	

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 gastrointestinal surgery, minimally invasive surgery has been progressing, and laparoscopic surgery and robotic 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 radiological and endoscopic images, minimally invasive surgery, chemotherapy and radiotherapy for malignat diseases, surgical and medicational treatment for inflammatory bowel diseases and AI-based evaluation in laparoscopic and robotic surgery. We need to work on new clinical research incorporating these treatments other than surgery. We train future gastrointestinal 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
Assistant prof. Maeda Assistant prof. Ito	(1) Introduction of Robotic Surgery in Upper Gastrointestinal Surgery* Unlike conventional surgery with thoracotomy and laparotomy, surgical robot has a potential to help us perform more difficult surgeries with less invasiveness. In the field of gastric surgery, robotic surgery has been reported to reduce abdominal infectious complications including pancreatic fistulas. Our graduate students aim to become surgeons with advanced skills to be able to perform robotic surgery precisely and safely.
Prof. Yamaguchi Assistant prof. Koshino	(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. Bamba	(3) 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.
Associate prof. Ogawa Assistant prof. Futatsuki Assistant prof. Tani	(4) 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 Charleson 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.

Associate prof. Ogawa Assistant prof. Futatsuki Assistant prof. Tani	(5) 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. Recentry, 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 α2 glycoprotein, etc.) and resected specimens in addition to clinicopathological factors.
Prof. Yamaguchi Associate prof. Ogawa Assistant prof. Futatsuki Assistant prof. Tani	(6) 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 for Endoscopic Surgery and has askill of robotic surgery.

Ⅳ Syllabus (＊ ＝ for doctor's license holders)

Title	Instructor	Credit	Theme
Minilally invasive surgery for upper GI disease	Assistant prof. Maeda Assistant prof. Ito	1	Learn about minilally invasive surgery for upper GI disease
General statement of colorectal surgery	Prof. Yamaguchi Assistant prof. Bamba Assistant prof. Kaneko Assistant prof. Koshino	1	Learn the general overview of colorectal surgery through clinical conference and journal club
Artificial Inteligence of gastrointstinal surgery	Prof. Yamaguchi Assistant prof. Bamba	1	Learn about the use of AI in gastrointestinal surgery, especially in relation to surgery
Theraputic strategy and staged surgery in ulcerative colitis	Associate prof. Ogawa Assistant prof. Futatsuki Assistant prof. Tani	1	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	Associate prof. Ogawa Assistant prof. Futatsuki Assistant prof. Tani	1	Learn the theory of dealing with skip lesions and preventing short bowel syndrome, and observe the surgical procedure in crohn's disease.
Research task(Problem-based Research)	Prof. Yamaguchi Associate prof. Ogawa Assistant prof. Bamba et al.	10	Conducting research on an issue and writing a research paper
Total credits		15	

Gastrointestinal Surgery Syllabus

Syllabus Title	Minilally invasive surgery for upper GI disease
Instructor	Assistant prof. Maeda, et al
Credit	1
Type of Class	Lecture, Seminar
Theme	Learn about minilally invasive surgery for upper GI disease
Schedule	9:00–17:00 on Monday, Thursday
Course Objective	Get the basic knowledge to safely perform thoracoscopic esophagectomy with gastric tube reconstruction, laparoscopic (robotic) distal gastrectomy, proximal gastrectomy, and total gastrectomy.
Evaluation Methods	Lecture attendance (50%), Reports (50%)
Grading Scale	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	
Independent Study Outside of Class	Participate in surgery, understand the points that should be solved clinically, and use it as an opportunity to get ideas.
Room	The medical office of Institute of Gastroenterology, Central operating rooms
Special Note	Those who are unable to follow the above timetable can change the timetable.

Course Plan

Number	Instructor	Contents
1	S. Maeda, et al.	Overview of minimally invasive upper GI surgery
2	S. Maeda, et al.	Thoracoscopic esophagectomy
3	S. Maeda, et al.	Laparoscopic gastric tube reconstruction
4	S. Maeda, et al.	Laparoscopic gastrectomy
5	S. Maeda, et al.	Robotic gastrectomy
6	S. Maeda, et al.	Reconstruction in laparoscopic gastrectomy
7	S. Maeda, et al.	Group discussion
8	S. Maeda, et al.	Summary

Gastrointestinal Surgery Syllabus

Syllabus Title	General statement of colorectal surgery
Instructor	Prof. Yamaguchi, Assistant prof. Banba, Assistant prof. Kaneko, Assistant prof. Koshino
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

Gastrointestinal Surgery Syllabus

Syllabus Title	Artificial Inteligence of gastrointstinal surgery
Instructor	Prof. Yamaguchi, Assistant prof. Banba
Credit	1
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/References	
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.	Genaral statement of AI for gastrointestinal surgery
11	S. Yamaguchi, etc.	Group discussion
12	S. Yamaguchi, etc.	Summarization

Gastrointestinal Surgery Syllabus

Syllabus Title	Theraputic strategy and staged surgery in ulcerative colitis
Instructor	Assoc. Prof. Ogawa, Assis. Prof. Futatsuki, Assis. Prof.Tani
Credit	1
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	S. Ogawai, etc.	Diagnosis of severity of ulcerative colitis
2	S. Ogawai, etc.	Pathophysiology of toxic megacolon
3	S. Ogawai, etc.	Incidences and risk factors for postoperative complications
4	S. Ogawai, etc.	Indications for laparoscopic surgery
5	S. Ogawai, etc.	Postoperative long-term complications and conditions
6	S. Ogawai, etc.	Postoperative QOL
7	S. Ogawai, etc.	Observe the surgical procedure
8	S. Ogawai, etc.	Group discussion
9	S. Ogawai, etc.	Summary

Gastrointestinal Surgery Syllabus

Syllabus Title	Presevation of bowel function and short bowel syndrome in Crohn's disease
Instructor	Assoc. Prof. Ogawa, Assis. Prof. Futatsuki, Assis. Prof.Tani
Credit	1
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	S. Ogawai, etc.	Introduction to the pathophysiology of Crohn's disease.
2	S. Ogawai, etc.	Diagnosis of intestinal lesions of Crohn's disease
3	S. Ogawai, etc.	Anal lesions of Crohn's disease
4	S. Ogawai, etc.	Malignant tumor associated with Crohn's disease
5	S. Ogawai, etc.	Laparoscopic surgery for Crohn's disease
6	S. Ogawai, etc.	Prevention of postoperative recurrence of Crohn's disease
7	S. Ogawai, etc.	Team medical care for Crohn's disease
8	S. Ogawai, etc.	Group discussion
9	S. Ogawai, etc.	Summary

Gastrointestinal Surgery Syllabus

Syllabus Title	Research task(Problem-based Research)
Instructor	Prof. Yamaguchi, Assistant prof. Banba, Assistant prof. Kaneko, Assistant prof. Koshino
Credit	10
Type of Class	Research task
Theme	Research task and making article
Schedule	Thursday 9:00－12：00, Tuesday and Thurseday 7:00-8:30
Course Objective	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		

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 diseaes such as brain tumors, cerebrovascular diseases, functional neurological disorders, spinal cord diseases, pediatric neurosurgery, and head trauma. We have 30 clinical subspecialities, 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. 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
後任の教授	
後任の教授	
Professor Hayashi Assistant Professor Eguchi	(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.
Associate Professor Aihara Assistant Professor Kobayashi	(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.

Associate Professor Aihara Assistant Professor Kobayashi	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 adjvant therapy for glioma.
Senior Lecturer Amano Assistant Professor Oda	(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. Theses results will contribute to the selection of postoperative treatment for residual tumors.
Senior Lecturer Amano Assistant Professor Oda	(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.
Associate Professor Aihara Associate Professor Akagawa	(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.
Senior Lecturer Ishikawa Assistant Professor Funatsu	(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.
Associate Professor Aihara Assistant Professor Chiba	(10) Studies on cell death and neuronal differentiation in medulloblastoma 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. 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.
Professor Kubota Associate Professor Aihara	(11) Basic and clinical research on the treatment of epilepsy We will examine the pathophysiology of epilepsy physiologically and nuclear medicine, create an experimenta epilepsy model, compare the pathology with the clinical feature using biochemical and physiological methods, and link these results to treatment for epilepsy.
Professor Kubota Associate Professor Aihara	(12) Elucidation of the function of the lymbic system in epilepsy patients 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.

Assistant Professor Horisawa Assistant Professor Kim	13) Endoscopic selective dorsal rhizotomy (SDR) for equinus patients with cerebral palsy 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. 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.
Assistant Professor Shimizu	(14) Study on prediction of postoperative complications by radiculopathy after surgery for spinal cord schwannoma 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.
Assistant Professor Horisawa Assistant Professor Kim	(15) Study on less-invasive intracerebral intervention treatment with convergent ultrasound and gamma knife 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.

Ⅳ Syllabus （＊ ＝ for doctor's license holders）

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

(Neurosurgery) Syllabus (1)

Syllabus Title	Introduction to Neurosurgery (Lecture)		
Instructor	後任の教授		
Credit	1		
Type of Class	Lacture		
Theme	Lecture on the general content of neurosurgery and the outline of each subspecialty		
Schedule	Thursday 17: 00-18: 10		
Course Objective	・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 13th 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	後任の教授	Introduction to Neurosurgery
	2	後任の教授, 他	Diagnostic of emergency diseases in neurosurgery
	3	後任の教授	Neurophysiological test
	4	後任の教授, 他	Diagnostic of neuroimaging
	5	後任の教授	Diagnostic of brain tumors
	6	後任の教授	State-of-the-art therapeutics in neurosurgery
	7	後任の教授, 他	Diagnostic and therapeutic of trauma in neurosurgery and brain death
	8	後任の教授, 他	Diagnostic and therapeutic of cerebrovascular disease

(Neurosurgery) Syllabus (2)

Syllabus Title	Brain tumor/Cerebrovascular disease (Lecture)
Instructor	後任の教授, Associate Prof. Aihara, Senior Lecturer Amano, Senior Lecturer Yamaguchi, and Senior Lecturer 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	・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. ・To be able to have discussions in these fields.
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 13th 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	後任の教授, 他	Diagnosis and treatment of benign brain tumors
2	Yasuo Aihara	Diagnosis of malignant brain tumors
3	後任の教授, 他	Diagnosis of brain tumors
4	Yasuo Aihara	Diagnosis of pediatric brain tumors
5	Kosaku Amano	Pituitary tumor
6	Yasuo Aihara	Advanced therapy for brain tumor
7	Yasuo Aihara	Therapy for pediatric brain tumor
8	後任の教授, 他	Brain tumor surgery
9	後任の教授, 他	Overview of cerebrovascular disease
10	後任の教授, 他	Diagnosis and treatment of hemorrhagic vascular lesions (aneurysm, cerebral hemorrhage)
11	後任の教授, 他	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	後任の教授, 他	Risk factors and genetic relationships for cerebrovascular diseases
15	後任の教授, 他	Preventive measures against cerebrovascular diseases (brain check, etc.)

(Neurosurgery) Syllabus (3)

Syllabus Title	Functional Neurological Disorders and Epilepsy, Advanced Therapy (Lecture)
Instructor	Prof. Hayashi, Associate Prof. Aihara, Senior Lecturer Yamaguchi, Senior Lecturer Ishikawa, and Assistant Prof. 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 acquire knowledge and understanding of advanced therapies such as gamma knife and endovascular therapy. To be able to have discussions in these fields.
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 13th 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	Shiro Horisawa	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 (reserch projects)	
Instructor	後任の教授, Prof. Hayashi, Associate Prof. Aihara, Senior Lecturer Amano, Senior Lecturer Yamaguchi, and Senior Lecturer Ishikawa	
Credit	10	
Type of Class	Laboratory experiments (reserch 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	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	(1) Multiple-institutional and comparative investigation for assessing the outcomes of various surgical procedures for treating knee osteoarthritis 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.
Prof. Okazaki	(2) Preparations of animal models with ruptured anterior cruciate ligaments and the development of implantable tendons 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.
Prof. Okazaki	(3) Application of an automatic bone-tissue morphology measuring system for diagnosing and treating metabolic bone diseases 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. 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.

Prof. Ikari	(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.
Prof. Okazaki	(5) Biomechanical investigation of the applications of internally fixing materials for bone fracture and osteotomy 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.
Prof. Okazaki	(6) Biomechanical and clinical investigations for spinal fusion surgery 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.

Ⅳ Syllabus

*: Students having medical licenses

Subject	Supervisor	Credit	テーマ
Fundamental orthopedics treatments	Ken Okazaki Katsunori Ikari Koichiro Yano Masafumi Ito Yutarou Munakata Ayako Tominaga	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, Prof. Katsunori Ikari, Assoc. prof. Koichiro Yano, Inst. Masafumi Ito and Inst. Ayako Tominaga		
Credit	1		
Course type	Lecture and Practicum		
Theme	Understanding basic orthopedic surgical treatments		
Day and time	Monday at 15:15–16:25		
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	“Standard textbook of Orthopedic Surgery”, Igaku-Shoin, 2020 (In Japanese) “Medical Journals” relating to orthopedic surgery		
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	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.	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	Koichiro Yano	Foot and ankle diseases
	5	Masafumi Ito	Bone fractures and injury
	6	Ayako Tominaga	Bone metabolism

Orthopaedic Surgery Syllabus

*: Students having medical licenses

Name of course	Treatment options for musukuloskeletal 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 locomotorium 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	“Standard textbook of Orthopedic Surgery”, Igaku-Shoin, 2020 (In Japanese) “Medical Journals” relating to orthopedic surgery Monthly books for orthopedics
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	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.	Lecturers	Lesson contents
	1	Ken Okazaki	Case repots discussed in the weekly clinical conference of the department of orthopedic surgery
	2	Ken Okazaki	Case repots discussed in the weekly clinical conference of the department of orthopedic surgery
	3	Ken Okazaki	Case repots discussed in the weekly clinical conference of the department of orthopedic surgery
	4	Ken Okazaki	Case repots discussed in the weekly clinical conference of the department of orthopedic surgery
	5	Ken Okazaki	Case repots discussed in the weekly clinical conference of the department of orthopedic surgery
	6	Ken Okazaki	Case repots discussed in the weekly clinical conference of the department of orthopedic surgery
	7	Ken Okazaki	Case repots discussed in the weekly clinical conference of the department of orthopedic surgery
	8	Ken Okazaki	Case repots discussed in the weekly clinical conference of the department of orthopedic surgery
	9	Ken Okazaki	Case repots discussed in the weekly clinical conference of the department of orthopedic surgery
	10	Ken Okazaki	Case repots discussed in the weekly clinical conference of the department of orthopedic surgery
	11	Ken Okazaki	Case repots discussed in the weekly clinical conference of the department of orthopedic surgery
	12	Ken Okazaki	Case repots discussed in the weekly clinical conference of the department of orthopedic surgery
	13	Ken Okazaki	Case repots discussed in the weekly clinical conference of the department of orthopedic surgery
	14	Ken Okazaki	Case repots discussed in the weekly clinical conference of the department of orthopedic surgery
	15	Ken Okazaki	Case repots discussed in the weekly clinical conference of the department of orthopedic surgery
	16	Ken Okazaki	Case repots discussed in the weekly clinical conference of the department of orthopedic surgery
	17	Ken Okazaki	Case repots discussed in the weekly clinical conference of the department of orthopedic surgery
	18	Ken Okazaki	Case repots 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 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	Understanding the present statuses of rheumatoid arthritis treatments and appeared issues Obtaining a capability in making adequate answers to questions found in clinical practice by the students without the help of supervisors
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	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.	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 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	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 addend 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
Successor Professor Associate Professor Maruko	(1) Cell biology of vitreoretinal diseases*. ①Research 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. 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.
Successor Professor Associate Professor Maruko	(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.

Successor Professor Associate Professor Maruko	(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.
Successor Professor Associate Professor Maruko	(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.
Successor Professor Associate Professor Maruko	(2) Research on anti-TNF-alpha 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.
Assistant Professor Hasegawa	(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.
Assistant Professor Hasegawa	(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 (DR1α) 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.

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

Item	Supervisor	Unit	Theme
General Ophthalmology	Successor Professor	1	Eye Function、 Visual transmission and information processing
Diagnostic Ophthalmology	Associate Professor Maruko	1	Functional and organic abnormalities
Comprehensive Ophthalmology	Successor Professor Associate Professor Maruko	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)	Successor Professor・ Associate Professor Maruko・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
Supervisor	Successor Professor
Number of credits	1
Class format	Lecture and practice
Theme	Eye function, visual transmission and information processing
Day, Time, etc.	Monday, Wednesday, Thursday14:30～17:30、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	Successor Professor	Structure and function of eyelid and external eye muscles
	2	Successor Professor	Structure and function of the cornea
	3	Successor Professor	Structure and function of the uvea
	4	Successor Professor	Structure and function of the lens
	5	Successor Professor	Structure and function of the retina
	6	Successor Professor	Structure and function of the vitreous body
	7	Successor Professor	Measurement of eye movements using a large low vision telescope
	8	Successor Professor	Functional measurement by Hess and Hertel measurements
	9	Successor Professor	Corneal observation using a pore light microscope
	10	Successor Professor	Corneal observation using anterior segment image analysis system
	11	Successor Professor	Measurement of ocular axial length using ultrasonic A-mode method
	12	Successor Professor	Measurement of Choroidal Circulation by Laser Speckle Method
	13	Successor Professor	Measurement and interpretation of electroretinogram
	14	Successor Professor	Ultrasound images of the vitreous retina
	15	Successor Professor	Observation of the retina and vitreous using OCT

Ophthalmology Syllabus

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

Syllabus item name	Diagnostic Ophthalmology
Supervisor	Associate Professor Maruko
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
Supervisor	Successor Professor、Associate Professor Maruko
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	Successor Professor	Cataract Surgery
2	Ichiro Maruko	Surgical procedures for glaucoma
3	Ichiro Maruko	Surgical procedures for retinal detachment
4	Successor Professor	Surgical procedures for diabetic retinopathy
5	Successor Professor	How to Treat Age-Related Macular Degeneration
6	Successor Professor	Cataract surgery observation
7	Ichiro Maruko	Glaucoma surgery observation
8	Ichiro Maruko	Observation of retinal detachment surgery
9	Successor Professor	Observation of surgery for diabetic retinopathy
10	Successor Professor	Observation of surgery for age-related macular degeneration

Ophthalmology Syllabus

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

Syllabus item name	Eye infections
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
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	・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	Occular surface disease(1)
	8	Taiji Hasegawa	Occular surface disease(2)
	9	Taiji Hasegawa	Occular surface disease(3)
	10	Taiji Hasegawa	Occular surface disease(1)
	11	Taiji Hasegawa	Occular surface disease(2)

Ophthalmology Syllabus

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

Syllabus item name	Clinical research and practice (project research)
Supervisor	Successor Professor・Associate Professor Maruko・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	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

We focus our research on hearing loss due to inner ear disorders and on eosinophilic chronic rhinosinusitis. For inner ear disorders, we conduct translational research—from animal models in basic science to clinical application. As for eosinophilic chronic rhinosinusitis, which is strongly associated with asthma, we provide comprehensive airway management in cooperation with our hospital's Respiratory Center, in addition to surgery, and have achieved improved treatment outcomes.

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. Mizutari	**Elucidation of the Pathophysiology and Development of Therapeutic Strategies for Inner-Ear Synaptopathy＊** In the case of hearing loss or difficulty in auditory perception caused by disorders of inner-ear synapses—currently lacking definitive treatments—we aim to clarify the pathological mechanisms not merely by examining micro-morphology but by employing molecular biological approaches. Furthermore, we develop novel therapeutic methods tailored to the specific pathophysiology and seek to translate these into clinical application.
Prof. Mizutari Assistant Prof. Inai Assistant Prof. Mukai	**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. Mizutari Assistant Prof. Inai Assistant Prof. Mukai	**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. Mizutari Assistant Prof. Inai Assistant Prof. Mukai	**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.
Associate Prof. Yamamura	**Elucidation of the pathophysiology and clinical treatment of salivary disorders＊** 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.

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

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

(Otorhinolaryngology) Syllabus (1)

Syllabus Title	Diagnosis and Treatment of Middle-Ear Diseases
Instructors	Professor Mizutari ; Associate Prof. Yamamura ; Assistant Professors (Inai, Mukai)
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	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, 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. Mizutari and other instructors	Anatomy of the middle ear, and its functions
2	Prof. Mizutari and other instructors	Principles of hearing tests and their evaluation methods
3	Prof. Mizutari and other instructors	Principles and practices of pure-tone audiometry
4	Prof. Mizutari and other instructors	Principles and practices of speech audiometry
5	Prof. Mizutari and other instructors	Principles and practices of middle-ear function test (impedance audiometry)
6	Prof. Mizutari and other instructors	Pathology, diagnosis and treatment of acute otitis media
7	Prof. Mizutari and other instructors	Pathology, diagnosis and treatment of chronic otitis media
8	Prof. Mizutari and other instructors	Pathology, diagnosis and treatment of exudative otitis media
9	Prof. Mizutari and other instructors	Pathology, diagnosis and treatment of cholesteatoma
10	Prof. Mizutari and other instructors	Pathology and testing for allergic diseases
11	Prof. Mizutari and other instructors	Pathology, diagnosis and treatment of eosinophilic otitis media
12	Prof. Mizutari and other instructors	Actual exercises in tympanic plastic surgery I
13	Prof. Mizutari and other instructors	Actual exercises in tympanic plastic surgery II
14	Prof. Mizutari and other instructors	Actual exercises in tympanic plastic surgery III
15	Prof. Mizutari and other instructors	Summary

(Otorhinolaryngology) Syllabus (2)

Syllabus Title	The Clinics of Head and Neck Tumors
Instructors	Professor Mizutari ; Associate Prof. Yamamura ; Assistant Professors (Inai, 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	1. Students will learn the anatomy and function of the head and neck. 2. Students will master the basic procedures of nasopharyngeal and laryngeal fiberscopy 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 (≥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	Assistant Prof. Inai and other instructors	Anatomy and function of the head and neck
2	Assistant Prof. Inai and other instructors	Introduction to head and neck tumors
3	Assistant Prof. Inai and other instructors	Diagnostic imaging method (echography) for the head and neck
4	Assistant Prof. Inai and other instructors	Diagnostic imaging methods (computed tomography (CT)) for the head and neck
5	Assistant Prof. Inai and other instructors	Diagnostic imaging methods (magnetic resonance (MR)) for the head and neck
6	Assistant Prof. Inai and other instructors	Pathology, diagnosis and treatment of oral tumors
7	Assistant Prof. Inai and other instructors	Pathology, diagnosis and treatment of epipharynx tumors
8	Assistant Prof. Inai and other instructors	Pathology, diagnosis and treatment of mesoparynx tumors
9	Assistant Prof. Inai and other instructors	Pathology, diagnosis and treatment of hypopharynx tumors
10	Assistant Prof. Inai and other instructors	Pathology, diagnosis and treatment of laryngeal tumors
11	Assistant Prof. Inai and other instructors	Pathology, diagnosis and treatment of salivary gland tumors
12	Assistant Prof. Inai and other instructors	Radiation therapy for head and neck tumors
13	Assistant Prof. Inai and other instructors	Chemotherapy for head and neck tumors
14	Assistant Prof. Inai and other instructors	Palliative care for head and neck tumors
15	Assistant Prof. Inai and other instructors	Summary

(Otorhinolaryngology) Syllabus (3)

Syllabus Title	Introduction to Otorhinolaryngology
Instructors	Professor Mizutari ; Associate Prof. Yamamura ; Assistant Professors (Inai, Mukai)
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	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 Mizutari ; Associate Prof. Yamamura ; Assistant Professors (Inai, Mukai)
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	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 ～ 90	Prof. Mizutari and other instructors	Achievement of course objectives 1～2
	91 ～ 120	Prof. Mizutari and other instructors	Achievement of course objectives 3～4
	121 ～ 150	Prof. Mizutari and other instructors	Achievement of course objectives 5～6

Otorhinolaryngology

Ⅰ Educational Policy

We focus our research on hearing loss due to inner ear disorders and on eosinophilic chronic rhinosinusitis. For inner ear disorders, we conduct translational research—from animal models in basic science to clinical application. As for eosinophilic chronic rhinosinusitis, which is strongly associated with asthma, we provide comprehensive airway management in cooperation with our hospital's Respiratory Center, in addition to surgery, and have achieved improved treatment outcomes.

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. Mizutari	**Elucidation of the Pathophysiology and Development of Therapeutic Strategies for Inner-Ear Synaptopathy＊** In the case of hearing loss or difficulty in auditory perception caused by disorders of inner-ear synapses—currently lacking definitive treatments—we aim to clarify the pathological mechanisms not merely by examining micro-morphology but by employing molecular biological approaches. Furthermore, we develop novel therapeutic methods tailored to the specific pathophysiology and seek to translate these into clinical application.
Prof. Mizutari Assistant Prof. Inai Assistant Prof. Mukai	**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. Mizutari Assistant Prof. Inai Assistant Prof. Mukai	**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. Mizutari Assistant Prof. Inai Assistant Prof. Mukai	**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.
Associate Prof. Yamamura	**Elucidation of the pathophysiology and clinical treatment of salivary disorders＊** 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.

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

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

(Otorhinolaryngology) Syllabus (1)

Syllabus Title	Diagnosis and Treatment of Middle-Ear Diseases
Instructors	Professor Mizutari ; Associate Prof. Yamamura ; Assistant Professors (Inai, Mukai)
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	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, 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. Mizutari and other instructors	Anatomy of the middle ear, and its functions
2	Prof. Mizutari and other instructors	Principles of hearing tests and their evaluation methods
3	Prof. Mizutari and other instructors	Principles and practices of pure-tone audiometry
4	Prof. Mizutari and other instructors	Principles and practices of speech audiometry
5	Prof. Mizutari and other instructors	Principles and practices of middle-ear function test (impedance audiometry)
6	Prof. Mizutari and other instructors	Pathology, diagnosis and treatment of acute otitis media
7	Prof. Mizutari and other instructors	Pathology, diagnosis and treatment of chronic otitis media
8	Prof. Mizutari and other instructors	Pathology, diagnosis and treatment of exudative otitis media
9	Prof. Mizutari and other instructors	Pathology, diagnosis and treatment of cholesteatoma
10	Prof. Mizutari and other instructors	Pathology and testing for allergic diseases
11	Prof. Mizutari and other instructors	Pathology, diagnosis and treatment of eosinophilic otitis media
12	Prof. Mizutari and other instructors	Actual exercises in tympanic plastic surgery I
13	Prof. Mizutari and other instructors	Actual exercises in tympanic plastic surgery II
14	Prof. Mizutari and other instructors	Actual exercises in tympanic plastic surgery III
15	Prof. Mizutari and other instructors	Summary

(Otorhinolaryngology) Syllabus (2)

Syllabus Title	The Clinics of Head and Neck Tumors
Instructors	Professor Mizutari ; Associate Prof. Yamamura ; Assistant Professors (Inai, 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	1. Students will learn the anatomy and function of the head and neck. 2. Students will master the basic procedures of nasopharyngeal and laryngeal fiberscopy 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 (≥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	Assistant Prof. Inai and other instructors	Anatomy and function of the head and neck
2	Assistant Prof. Inai and other instructors	Introduction to head and neck tumors
3	Assistant Prof. Inai and other instructors	Diagnostic imaging method (echography) for the head and neck
4	Assistant Prof. Inai and other instructors	Diagnostic imaging methods (computed tomography (CT)) for the head and neck
5	Assistant Prof. Inai and other instructors	Diagnostic imaging methods (magnetic resonance (MR)) for the head and neck
6	Assistant Prof. Inai and other instructors	Pathology, diagnosis and treatment of oral tumors
7	Assistant Prof. Inai and other instructors	Pathology, diagnosis and treatment of epipharynx tumors
8	Assistant Prof. Inai and other instructors	Pathology, diagnosis and treatment of mesoparynx tumors
9	Assistant Prof. Inai and other instructors	Pathology, diagnosis and treatment of hypopharynx tumors
10	Assistant Prof. Inai and other instructors	Pathology, diagnosis and treatment of laryngeal tumors
11	Assistant Prof. Inai and other instructors	Pathology, diagnosis and treatment of salivary gland tumors
12	Assistant Prof. Inai and other instructors	Radiation therapy for head and neck tumors
13	Assistant Prof. Inai and other instructors	Chemotherapy for head and neck tumors
14	Assistant Prof. Inai and other instructors	Palliative care for head and neck tumors
15	Assistant Prof. Inai and other instructors	Summary

(Otorhinolaryngology) Syllabus (3)

Syllabus Title	Introduction to Otorhinolaryngology
Instructors	Professor Mizutari ; Associate Prof. Yamamura ; Assistant Professors (Inai, Mukai)
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	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 Mizutari ; Associate Prof. Yamamura ; Assistant Professors (Inai, Mukai)
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	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 ～ 90	Prof. Mizutari and other instructors	Achievement of course objectives 1～2
	91 ～ 120	Prof. Mizutari and other instructors	Achievement of course objectives 3～4
	121 ～ 150	Prof. Mizutari and other instructors	Achievement of course objectives 5～6

Gynecology

Ⅰ Educational Policy

The research fields in obstetrics and gynecology cover four fields: obstetrics, gynecological oncology, reproductive endocrinology, and menopause and women's health. Especially in the field of gynecology, we mainly practice research rooted in clinical practice. The contents will be research on management for gynecologic malignancies, management for endometriosis, and implantation failure in infertility. We aim to develop human resources who can systematically study all fields of obstetrics and gynecology and develop diagnostic, treatment, and management methods that can benefit patients in each field.

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
Tsutomu Tabata Professor and Head (of division)	(1)In recent years, with the aging of delivery age, about 60% of pregnant women give birth at the age of 30 or older. On the other hand, cervical cancer is getting younger, and the number of cervical cancer patients in their twenties and thirties is increasing rapidly. Ovarian cancer is also increasing among young people, and pregnancies with ovarian cancer are also increasing. As a result, pregnancy with gynecological cancer has become a problem in Japan. Therefore, we will investigate the occurrence frequency, treatment methods, and prognosis of cervical cancer and ovarian cancer during pregnancy, and clarify how malignant tumors and their treatment affect pregnancy. In addition, the prognosis of neonates will also be examined.
Jun Kumakiri Professor	(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.
Yu Horibe Assistant professor	(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.
Takashi Motohashi Assistant Professor	(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.

Toshiyuki Kanno Associate Professor	(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.

Ⅳ Syllabus (＊ ＝ for doctor's license holders)

Title	Instructor	Credit	Theme
Gynecological Oncology	Tsutomu Tabata Jun Kumakiri Takashi Motohashi	2	Diagnosis, treatment and management of gynecology
Endocrinology of reproduction	Yu Horibe	1	Diagnosis, treatment and management of infertility
Obstetrics	Toshiyuki Kanno	2	Diagnosis, treatment and management of obstetric compilation
Experiment and research	Tsutomu Tabata Jun Kumakiri Takashi Motohashi	10	Implementation of research projects and preparation of research papers
Total credits		15	

(Gynecology) Syllabus (1)

Syllabus Title	Gynecological Oncology
Instructor	Tsutomu Tabata, Jun Kumakiri , Takashi Motohashi
Credit	2
Type of Class	Lectures
Theme	Diagnosis, treatment of endometriosis and gynecological tumor
Schedule	every Thursday 13:00-17:00
Course Objective	Understanding diagnosis and treatment for gynecologic tumors and clinical understanding of endometriosis
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	Tsutomu Tabata	mechanism and pathology of gynecological tumor
10	Tsutomu Tabata	epidemiology of gynecological tumor
11	Tsutomu Tabata	diagnosis of gynecological tumor
12	Tsutomu Tabata	dysmenorrhea and chronic pelvic pain by gynecological tumor
13	Tsutomu Tabata	infertility and gynecological tumor
14	Takashi Motohashi	medical treatment of gynecological tumor
15	Takashi Motohashi	surgical treatment of gynecological tumor
16	Takashi Motohashi	summary of gynecological tumor

(Gynecology) Syllabus (2)

Syllabus Title	Endocrinology of reproduction
Instructor	Yu Horibe
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	Yu Horibe	cause and pathology of infertility
2	Yu Horibe	examination of infertility
3	Yu Horibe	endometriosis and infertility
4	Yu Horibe	treatment of ovulation disorder
5	Yu Horibe	treatment of fallopian tube obstruction
6	Yu Horibe	AIH and IVF
7	Yu Horibe	freezing germ cell and tissues
8	Yu Horibe	summary

(Gynecology) Syllabus (3)

Syllabus Title	Obstetrics
Instructor	Toshiyuki Kanno
Credit	2
Type of Class	Lectures
Theme	diagnosis, treatment and management of obstetrical compilation and complications during pregnancy
Schedule	every Monday 13:00-17:00
Course Objective	understanding diagnosis, treatment and management of obstetrical compilation 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	Toshiyuki Kanno	diagnosis, treatment and management of abortion and premature birth
2	Toshiyuki Kanno	diagnosis, treatment and management of placental abruption
3	Toshiyuki Kanno	diagnosis, treatment and management of hypertensive disorders of pregnancy (1)
4	Toshiyuki Kanno	diagnosis, treatment and management of hypertensive disorders of pregnancy (2)
5	Toshiyuki Kanno	diagnosis, treatment and management of hypertensive disorders of pregnancy (3)
6	Toshiyuki Kanno	diagnosis, treatment and management of fetal growth restriction
7	Toshiyuki Kanno	diagnosis, treatment and management of amniotic fluid abnormality
8	Toshiyuki Kanno	diagnosis, treatment and management of fetal abnormality
9	Toshiyuki Kanno	complications during pregnancy: diagnosis, treatment and management of abnormal glucose metabolism
10	Toshiyuki Kanno	complications during pregnancy: diagnosis, treatment and management of heart disease
11	Toshiyuki Kanno	complications during pregnancy: diagnosis, treatment and management of kidney disease
12	Toshiyuki Kanno	complications during pregnancy: diagnosis, treatment and management of infection
13	Toshiyuki Kanno	complications during pregnancy: diagnosis, treatment and management of kidney disease
14	Toshiyuki Kanno	physiology and pathology of delivery
15	Toshiyuki Kanno	maternal and child health
16	Toshiyuki Kanno	summary

(Gynecology) Syllabus (4)

Syllabus Title	Experiment and Reserch		
Instructor	Tsutomu Tabata , Jun Kumakiri, Takashi Motohashi		
Credit	10		
Type of Class	Experiment and research		
Theme	Implementation of research papers and preparation of research papers		
Schedule	every Monday 9:30～12:00 and Thursday 13:00-17:00		
Course Objective	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	Number	Instructor	Contents
	1 to 90	Tsutomu Tabata ,Jun Kumakiri , Takashi Motohashi	achievement of the goal 1-2
	91 to 120	Tsutomu Tabata ,Jun Kumakiri , Takashi Motohashi	achievement of the goal 3-4
	121 t o150	Tsutomu Tabata ,Jun Kumakiri , Takashi Motohashi	achievement of the goal 5

Obstetrics

Ⅰ Educational Policy

In the division of obstetrics, there are three professionality: obstetrics, reproductology and endocrinology and neonatology. Our class implements study based on clinical matter. Detail of studies are obstetrical compilation and complications during pregnancy, management of infertility of implantation and management in neonatal medicine. We offer all professionality 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
Gen Ishikawa Lecturer	(1) Study for involvement of inflammasomes in preeclampsia. Inflammasomes are involved in the pathogenesis of noninfectious inflammatory disorders. NLRP3, a component of the inflammasome, has also been suggested to be involved in the pathogenesis of preeclampsia, however the details remain unclear. In this study, we will examine the expression status of the NLRP3 inflammasomes in the serum of pregnant women with preeclampsia and verify NLRP3 expression in a co-culture environment with affected serum in primary cultures of trophoblastic tissue isolated from normal term placentas. Furthermore, we will observe changes in soluble fms-like tyrosine kinase-1 expression using an inflammasome inhibitory experimental settings.
Akira Nakabayashi Professor	(2) 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.
Satsuki Kakiuchi Associate Professor	(3) Analysis of prognostic factors for neonatal morbidity in very preterm neonates With advanced perinatal care and technology, survival among infants born very preterm has improved dramatically over the last several decades. However, adverse medical and neurodevelopmental outcomes for those born very preterm remains high, particularly at the lowest gestational ages. We explore prognostic factors of neonatal morbidity such as intraventricular hemorrhage grade, seizures and hypoxic-ischemic encephalopathy. This research is conducted by using data from Neonatal Research Network of Japan.

Ⅳ Syllabus (＊ ＝ for doctor's license holders)

Title	Instructor	Credit	Theme
Obstetrics	Gen Ishikawa	2	Diagnosis, treatment and management of obstetrical complications
Endocrinology of reproduction	Akira Nakabayashi	1	Diagnosis, treatment and management of infertility
Neonatology	Satsuki Kakiuchi	2	Management in neonatal medicine
Experiment and research	Gen Ishikawa Akira Nakabayashi Satsuki Kakiuchi	10	Implementation of research projects and preparation of research papers
Total credits		15	

(Obstetrics) Syllabus (1)

Syllabus Title	Obstetrics
Instructor	Gen Ishikawa
Credit	2
Type of Class	Lectures
Theme	Diagnosis, treatment and management of obstetrical compilation and complications during pregnancy
Schedule	every Thursday 13:00–17:00
Course Objective	Uderstanding diagnosis, treatment and management of obstetrical compilation 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	Sanfujinka no hisyuu tishiki 2022, Japan Society of Obstetrics and Gynecology (in Japanese) Williams Obstetrics. 26th. Cunningham FG, et al. ed. McGrawHill 2022
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	Gen Ishikawa	Diagnosis, treatment and management of abortion and premature birth
2	Gen Ishikawa	Diagnosis, treatment and management of placental abruption
3	Gen Ishikawa	Diagnosis, treatment and management of hypertensive disorders of pregnancy (1)
4	Gen Ishikawa	Diagnosis, treatment and management of hypertensive disorders of pregnancy (2)
5	Gen Ishikawa	Diagnosis, treatment and management of hypertensive disorders of pregnancy (3)
6	Gen Ishikawa	Diagnosis, treatment and management of fetal growth restriction
7	Gen Ishikawa	Diagnosis, treatment and management of amniotic fluid abnormality
8	Gen Ishikawa	Diagnosis, treatment and management of fetal abnormality
9	Gen Ishikawa	Complications during pregnancy: diagnosis, treatment and management of abnormal glucose metabolism
10	Gen Ishikawa	Complications during pregnancy: diagnosis, treatment and management of heart disease
11	Gen Ishikawa	Complications during pregnancy: diagnosis, treatment and management of kidney disease
12	Gen Ishikawa	Complications during pregnancy: diagnosis, treatment and management of infection
13	Gen Ishikawa	Complications during pregnancy: diagnosis, treatment and management of kidney disease
14	Gen Ishikawa	Physiology and pathology of delivery
15	Gen Ishikawa	Maternal and child health
16	Gen Ishikawa	Summary

(Obstetrics) Syllabus (2)

Syllabus Title	Reproductology and Endocrinology
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	Seisyoku no hisyuu tishiki 2020. kyorin (in Japanese)
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	Artificial insemination of husband and in vitro fertilization
7	Akira Nakabayashi	Freezing germ cell and tissues
8	Akira Nakabayashi	Summary

(Obstetrics) Syllabus (3)

Syllabus Title	Neonatology
Instructor	Satsuki Kakiuchi
Credit	2
Type of Class	Lectures
Theme	Management in neonatal medicine
Schedule	Every Monday 13:00–17:00
Course Objective	Understanding pathophysiology in the neonate Understanding underlying causes and mechanisms and all aspects of the treatment of neonatal diseases and abnormalities Understanding developmental care, organization of care and home care after discharge
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	Sinseiji Nyuumon 5th ed., Igaku shoin, 2018 (in Japanese) Neonatology : A Practical Approach to Neonatal Diseases – Mixed media product 2nd ed., Springer International Publishing Ag, 2018
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	Satsuki Kakiuchi	Advances in neonatology
2	Satsuki Kakiuchi	Neonatal cosequences of maternal conditions
3	Satsuki Kakiuchi	Resustation at birth
4	Satsuki Kakiuchi	Examination of the newborn
5	Satsuki Kakiuchi	Diagnosis, treatment and management of genetic disorders
6	Satsuki Kakiuchi	Diagnosis, treatment and management of infection in the newborn
7	Satsuki Kakiuchi	Respiratory phisiology and respiratory support
8	Satsuki Kakiuchi	Dagnosis, treatment and management of congenital cardiovascular disorders
9	Satsuki Kakiuchi	Dagnosis, treatment and management of gastrointestinal disorders
10	Satsuki Kakiuchi	Dagnosis, treatment and management of jaundice
11	Satsuki Kakiuchi	Dagnosis, treatment and management of hematologocal disorders
12	Satsuki Kakiuchi	Dagnosis, treatment and management of endocrine and metabolic disorders
13	Satsuki Kakiuchi	Dagnosis, treatment and management of central nervous system disorders
14	Satsuki Kakiuchi	Developmental care and the neonatal environment
15	Satsuki Kakiuchi	Parent–infant attachment and support for parents
16	Satsuki Kakiuchi	Summary

(Obstetrics) Syllabus (4)

Syllabus Title	Experiment and Reserch		
Instructor	Gen Ishikawa , Akira Nakabayashi , Satsuki Kakiuchi		
Credit	10		
Type of Class	Experiment and Lecture		
Theme	Implementation of research papers and preparation of research papers		
Schedule	Thursday and Friday 13:00-17:00		
Course Objective	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 4th 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 to 90	Gen Ishikawa, Akira Nakabayashi , Satsuki Kakiuchi	achievement of the goal 1-2
	91 to 120	Gen Ishikawa , Akira Nakabayashi , Satsuki Kakiuchi	achievement of the goal 3-4
	121 t o150	Gen Ishikawa, Akira Nakabayashi , Satsuki Kakiuchi	achievement of the goal 5

Anesthesiology

Ⅰ Educational Policy

In clinical practice, the field of anesthesiology provides intensive care for severely ill patients, pain clinics for painmanagement, and palliative care for cancer patients based on anesthesia management in operating rooms. Ourresearch opportunities are from basic science to clinical, including our large international collaborative study, an RCT"HARMONICA Study (jRCT#1031190038)". All students are welcome to join our effort. Our goal to hopefully change our practice to improve patient care.

Ⅱ Goals

・Acquire a wide range of knowledge on the management of circulation, respiration, and metabolism, which areessential for sustaining life.・Acquire specialized knowledge and management methods in each subspecialty, such as anesthesia for heart andlarge vessel surgery, neurosurgical anesthesia, obstetric anesthesia, pediatric anesthesia, thoracotomy and pulmonarysurgery anesthesia.・Acquire appropriate basic medical knowledge and clinical skills for acute and chronic pain.・Have a wide range of vision and rich communication skills, and can choose the appropriate management method fromamong multiple management options.・Present research results at international conferences and publish in international journals.・Expand your knowledge by participating in other researchers' research on general areas of systemic management.

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

Name and position	Research theme
Yasuko Nagasaka, M.D., Ph.D. Professor in Anesthesia, Tokyo Women's Medical University and Graduate School, School of Medicine Chair and Director of the Department of Anesthesia, Tokyo Women's Medical University Hospital	Nagasaka Laboratory ① Cardiac anesthesia area: Prospective RCT/Prevention of renal dysfunction due to long-term cardiopulmonary bypass (HARMONICA study/jRCT1031190038) ② General anesthesia area: Mechanism of blood pressure reduction caused by anesthetics (Japanese Government's Health, Labor and Welfare Research Institute project) ③ Build a preoperative evaluation system using AI (medical-engineering collaboration) ④ Obstetric anesthesia field: Postpartum depression, respiratory tract of pregnant women (Chest in 2015, published by BJA and other major papers) ⑤ Pediatric anesthesia area: Evaluation of breathing using EIT in children, research on postoperative delirium using EEG in children (2025 JAMA Pediatrics)
Satoshi Kurokawa, M.D., Ph.D.	Kurokawa Laboratory ①Usefulness of transesophageal echocardiography in cardiac surgery for congenital heart disease: Key points of evaluation in various diseases and establishment of pitfalls ② Anesthesia management for non-cardiac surgery in adult patients with congenital heart disease: Optimal intraoperative monitoring and anesthesia management targeting cyanotic heart disease (non-curable cases), pulmonary hypertension, single ventricle circulation, and right ventricular systemic ventricle. consideration ③ Intrapartum anesthesia for pregnant women with adult congenital heart disease: Consideration of intrapartum anesthesia management for adult congenital heart disease classified as moderate-complex. ④ Widespread dilatation of epidural venous plexus in pregnant women with Fontan circulation: Observation of epidural venous plexus during non-pregnancy and late pregnancy using MRI
Tomoki Sasakawa, M.D., Ph.D.	Sasakawa Laboratory ①Development of regional anesthesia method and elucidation of anatomical and pharmacological mechanisms of action We will elucidate the anatomical and procedural theory and practice of regional anesthesia using whole-body peripheral nerve blocks using ultrasound echo and anatomical tissue staining. To elucidate the effects of different regional anesthesia techniques and combinations of analgesic adjuvants on short- and long-term perioperative prognosis. ② Establish a monitored anesthesia management method using regional anesthesia and an early mobilization program for patients with low cardiac function. ③Basic research using cells (understanding the mechanism of action of muscle relaxants)

Ⅳ Syllabus （＊ ＝ for doctor's license holders）

Title	Instructor	Credit	Theme
Anesthesiology (lectures)	Nagasaka, Kurokawa, Sasakawa, Suzuki, Okano,Doi, , Takeishi, Moriwaki	5	The trajectory of anesthesiology: past, present, and future
Anesthesiology (hands-on)	Nagasaka, Kurokawa, Sasakawa, Suzuki, Okano, Doi, Takeishi, Moriwaki	10	Hands-on seminars, pursue research projects and manuscript writing
Total credits		15	

(Anesthesiology) Syllabus (1)

Syllabus Title	Anesthesiology
Instructors	Nagasaka, Kurokawa, Sasakawa, Suzuki, Okano, Doi, Takeishi, Moriwaki
Credit	15
Type of Class	Lectures and hands-on
Theme	Anesthesiology lectures and hands-on
Schedule	On-demand
Course Objective	- Acquire a wide range of knowledge about the management of circulation, respiration, and metabolism, which are essential for maintaining life. - Acquire specialized knowledge and management methods in various areas such as anesthesia for cardiac and large vessel surgery, neurosurgical anesthesia, obstetric anesthesia, pediatric anesthesia, and thoracotomy and pulmonary surgery anesthesia.
Evaluation Methods	Attendance and report
Grading Scale	There are 5 types, S, A, B, and C are passed and D is failed. S (90 points or more - 100 points), A (80 points or more - less than 90 points), B (70 points or more - less than 80 points), C (60 points or more - less than 70 points), D (less than 60 points).
Textbooks/References	・M.A.Gropper, L.I.Eriksson, L.A.Fleisher, et al(Eds), Miller's Anesthesia, 10th ed., in 2 vols (Miller Anesthesiology) Elsevier; 9th edition (2019/10/28) ・Manuel Pardo MD (author), Ronald D. Miller MD MS (author) Basics of Anesthesia Hardcover Elsevier; 8th edition (2022) Graphic Anesthesia: Tim Hooper, James Nickells, Sonja Payne, Annabel Pearson, Ben Walton. ISBN: 9781914961304 (2023/05/22)
Independent Study Outside of Class	In accordance to the syllabus, prepare for the class by reading reference books and research literatures
Room	Education and research building 3rd floor conference room, operating room, pain clinic outpatient clinic
Special Note	For those who are unable to attend the above times, the timetable will be determined through consultation. Questions are accepted at any time. Feedback will be given at the final session.

Course Plan

Number	Instructor	Contents
1	Nagasaka, et al.	①Basics of Anesthesia ②Grand Rounds ③Systematic lecture
2	Nagasaka, et al.	
3	Nagasaka, et al.	
4	Nagasaka, et al.	
5	Nagasaka, et al.	
6	Nagasaka, et al.	
7	Nagasaka, et al.	
8	Nagasaka, et al.	
9	Nagasaka, et al.	
10	Nagasaka, et al.	
11	Nagasaka, et al.	
12	Nagasaka, et al.	
13	Nagasaka, et al.	
14	Nagasaka, et al.	
15	Nagasaka, et al.	

Urology

Ⅰ Educational Policy

Patients with end-stage kidney disease, urologic cancer, dysuria, pediatric urological disease or other benign urologic diseases are treated at the Department of Urology. Approximately 150 patients undergo kidney transplantation annually, with a graft survival rate of >90% at 10 years. More than 350 patients with kidney cancer are treated at our department annually, and approximately 300 patients undergo robotic surgery. We have several treatment modalities for prostate cancer such as robotic surgery, radiological therapy and systemic therapy, which are first discussed among urologists, radiologists and medical oncologist before initiation.
Our main foci of research are transplantation and cancer immunology. More than 30 original articles are published by our team annually. In addition, based on our robust database derived from patients, we have performed several clinical studies in collaboration with multiple institutions.
As mentioned above, our department provides state-of-the-art treatment for patients with urologic diseases and performs many basic and clinical studies.

Ⅱ Goals

1st: To understand the basics of kidney transplantation and urologic oncology, including standard treatment and complications.
2nd: To set research goals and initiate basic research.
3rd: To perform research experiments and summarize it.
4th: To present and publish the results of the research.

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

Name and position	Research theme
Toshihito Hirai (Associate Professor)	1.Basic and clinical research on immune tolerance To achieve long-term graft survival, the mechanism of immune tolerance has been investigated from several perspectives. Practical strategies for immune tolerance have been introduced through animal experiments and in clinical situations.
Hideki Ishida (Professor)	2.Basic and clinical research in kidney transplantation Based on the robust clinical data from our department, the etiology and pathogenesis of rejection, infection, complications, and malignancy after kidney transplantation are being investigated.
Toshio Takagi (Professor and Head) Kazuhiko Yoshida (Associate Professor)	3.Prospective study on functional preservation during partial nephrectomy for kidney neoplasms The number of patients undergoing partial nephrectomy has increased due to the detection of small renal masses through regular check-ups. Factors associated with long-term preservation of kidney functional are being investigated.
Hironori Fukuda (Assistant Professor)	4.Basic and clinical research on the prevention of recurrence in bladder cancer Clinical methods for the prevention of recurrence after surgery of bladder cancer are being investigated.
Kazuhiko Yoshida (Associate Professor)	5.mmuno-oncologic treatment in urologic oncology Immune checkpoint inhibitors have been widely used in the treatment of advanced urologic cancer in recent years. The appropriate treatment strategy is being investigated based on the basic and clinical aspects.
Yugo Sawada (Assistant Professor)	6 Clinical studies on voiding dysfunction and female pelvic organ prolapse

Ⅳ Syllabus （＊ ＝ for doctor's license holders)

Title	Instructor	Credit	Theme
Basic and clinical research in kidney transplantation and urologic oncology	Toshio Takagi and others	1	Basic and clinical research in kidney transplantation and urologic oncology
Standard treatment for urological cancer and post-kidney transplantation	Toshio Takagi and others	2	Standard treatment for urological cancer and post-kidney transplantation management.
Recent advances in kidney transplantation and urological cancer	Toshio Takagi and others	2	Recent advances in kidney transplantation and urological cancer
Experiment/Practice	Toshio Takagi and others	10	Experiment/Practice
計		15	

Urology 1

Syllabus Title	Basic and clinical research in kidney transplantation and urologic oncology
Instructor	Professor and Head:Toshio Takagi, Professor: Hideki Ishida, Associate Professor:Toshihito Hirai, Kazuhiko Yoshida, Assistant professor: Yugo Sawada, Hironori Fukuda
Credit	1
Type of Class	Lecture/Practice
Theme	Basic and clinical research in kidney transplantation and urologic oncology
Schedule	Tuesday: 8:00–9:00, Friday: 7:00–8:00, 8:30–9:30
Course Objective	1. To understand the etiology, pathogenesis, and immunology of tumors in urologic oncology. 2. To understand the immunology in kidney transplantation. 3. To determine the indications for kidney transplantation.
Evaluation Methods	Attendance (80%) and reports (20%)
Grading Scale	S（90～100 points）、A（80～90 points）、B（70～80 points）、C（60～70 points）、D（Under 60 points）: S、A、B、C; Pass、D; fail
Textbooks/References	Original papers and review articles related to research topics
Independent Study Outside of Class	Participation in conferences and reading original papers
Room	Urological laboratory office in the central ward on the 9th floor
Special Note	

Course Plan

Number	Instructor	Contents
1	Toshoio Takagi and others	Indications for kidney transplantation
2	Toshoio Takagi and others	Transplantation immunology
3	Toshoio Takagi and others	Tumor immunity
4	Toshoio Takagi and others	Etiology and pathogenesis of kidney cancer
5	Toshoio Takagi and others	Etiology and pathogenesis of urotherial cancer
6	Toshoio Takagi and others	Etiology and pathogenesis of prostate cancer

Urology 2

Syllabus Title	Standard treatment for urological cancer and post-kidney transplantation
Instructor	Professor and Head:Toshio Takagi, Professor: Hideki Ishida, Associate Professor:Toshihito Hirai, Kazuhiko Yoshida, Assistant professor:Yugo Sawada, Hironori Fukuda
Credit	2
Type of Class	Lecture/Practice
Theme	Standard treatment for urological cancer and post-kidney transplantation
Schedule	Tuesday: 8:00-9:00, Friday: 7:00-8:00, 8:30-9:30
Course Objective	1. To learn the standard treatments for urologic cancer. 2. To learn the immunosuppressant medications used after kidney transplantation. 3. To learn how to manage complications after kidney transplantation.
Evaluation Methods	Attendance (80%) and reports (20%)
Grading Scale	S(90～100 points)、A(80～90 points)、B(70～80 points)、C(60～70 points)、D(Under 60 points): S、A、B、C; Pass、D; fail
Textbooks/References	Original papers and review articles related to research topics
Independent Study Outside of Class	Reading references and original papers
Room	Urological laboratory office in the central ward on the 9th floor
Special Note	

Course Plan

Number	Instructor	Contents
1	Toshoio Takagi and others	Immunosuppressant medications after kidney transplantation
2	Toshoio Takagi and others	Treatment of complications after kidney transplantation
3	Toshoio Takagi and others	Standard treatment for kidney cancer
4	Toshoio Takagi and others	Standard treatment for urotherial carcinoma
5	Toshoio Takagi and others	Standard treatment for prostate cancer
6	Toshoio Takagi and others	Discussion 1
7	Toshoio Takagi and others	Discussion 2
8	Toshoio Takagi and others	Discussion 3
9	Toshoio Takagi and others	Discussion 4
10	Toshoio Takagi and others	Review

Urology 3

Syllabus Title	Recent advances in kidney transplantation and urological cancer
Instructor	Professor and Head:Toshio Takagi, Professor: Hideki Ishida, Associate Professor:Toshihito Hirai, Kazuhiko Yoshida, Assistant professor: Yugo Sawada, Hironori Fukuda
Credit	2
Type of Class	Lecture/Practice
Theme	Recent advances in kidney transplantation and urological cancer
Schedule	Tuesday: 8:00–9:00, Friday: 7:00–8:00, 8:30–9:30
Course Objective	1. To learn about the advancement in treatment options for urologic oncology. 2. To learn about the advancement in treatment options for kidney transplantation.
Evaluation Methods	Attendance (80%) and reports (20%)
Grading Scale	S（90～100 points）、A（80～90 points）、B（70～80 points）、C（60～70 points）、D（Under 60 points）: S、A、B、C; Pass、D; fail
Textbooks/References	Original papers and review articles related to research topics
Independent Study Outside of Class	Reading references and original papers
Room	Urological laboratory office in the central ward on the 9th floor
Special Note	

Course Plan

Number	Instructor	Contents
1	Toshoio Takagi and others	Complications during kidney transplantation
2	Toshoio Takagi and others	Immunological tolerance in kidney transplantation
3	Toshoio Takagi and others	Advances in immunosuppressant agents
4	Toshoio Takagi and others	Advances in the pathogenesis of kidney cancer
5	Toshoio Takagi and others	Advances in the pathogenesis of urotherial cancer
6	Toshoio Takagi and others	Advances in the pathogenesis of prostate cancer
7	Toshoio Takagi and others	Discussion 1
8	Toshoio Takagi and others	Discussion 2
9	Toshoio Takagi and others	Discussion 3
10	Toshoio Takagi and others	Review

Urology 4

Syllabus Title	Exmeriment/Practice	
Instructor	Professor and Head:Toshio Takagi, Professor: Hideki Ishida, Associate Professor:Toshihito Hirai, Kazuhiko Yoshida, Assistant professor: Yugo Sawada, Hironori Fukuda	
Credit	10	
Type of Class	Exmeriment/Practice	
Theme	Conducting research and writing of papers	
Schedule	Tuesday: 8:00-9:00, Friday: 7:00-8:00, 8:30-9:30	
Course Objective	1. To prepare research hypotheses and plans 2. To conduct research 3. To discuss the results of the research 4. To review the research 5. To present the research results at conferences 6. To submit papers for publication	
Evaluation Methods	Report (60%), Interview (10%), Discussion (10%), Writing paper (20%)	
Grading Scale	S(90～100 points)、A(80～90 points)、B(70～80 points)、C(60～70 points)、D(Under 60 points): S、A、B、C; Pass、D; fail	
Textbooks/References	Original papers and review articles related to the research topics	
Independent Study Outside of Class	To attend conferences and present papers	
Room	Reports (80%), interview (10%), discussion (10%), and writing of papers (20%)	
Special Note		
Course Plan	Number	授業内容
	1	Achievement of objectives 1-2
	～	
	90	
	91	Achievement of objectives 3-5
	～	
	120	
	121	Achievement of objectives 6
	～	
	150	

Oral and Maxillofacial Surgery

Ⅰ Education policy

Oral and Maxillofacial Suegery is 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
Professor Okamoto Associate professor Kaibucui	(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.
Professor Okamoto Associate professor Kaibucui	(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 eary 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.
Professor Okamoto	(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.
Professor Okamoto	(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.

Ⅳ Syllabus （＊ ＝ for doctor's license holders）

Title	Instructor	Credit	Theme
Oral infections	Associate professor Sasaki	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 Associate professor Sasaki	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.
Total credits		15	

Oral and Maxillofacial Surgery

（＊ ＝ For doctor license holders）

Syllabus Title	Oral Infections
Instructor	Associate professor Sasaki
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	Associate professor Sasaki	Oral bacteriology（1）
	2	Associate professor Sasaki	Oral bacteriology（2）
	3	Associate professor Sasaki	Oral bacteriology（3）
	4	Associate professor Sasaki	Oral bacteriology（4）
	5	Associate professor Sasaki	Oral bacteriology（5）
	6	Associate professor Sasaki	Periodontology（1）
	7	Associate professor Sasaki	Periodontology（2）
	8	Associate professor Sasaki	Periodontology（3）
	9	Associate professor Sasaki	Periodontology（4）
	10	Associate professor Sasaki	Periodontology（5）
	11	Associate professor Sasaki	Dental infection（1）
	12	Associate professor Sasaki	Dental infection（2）
	13	Associate professor Sasaki	Dental infection（3）
	14	Associate professor Sasaki	Focal infection（1）
	15	Associate professor Sasaki	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 methods.
Schedule	Friday　8:00～9:00 ／ 13:00～14:00
Course Objective	・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, Associate professor Sasaki
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	・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, Associate professor Sasaki	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	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	

Division of Maxillofacial Surgery and Stomatology, Department of Oral and Maxillofacial Surgery,

Ⅰ Educational Policy

Oral and maxillofacial surgery is a discipline that plays a critical role in the fundamental life-sustaining function of mastication ("eating"). In addition, because pathological conditions in this field are often visually apparent, treatment outcomes are expected to achieve not only functional recovery but also a high level of aesthetic improvement.
Our research activities span a wide spectrum from basic research to clinical research and investigator-initiated clinical trials. With a primary focus on the realization of regenerative medicine, we conduct three-dimensional bone and cartilage regeneration and periodontal tissue regeneration research, mainly utilizing dental pulp stem cells, central nervous system-derived stem cells, and adipose-derived stem cells.
In addition to multicenter collaborative research with leading domestic institutions in regenerative medicine, we actively pursue basic and clinical research collaborations with international partners, including Goethe University Frankfurt, Cornell University, the University of Connecticut, and Huaqiao University. Through these efforts, we aim to cultivate young researchers with a global perspective who are capable of contributing and leading research activities at the international level.

Ⅱ Goals

・Understand diagnostic and therapeutic approaches for oral and maxillofacial diseases, and critically evaluate and propose improved diagnostic and treatment strategies.
・Formulate basic and clinical research topics, design appropriate research plans, and conduct research in a systematic and ethical manner.
・Appropriately analyze research data using statistical methods and effectively present the results in oral and written formats.
・Prepare and publish research findings as original articles in reputable international peer-reviewed English-language journals.

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

Name and position	Research theme
Yoko Kawase-Koga (Professor and Head) Yasuyuki Fujii (Assistant Professor)	**(1) Development of Three-Dimensional Bone and Cartilage Regenerative Therapy Using Human Dental Pulp Stem Cells** Irreversible bone defects caused by congenital disorders such as cleft lip and palate, as well as acquired conditions including trauma and tumors, remain a pressing clinical challenge due to their associated functional and aesthetic impairments. Dental pulp stem cells have been widely recognized as a promising cell source for regenerative medicine because of their high proliferative capacity and multilineage differentiation potential. Through international collaborative research with leading domestic institutions and overseas partners, including Goethe University Frankfurt, this research aims to establish a fully autologous three-dimensional bone and cartilage regenerative therapy using human dental pulp stem cells throughout the entire treatment process, and to advance its translation toward clinical application.
Yoko Kawase-Koga (Professor and Head) Yasuyuki Fujii (Assistant Professor) Chika Togashi (Assistant Professor)	**(2) Investigation of Soft and Hard Tissue Healing in Oral and Maxillofacial Diseases** The central theme in oral and maxillofacial surgery is the reconstruction of occlusion and function. In conditions such as jaw deformities and maxillofacial trauma, aesthetic considerations are also critical, necessitating comprehensive evaluation of both hard and soft tissues. In this field, three-dimensional assessment of bone healing processes before and after surgery is performed using imaging modalities such as computed tomography. In addition, soft tissue changes are evaluated using simulation software to support the development of surgical techniques that achieve high levels of patient satisfaction. Furthermore, we actively engage in the development of novel surgical procedures, and continuously refine these techniques through feedback and outcome-based evaluation.

Ⅳ Syllabus (＊ ＝ for doctor's license holders)

Title	Instructor	Credit	Theme
Infections in the Oral and Maxillofacial Region	Yoko Kawase-Koga (Professor and Head) Yasuyuki Fujii (Assistant Professor) Chika Togashi (Assistant Professor)	1	Study and Treatment of Etiological Diseases in the Oral and Maxillofacial Region
Oral Tuomors	Yoko Kawase-Koga (Professor and Head) Yasuyuki Fujii (Assistant Professor) Chika Togashi (Assistant Professor)	2	Understanding the Pathophysiology and Pathology of Benign and Malignant Oral Tumors and Evaluation of Diagnostic Methods
Operation for Oral and Maxillofacial Surgery	Yoko Kawase-Koga (Professor and Head) Yasuyuki Fujii (Assistant Professor) Chika Togashi (Assistant Professor)	2	Lectures and Discussions on Function-Oriented Oral Surgery and Maxillofacial Reconstructive Surgery
Experiments and Practical Training (Research Project)	Yoko Kawase-Koga (Professor and Head) Yasuyuki Fujii (Assistant Professor) Chika Togashi (Assistant Professor)	10	Conduct of Research Projects, Research Presentations, and Manuscript Preparation
Total credits		15	

Division of Maxillofacial Surgery and Stomatology,
Department of Oral and Maxillofacial Surgery,

Syllabus Title	Infections in the oral and maxillofacial region
Instructor	Yoko Kawase-Koga (Professor and Head), Yasuyuki Fujii (Assistant Professor), Chika Togashi (Assistant Professor)
Credit	1
Type of Class	Lectures and Practical Exercises
Theme	Study and Treatment of Etiological Diseases in the Oral and Maxillofacial Region
Schedule	Wednesday 17 : 00 ～ 18 : 00
Course Objective	Learn the characteristics of bacteria in the oral and maxillofacial region, and acquire knowledge of the diagnosis, treatment, and prevention of biofilm-related infections and odontogenic focal infections.
Evaluation Methods	Attendance: 50% Reports: 50%
Grading Scale	S: 90-100 points, A: 80-89 points, B: 70-79 points, C: 60-69 points, D: Below 60 points 12 *Grades S, A, B, and C are considered passing grades, while D is considered a failing grade.
Textbooks/References	1. Dental Biofilm. Ishiyaku Publishers. 2. The Spiral of Death Induced by Oral Pathogens. Ishiyaku Publishers.
Independent Study Outside of Class	Conduct a literature search for English-language research articles relevant to the assigned theme and prepare a written report.
Room	Conference room
Special Note	Students who are unable to attend the class at the scheduled time will arrange an alternative timetable through consultation with the instructor. Questions and inquiries are accepted at any time. Feedback will be provided during the final session.

Course Plan

Number	Instructor	Contents
1	Prof. Koga	Oral Bacteriology (1)
2	Prof. Koga	Oral Bacteriology (2)
3	Dr. Fujii	Oral Bacteriology (3)
4	Dr. Fujii	Oral Bacteriology (4)
5	Dr. Fujii	Oral Bacteriology (5)
6	Dr. Togashi	Periodontology (1)
7	Dr. Togashi	Periodontology (2)
8	Dr. Togashi	Periodontology (3)
9	Dr. Togashi	Periodontology (4)
10	Dr. Togashi	Periodontology (5)
11	Prof. Koga	Odontogenic Infections (1)
12	Dr. Fujii	Odontogenic Infections (2)
13	Dr. Fujii	Odontogenic Infections (3)
14	Dr. Togashi	Oral Infection (1)
15	Dr. Togashi	Oral Infection (2)

Division of Maxillofacial Surgery and Stomatology,
Department of Oral and Maxillofacial Surgery,

Syllabus Title	Oral Oncology
Instructor	Yoko Kawase-Koga (Professor and Head), Yasuyuki Fujii (Assistant Professor), Chika Togashi (Assistant Professor)
Credit	2
Type of Class	Lectures and Practical Exercises
Theme	Understanding the Pathophysiology and Pathology of Benign and Malignant Oral Tumors and Evaluation of Diagnostic Methods
Schedule	Tuesday 8:00～9:00 ／ 13:00～14:00
Course Objective	1. Be able to perform pathological diagnosis of benign and malignant tumors. 2. Understand the diagnosis and treatment of oral cancer.
Evaluation Methods	Attendance: 50% Reports: 50%
Grading Scale	S: 90-100 points, A: 80-89 points, B: 70-79 points, C: 60-69 points, D: Below 60 points 12 *Grades S, A, B, and C are considered passing grades, while D is considered a failing grade.
Textbooks/References	1. WHO Classification of Head and Neck Tumours. IARC, Lyon. 2. New Atlas of Oral and Maxillofacial Pathological Diagnosis. Ishiyaku Publishers. (Japanese)
Independent Study Outside of Class	Conduct a literature search for English-language research articles relevant to the assigned theme and prepare a written report.
Room	Conference room
Special Note	Students who are unable to attend the class at the scheduled time will arrange an alternative timetable through consultation with the instructor. Questions and inquiries are accepted at any time. Feedback will be provided during the final session.

Course Plan

Number	Instructor	Contents
1	Prof. Koga	Introduction to Oral Tumors
2	Dr. Fujii	Epidemiology of Oral Tumors
3	Dr. Togashi	Odontogenic Tumors (1)
4	Dr. Togashi	Odontogenic Tumors (2)
5	Dr. Togashi	Odontogenic Tumors (3)
6	Dr. Fujii	Diagnosis of Oral Cancer (1)
7	Dr. Fujii	Diagnosis of Oral Cancer (2)
8	Dr. Fujii	Pathology of Oral Cancer (1)
9	Dr. Fujii	Pathology of Oral Cancer (2)
10	Dr. Fujii	Treatment of Oral Cancer (1)
11	Dr. Fujii	Treatment of Oral Cancer (2)
12	Dr. Fujii	Cancer Statistics(1)
13	Dr. Fujii	Cancer Statistics(2)
14	Prof. Koga	Basic Research(1)
15	Dr. Fujii	Basic Research (2)

Division of Maxillofacial Surgery and Stomatology,
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Syllabus Title	Operation for Oral and Maxillofacial Surgery
Instructor	Yoko Kawase-Koga (Professor and Head), Yasuyuki Fujii (Assistant Professor), Chika Togashi (Assistant Professor)
Credit	2
Type of Class	Lectures and Practical Exercises
Theme	Lectures and Discussions on Function-Oriented Oral Surgery and Maxillofacial Reconstructive Surgery
Schedule	Thursday 8 : 00 ～ 16 : 00
Course Objective	1. Be able to plan oral and maxillofacial surgical procedures with an emphasis on functional outcomes. 2. Be able to perform oral and maxillofacial surgical procedures.
Evaluation Methods	Conference participation: 30% Technical skills and professional attitude: 70%
Grading Scale	S: 90-100 points, A: 80-89 points, B: 70-79 points, C: 60-69 points, D: Below 60 points 12 *Grades S, A, B, and C are considered passing grades, while D is considered a failing grade.
Textbooks/References	Oral and Maxillofacial Surgery, Vols. 1-4. Quintessence Publishing. (Japanese) Color Atlas of Head and Neck Surgery. Nagai Shoten. (Japanese)
Independent Study Outside of Class	Prepare surgical records with reference to standard surgical textbooks and anatomical atlases.
Room	Operation room, Conference room
Special Note	Students who are unable to attend the class at the scheduled time will arrange an alternative timetable through consultation with the instructor. Questions and inquiries are accepted at any time. Feedback will be provided during the final session.

Course Plan

Number	Instructor	Contents
1	Prof. Koga, Dr. Fujii, Dr. Togashi	Dental and Alveolar Surgery
2	Prof. Koga, Dr. Fujii, Dr. Togashi	Oral Implant Surgery
3	Prof. Koga, Dr. Fujii, Dr. Togashi	Anti-inflammatory Surgery of the Oral, Maxillofacial, and Cervical Regions
4	Prof. Koga, Dr. Fujii, Dr. Togashi	Surgery for Jaw Tumors
5	Prof. Koga, Dr. Fujii, Dr. Togashi	Salivary Gland Surgery
6	Prof. Koga, Dr. Fujii, Dr. Togashi	Oral and Maxillofacial Surgery (1)
7	Prof. Koga, Dr. Fujii, Dr. Togashi	Oral and Maxillofacial Surgery (2)
8	Prof. Koga, Dr. Fujii, Dr. Togashi	Orthognathic Surgery (1)
9	Prof. Koga, Dr. Fujii, Dr. Togashi	Orthognathic Surgery (2)
10	Prof. Koga, Dr. Fujii, Dr. Togashi	Orthognathic Surgery (3)
11	Prof. Koga, Dr. Fujii, Dr. Togashi	Cleft Lip and Palate Surgery (1)
12	Prof. Koga, Dr. Fujii, Dr. Togashi	Cleft Lip and Palate Surgery (2)
13	Prof. Koga, Dr. Fujii, Dr. Togashi	Cleft Lip and Palate Surgery (3)
14	Prof. Koga, Dr. Fujii, Dr. Togashi	Head and Neck Cancer Surgery(1)
15	Prof. Koga, Dr. Fujii, Dr. Togashi	Head and Neck Cancer Surgery(2)

Division of Maxillofacial Surgery and Stomatology,
Department of Oral and Maxillofacial Surgery,

Syllabus Title	Experiments and Practical Training (Research Project)		
Instructor	Yoko Kawase-Koga (Professor and Head), Yasuyuki Fujii (Assistant Professor), Chika Togashi (Assistant Professor)		
Credit	10		
Type of Class	Experiments and Practical Training (Research Project)		
Theme	Conduct of Research Projects, Research Presentations, and Manuscript Preparation		
Schedule	Friday 14 : 00 ～ 15 : 00		
Course Objective	Upon completion of this course, students will be able to: 1. Acquire the experimental techniques required to carry out research in accordance with an established research plan, and conduct research with a clear understanding of medical research ethics. 2. Accurately record, manage, and preserve experimental procedures and research data. 3.Appropriately summarize experimental results in figures and tables. 4.Present research findings at external academic conferences or scientific meetings and engage in constructive scientific discussion. 5.Prepare research findings as an English-language manuscript and submit it to a peer-reviewed journal; appropriately respond to reviewers' comments and achieve publication of the manuscript.		
Evaluation Methods	Attendance: 50% Reports: 50%		
Grading Scale	S: 90-100 points, A: 80-89 points, B: 70-79 points, C: 60-69 points, D: Below 60 points 12 *Grades S, A, B, and C are considered passing grades, while D is considered a failing grade.		
Textbooks/References	1. Statistics for Conference and Journal Publications. Shinko Trading Medical Publishing. (Japanese) 2. Practical Dictionary of Medical English Usage for Writing Medical Research Papers. Medical View.		
Independent Study Outside of Class	Students are expected to undertake preparatory study using course guidelines and recommended reference materials.		
Room	Conference room		
Special Note	Students who are unable to attend the class at the scheduled time will arrange an alternative timetable through consultation with the instructor. Questions and inquiries are accepted at any time. Feedback will be provided during the final session.		
Course Plan	Number	Instructor	Contents
	1-90	Prof. Koga, Dr. Fujii, Dr. Togashi	Literature Search and Summarization of Research Findings
	91-120	Prof. Koga, Dr. Fujii, Dr. Togashi	Writing Medical Research Papers in English and Figure Preparation
	121-150	Prof. Koga, Dr. Fujii, Dr. Togashi	Preparation of Presentation Slides for Academic Conferences

Critical Care and Emergency Medicine

Ⅰ Educational Policy

In the field of emergency medicine, our goal is to better understand the pathophysiology and bioinvasiveness of emergency intensive care in order to improve the survival rate and social reintegration rate for emergency and critically ill patients.The main research themes are the pathophysiology and treatment of multiple organ failure, the pathophysiology and treatment of sepsis, the prognosis and treatment of post-cardiopulmonary resuscitation syndrome, the role of disaster base hospitals for the large number of casualties during disasters, and the end-stage of emergency intensive care. These studies require joint research with the Department of Basic Medicine, multi-center joint research, and international joint research with foreign countries. We strive to improve the quality of emergency intensive care and become an international opinion leader by returning the results to clinical practice and further using those results.

Ⅱ Goals

・Acquire appropriate techniques and clinical skills for emergency medicine, intensive care medicine, and disaster medicine.
・Understand the basics of emergency medicine, intensive care medicine, and disaster medicine, and acquire knowledge of medical systems, pathophysiology, and standard treatments.
・Have a broad perspective and good communication skills, place importance on pathophysiology, and be able to select the appropriate treatment method from among multiple treatment options.
・Write and submit a paper on study content.
・Develop the ability to have a wide range of interests in and discuss research in emergency medicine, intensive care medicine, and disaster medicine.

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

Name and position	Research theme
Mori Shusuke Professor and Head of divition	(1) Mechanisms and clinical outcomes regarding disseminated intravascular coagulopathy induced by sepsis. (2) Database research on trauma and pre-hospital care, and collaborative studies with other facilities (3) Effects of organic brain diseases on cardiac electrical activity in pursuit of the causes of sudden death in epilepsy.
Takeda Munekazu Clinical Professor	(4) Research on post-cardiac arrest syndrome, and the prognosis and treatment of shock Building strategies for improving social reintegration with respect to indications for brain resuscitation and assisted extracorporeal circulation in post-cardiac arrest syndrome. (5) Research on the roles of medical institutions in times of disaster Creation of a continuous training model for how to best implement disaster training related to the region, based on scientific analysis of disaster medicine training. In addition, we aim to construct a BCP for university hospitals that serve as disaster base hospitals.
Namiki Mizuho Assistant Professor Kubota Suguru Assistant Professor	(6) End-of-life care in emergency medicine and critical care medicine We aim to investigate end-of-life care in emergency medical care and critical care medicine from the perspectives of patient family care, patient and family rights, treatment approach selection, society, ethics, and law.

Ⅳ Syllabus (＊ ＝ for doctor's license holders)

Title	Instructor	Credit	Theme
Emergency medicine	Mori S, Takeda M, Namiki M, Kubota S	2	Basics and clinical practices in emergency medicine
Critical Care medicine	Mori S, Takeda M, Namiki M, Kubota S	2	Basics and clinical practices in critical care medicine
Disaster medicine	Mori S, Takeda M, Namiki M, Kubota S	1	Medical services and systems during disasters, and the roles of disaster base hospitals and DMATs
Laboratory or clinical practice	Mori S, Takeda M, Namiki M, Kubota S	10	Conduct a project study and write a research paper
Total credits		15	

Critical Care and Emergency Medicine

Syllabus Title	Emergency Medicine		
Instructor(s)	Professor and Head of divition Mori S, Clinical Professor Takeda M, Assistant Professor Namiki M, Assistant Professor Kubota S		
Credit	2		
Format of Class	Lectures and exercises		
Theme	Basics and clinical practices related to emergency medicine		
Schedule	Monday 09:00 to 10:10, 16:00 to 17:00		
Course Objective(s)	・Learn about the emergency medical care system in Japan. ・Acquire skills in initial care, differential diagnosis, and resuscitation methods in emergency medical care. ・Acquire skills in initial care for trauma. ・Learn the latest issues related to emergency medicine.		
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	Standard Emergency Medicine, Ed. 5, Japanese Association for Acute Medicine 2013; Emergency Treatment Guidelines, Ver. 5, Japanese Association for Acute Medicine 2018; JRC Resuscitation Guidelines 2020, Japan Resuscitation Council 2021; ICLS Course Guidebook, Ver. 5, Japanese Association for Acute Medicine ICLS Course 2022; Initial Trauma Treatment Guidelines JATEC Ver. 6, Japanese Association for the Surgery of Trauma 2021		
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	Contents
	1	Mori Shusuke, Professor and Head	Emergency medical care system, medical control
	2	Mori Shusuke, Professor and Head	Initial care and first aid in emergencies
	3	Mori Shusuke, Professor and Head	Differential diagnosis in emergency medical care
	4	Mori Shusuke, Professor and Head	BLS and ICLS (1)
	5	Mori Shusuke, Professor and Head	Initial trauma care (1)
	6	Mori Shusuke, Professor and Head	Poisoning (1)
	7	Mori Shusuke, Professor and Head	Poisoning (2)
	8	Mori Shusuke, Professor and Head	Special emergencies (heatstroke, accidental hypothermia, environmental factors)
	9	Mori Shusuke, Professor and Head	Initial trauma care (2)
	10	Mori Shusuke, Professor and Head	BLS and ICLS (2)
	11	Mori Shusuke, Professor and Head	Special characteristics of emergency diagnosis and emergency medical care, patient family support, legal response

Critical Care and Emergency Medicine

Syllabus Title	Critical Care Medicine
Instructor(s)	Professor and Head of divition Mori S, Clinical Professor Takeda M, Assistant Professor Namiki M, Assistant Professor Kubota S
Credit	2
Format of Class	Lectures and exercises
Theme	Basics and clinical practices related to critical care medicine
Schedule	Monday 13:00 to 14:10, Wednesday 09:30 to 10:30
Course Objective(s)	Understand standard treatments in the critical care of critically ill patients and elucidate pathophysiology and novel treatments. Deepen understanding of end-of-life care for critically ill patients.
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	Intensive Care Specialist Text (electronic ver.), Ed. 2; ARDS Clinical Practice Guidelines 2021; The Japanese Clinical Practice Guidelines for Management of Sepsis and Septic Shock 2020 (J-SSCG2020), Digest version; Surviving Sepsis Campaign Guideline 2021; Japanese Guidelines for Nutrition Support Therapy in the Adult and Pediatric Critically Ill Patients; Clinical Practice Guideline for Acute Kidney Injury (AKI), Digest Ver.
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	Contents
1	Mori Shusuke, Professor and Head	Introduction to critical care medicine
2	Mori Shusuke, Professor and Head	Monitor management in the intensive care unit
3	Mori Shusuke, Professor and Head	Ventilator management
4	Mori Shusuke, Professor and Head	Acute blood purification methods
5	Mori Shusuke, Professor and Head	Sepsis (1)
6	Mori Shusuke, Professor and Head	Sepsis (2)
7	Mori Shusuke, Professor and Head	Nutritional management of critically ill patients
8	Mori Shusuke, Professor and Head	Disseminated intravascular coagulation
9	Mori Shusuke, Professor and Head	Acute kidney injury
10	Mori Shusuke, Professor and Head	ARDS
11	Takeda Munekazu, Clinical Professor	Critical care management of polytrauma patients
12	Mori Shusuke, Professor and Head	Assisted extracorporeal circulation management
13	Namiki Mizuho, Assistant Professor	Poisoning and acute blood purification methods
14	Mori Shusuke, Professor and Head	Targeted temperature management
15	Mori Shusuke, Professor and Head	Neuroprotective therapy
16	Mori Shusuke, Professor and Head	Multiple organ failure (1)
17	Mori Shusuke, Professor and Head	Multiple organ failure (2)
18	Mori Shusuke, Professor and Head	Brain death and organ transplantation
19	Namiki Mizuho, Assistant Professor	Hyperbaric oxygen therapy
20	Mori Shusuke, Professor and Head	End-of-life care in critical care

Critical Care and Emergency Medicine

Syllabus Title	Disaster medicine		
Instructor(s)	Professor and Head of divition Mori S, Clinical Professor Takeda M, Assistant Professor Namiki M, Assistant Professor Kubota S		
Credit	1		
Format of Class	Lectures and exercises		
Theme	Medical care and systems during disasters, and the roles of disaster base hospitals and DMATs		
Schedule	Saturday11:00 to 12:10		
Course Objective(s)	・Learn the special characteristics of disaster medicine. Learn the roles of disaster base hospitals and DMATs. ・Acquire knowledge and response skills in disaster medicine. ・Learn the disaster medicine systems in different regions, Tokyo, and nationally in Japan. ・Learn about NBC (CBRN) disasters. ・Attempt to formulate a BCP for times of disaster.		
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	DMAT Standard Text, Revised Ed. 2, Japanese Association for Disaster Medicine 2015; Hospital BCP, Shinkoh Igaku Shuppan		
Independent Study Outside of Class	Reading the aforementioned references and related literature.		
Room	Conference room, skills labo 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	Contents
	1	Mori Shusuke, Professor and Head	Special characteristics of disaster medicine
	2	Kubota Suguru, Assistant Professor	Disaster medicine
	3	Namiki Mizuho, Assistant Professor	Triage
	4	Takeda Munekazu, Clinical Professor	Support during disasters (1)
	5	Takeda Munekazu, Clinical Professor	Disaster medicine system, DMAT, disaster base hospitals
	6	Mori Shusuke, Professor and Head	NBC (CBRNE) disasters
	7	Takeda Munekazu, Clinical Professor	BCP formulation
	8	Takeda Munekazu, Clinical Professor Kubota Suguru, Assistant Professor	Support during disasters (2)

Critical Care and Emergency Medicine

Syllabus Title	Experiments and Practical Study (Project Study)	
Instructor(s)	Professor and Head of divitio Mori S, Clinical Professor Takeda M, Assistant Professor Namiki M, Assistant Professor Kubota S	
Credit	10	
Format of Class	Experiments and practical study (project study)	
Theme	Conducting a project study and writing a research paper	
Schedule	Monday, Tuesday, Wednesday, and Friday 09:00 to 12:00, 13:00 to 17:00. Thursday 15:00 to 17:00	
Course Objective(s)	1. Learn the experimental techniques needed for the prepared study plan, and be able to implement them. 2. Develop the ability to accurately record and store experimental content and data. 3. Develop the ability to appropriately summarize experimental results in figures and tables. 4. Develop the ability to statistically analyze experimental results and data. 5. Develop the ability to appropriately present study content at conferences and symposia in Japan and abroad, and discuss the results. 6. Write and submit a paper on study content. Respond appropriately to reviewers' comments and achieve publication of the paper. 7. Develop the ability to teach the knowledge and skills related to one's own study to younger researchers.	
Evaluation Methods	Experimental notes and research report (50%), creation of figures and tables (10%), statistical analysis (10%), research presentation and discussion (10%), writing of research paper (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	Acquire knowledge related to project study and comprehend past research through published papers and other publications. Actively participate, make presentations, gather information, and discuss at relevant conferences and other gatherings.	
Room	Conference room, skills labo etc.	
Special Note	For people who cannot participate at the above times, a time schedule will be determined after consultation. Questions are accepted at any time. Feedback is given as needed.	
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 5,6 and 7
	…	
	Class 150	

ADVANCED TECHNO-SURGERY

Ⅰ Educational Policy

Our laboratory conducts research and development aimed at achieving higher quality medical care, based on cutting-edge engineering technologies such as AI and robotics. Our core research theme, image-guided surgery in the intelligent operating room, began with the introduction of intraoperative MRI in 2000. Following the development of a new MRI operating room, the Hyper Smart Cyber Operating Theater (Hyper SCOT), we are now at the pioneering stage of information-guided surgery based on an information platform using AI surgery. In addition to the intraoperative MRI and update navigation systems, we are promoting research into the integration and utilization of various intraoperative information, including optical coherence tomography (OCT), intraoperative language function tests (IEMAS), neurophysiological information such as MEPs and SEPs, and intraoperative diagnosis of malignancy using flow cytometry. Furthermore, we aim to improve surgical quality through a multidisciplinary approach in collaboration with equipment development, such as the development and integration of various modalities that provide comprehensive support for preoperative, intraoperative, and postoperative care, including photodynamic diagnosis, and the development of tumor extraction forceps. Furthermore, in order to spread cutting-edge engineering technologies to many medical departments, we are working with various clinical departments to conduct research and development on surgical support robots and devices, the development of remote surgical support technologies, and predictive research using clinical information analysis and AI. To support these efforts, we are building an R&D infrastructure through medical-engineering collaboration (integration) and industry-government-academia collaboration.
We are also focusing on the social implementation of Mobile-SCOT, a mobile version of SCOT, and research into home medical support using AI robots, and are conducting research that will present the future of medical care. In addition to technological development, we are also focusing on medical device regulatory science research to implement and popularize medical devices while taking into account societal issues, with the aim of providing patients with new treatment technologies that combine clinical needs and technological seeds.

Ⅱ Goals

1. To be able to focus on utilizing the wide range of knowledge and advanced skills backed by the research results, as well as the ability to apply them, while conducting numerous basic surveys and accumulating accurate research results.
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
Ken Masamune (Professor) Manabu Tamura (Associate Professor) Shuji Kitahara (Associate Professor) Kitaro Yoshimitsu (Assistant Professor) Kaori Kusuda (Part-time Assistant Professor)	(1) Surgical strategy systems in surgery 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.
Ken Masamune (Professor) Manabu Tamura (Associate Professor) Shuji Kitahara (Associate Professor) Kitaro Yoshimitsu (Assistant Professor)	(2) Digital twin surgery simulator for surgical risk management For efficient and optimal crisis management in surgery, a recorder that records and stores intraoperative anesthesia management information, patient physiological information (data from wearable equipment), and surgical information (surgical field image data) as digital information over time is necessary. In addition, a digital twin operating room simulator system is essential for analysis and evaluation of unforeseen problems and for prediction of events using AI and other methods. In this study, we will develop a monitoring system and an AI prediction system, and establish a technology to guide the surgical process safely. In addition, research progress reports will be presented in the form of academic conference presentations (twice a year) for the guidance of research presentations.

Ken Masamune (Professor) Manabu Tamura (Associate Professor) Shuji Kitahara (Associate Professor) Kitaro Yoshimitsu (Assistant Professor)	(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. In addition, for guidance on research presentations, research progress reports will be presented in the form of conference presentations (twice a year).
Masamune Ken (Professor) Shuji Kitahara (Associate Professor) Kitaro Yoshimitsu (Assistant Professor) Yuki Horise (Part-time Assistant Professor)	(4) Practical development of remote surgery support and mobile SCOT As an embodiment of a new style of medical care, research and development of a mobile operating room "Mobile SCOT", in which the smart treatment room itself is installed in the vehicle. Research and development will be carried out with the aim of setting and implementing a wide range of themes related to the engineering technology and diagnostic imaging technology necessary to realize telemedicine support during normal times and emergencies. In collaboration with the government and local governments, we will deepen the study from a sociological perspective, and scientifically demonstrate that this research will contribute to correcting disparities between medical areas. In addition, for guidance on research presentations, research progress reports will be presented in the form of conference presentations (twice a year).
Ken Masamune (Professor) Manabu Tamura (Associate Professor) Shuji Kitahara (Associate Professor) Kitaro Yoshimitsu (Assistant Professor)	(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. In addition, for guidance on research presentations, research progress reports will be presented in the form of conference presentations (twice a year).

Ⅳ Syllabus (＊ ＝ for doctor's license holders)

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

(Advanced Techno-Surgery) Syllabus (1)

Syllabus Title	Advanced techno-surgery
Instructor	Prof. Ken MASAMUNE, Associate Prof. Manabu TAMURA, Associate Prof. Shuji KITAHARA, Assistant Prof. Kitaro YOSHIMITSU
Credit	2
Type of Class	Lectures and Exercises
Theme	Basic Ideas and Applications of Advanced Techno Surgery Constituting Advanced Medicine
Schedule	Wednesday 14:30-16:30
Couse Objective	1) The student will be able to understand the current status of advanced techno surgery and the academic goals for the future. 2) To be able to understand the origins of advanced medical care and its application to the integration of advanced engineering and surgery, with a focus on devices. 3) To be able to understand the relationship between data analysis, imaging and simulation, which constitute advanced medical care, and advanced engineering and surgery. 4) To be able to grasp the elements of advanced engineering surgery that are essential to the promotion of advanced medical care, and to be able to formulate plans that lead to the development and application of medical science.
Evaluation Methods	Attendance (50%) Submission of reports on lecture content (50%)
Grading Scale	5 categories: 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 being passed and D being failed.
Textbooks/References	Medical books that explain the fundamentals of devices and methods that constitute advanced medicine, and books that explain the fundamentals of surgery Books related to medical statistics, biodesign, and regulatory science
Independent Study Outside of Class	Read the above reference books and related literature. Actively communicate with your academic advisor to collect information and observe the research conducted by your academic advisor that you are interested in.
Room	Institute of Advanced BioMedical Engineering and Science, B1F-N101
Special Note	Those unable to attend at the above times will be assigned a time slot 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	Ken Masamune, et al.	Introduction to Advanced Engineering Surgery
2	Ken Masamune, et al.	Overview of surgical instruments required for surgery and functional evaluation of devices 1
3	Ken Masamune, et al.	Overview of surgical instruments required for surgery and functional evaluation of devices 2
4	Ken Masamune, et al.	Introduction to Surgical Robotics, Manipulators and AI 1
5	Ken Masamune, et al.	Introduction to Surgical Robotics, Manipulators and AI 2
6	Ken Masamune, et al.	Minimally invasive surgical methods and devices, instruments, and systems 1
7	Ken Masamune, et al.	Minimally invasive surgical methods and devices, instruments, and systems 2
8	Ken Masamune, et al.	Intraoperative information management, planning and analysis 1
9	Ken Masamune, et al.	Intraoperative information management, planning and analysis 2
10	Ken Masamune, et al.	Various types of preoperative and intraoperative images and multidimensional information processing1
11	Ken Masamune, et al.	Various types of preoperative and intraoperative images and multidimensional information processing2
12	Ken Masamune, et al.	Simulation/Navigation in surgery or related fields 1
13	Ken Masamune, et al.	Simulation/Navigation in surgery or related fields 2
14	Ken Masamune, et al.	Simulation/Navigation in surgery or related fields 3
15	Ken Masamune, et al.	Simulation/Navigation in surgery or related fields 4

(Advanced Techno-Surgery) Syllabus (2)

Syllabus Title	Advanced techno-surgery (Seminar , Group discussion)
Instructor	Prof. Ken MASAMUNE, Associate Prof. Manabu TAMURA, Associate Prof. Shuji KITAHARA, Assistant Prof. Kitaro YOSHIMITSU
Credit	2
Type of Class	Lectures and Exercises
Theme	Seminar and Group discussion on Advanced Techno Surgery
Schedule	Wednesday 8:00-9:30 (seminar) 14:30-16:30 (lecture and group discussion)
Couse Objective	1) Acquire a wide range of knowledge about advanced techno surgery. 2) Learn how to obtain documents and reference books and organize knowledge efficiently. 3) Understand the current status and issues of surgical devices, robotics, manipulators, minimally invasive surgery, medical information, surgical support, intraoperative images, and biological information measurement, acquire specialized knowledge, and be able to discuss. 4) Able to proactively engage in advanced techno surgery and cooperate in smooth progress of group discussions.
Evaluation Methods	Attendance (50%) Submission of reports on seminars related to advanced engineering surgery (25%) Content of discussions in group discussions (25%)
Grading Scale	5 categories: 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 being passed and D being failed.
Textbooks/References	The main focus will be on negotiating scholarly articles on advanced engineering surgery; specialized books on specific areas of interest will be introduced on a case-by-case basis.
Independent Study Outside of Class	Read the above reference books and related literature. To acquire a broad knowledge in the fusion area by taking an interest in the research contents of other researchers.
Room	Institute of Advanced BioMedical Engineering and Science, B1F-N101
Special Note	Those unable to attend at the above times will be assigned a time slot 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	Ken Masamune, et al.	Lecture and Seminar in Advanced Techno Surgery 1
2	Ken Masamune, et al.	Lecture and Seminar in Advanced Techno Surgery 2
3	Ken Masamune, et al.	Lecture and Seminar in Advanced Techno Surgery 3
4	Ken Masamune, et al.	Lecture and Seminar in Advanced Techno Surgery 4
5	Ken Masamune, et al.	Lecture and Seminar in Advanced Techno Surgery 5
6	Ken Masamune, et al.	Lecture and Seminar in Advanced Techno Surgery 6
7	Ken Masamune, et al.	Lecture and Seminar in Advanced Techno Surgery 7
8	Ken Masamune, et al.	Lecture and Seminar in Advanced Techno Surgery 8
9	Ken Masamune, et al.	Lecture and Seminar in Advanced Techno Surgery 9
10	Ken Masamune, et al.	Lecture and Seminar in Advanced Techno Surgery 10
11	Ken Masamune, et al.	Lecture and Seminar in Advanced Techno Surgery 11
12	Ken Masamune, et al.	Lecture and Seminar in Advanced Techno Surgery 12
13	Ken Masamune, et al.	Lecture and Seminar in Advanced Techno Surgery 13
14	Ken Masamune, et al.	Lecture and Seminar in Advanced Techno Surgery 14
15	Ken Masamune, et al.	Lecture and Seminar in Advanced Techno Surgery 15
16	Ken Masamune, et al.	Seminar and Group discussion in Advanced Techno Surgery 1
17	Ken Masamune, et al.	Seminar and Group discussion in Advanced Techno Surgery 2
18	Ken Masamune, et al.	Seminar and Group discussion in Advanced Techno Surgery 3
19	Ken Masamune, et al.	Seminar and Group discussion in Advanced Techno Surgery 4
20	Ken Masamune, et al.	Seminar and Group discussion in Advanced Techno Surgery 5
21	Ken Masamune, et al.	Seminar and Group discussion in Advanced Techno Surgery 6
22	Ken Masamune, et al.	Seminar and Group discussion in Advanced Techno Surgery 7
23	Ken Masamune, et al.	Seminar and Group discussion in Advanced Techno Surgery 8
24	Ken Masamune, et al.	Seminar and Group discussion in Advanced Techno Surgery 9
25	Ken Masamune, et al.	Seminar and Group discussion in Advanced Techno Surgery 10

(Advanced Techno-Surgery) Syllabus (3)

Syllabus Title	Advanced biomedical science (Intensive discussion)		
Instructor	Prof. Ken MASAMUNE, Associate Prof. Manabu TAMURA, Associate Prof. Shuji KITAHARA, Assistant Prof. Kitaro YOSHIMITSU		
Credit	1		
Type of Class	Lectures and Exercises		
Theme	Concentrated discussion on Advanced Techno Surgery		
Schedule	2 Saturdays a year 9:00-12:00, 13:00-18:00		
Couse Objective	1) To be able to present one's own research and to be interested in and able to discuss a wide range of other people's research on advanced medicine. 2) To be able to check the progress of his/her own research plan and revise it accordingly in time for presentation.		
Evaluation Methods	Attendance (25%) Submission of abstract (25%) Content of own research presentation and discussion (40%) Content of discussion on others' research presentation (10%)		
Grading Scale	5 categories: 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 being passed and D being failed.		
Textbooks/References	none		
Independent Study Outside of Class	Prepare abstracts and presentation materials in consultation with the faculty advisor as the research progresses.		
Room	Institute of Advanced BioMedical Engineering and Science, 2F-conference room		
Special Note	Those unable to attend at the above times will be assigned a time slot 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	Ken Masamune, et al.	Presentation/discussion at the meeting of ABMES around June-July.
	2	Ken Masamune, et al.	Presentation/discussion at the meeting of ABMES around Jan-Feb.

(Advanced Techno-Surgery) Syllabus (4)

Syllabus Title	Experiments and practical training (research on an issue)
Instructor	Prof. Ken MASAMUNE, Associate Prof. Manabu TAMURA, Associate Prof. Shuji KITAHARA, Assistant Prof. Kitaro YOSHIMITSU
Credit	10
Type of Class	Experiments and practical training (research on an issue)
Theme	Conducting research on an issue and writing a thesis
Schedule	Monday, Tuesday, Thursday, Friday 9:00–12:00, 13:00–17:00 Wednesday 17:00–19:00
Couse Objective	1. To master the necessary experimental techniques and conduct research in accordance with the research plan 2. To be able to properly record and store experimental contents and data. 3. To be able to prepare for statistical processing. 3. To be able to summarize the results of experiments in appropriate charts and tables. Understand the basics of arithmetic operations necessary for statistical processing. 4. To be able to present research results appropriately at domestic and international conferences and research meetings, and to be able to discuss the results. 5. To be able to write papers on research and submit them for publication. Respond appropriately to reviewers' comments and achieve publication. 6. to be able to teach knowledge and skills related to his/her research to younger researchers.
Evaluation Methods	Experiment notes and research report (60%) Preparation of figures and tables (10%) Research presentation and discussion (10%) Writing of thesis (20%)
Grading Scale	5 categories: 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 being passed and D being failed.
Textbooks/References	Review articles and original research papers related to the subject research
Independent Study Outside of Class	To gain knowledge of research topics and previous research through literature and other sources. Actively participate in and present at related academic conferences to gather information and engage in discussion.
Room	Institute of Advanced BioMedical Engineering and Science, Tokyo Women's Meidcal University hospital, et al.
Special Note	Those unable to attend at the above times will be assigned a time slot by mutual agreement. Questions, etc. will be accepted at any time. Feedback will be given at the final session.

Course Plan	Number	Instructor	Contents
	1–90	Ken Masamune, et al.	Achievement of Goals 1–2
	90–120	Ken Masamune, et al.	Achievement of Goals 3–4
	121–150	Ken Masamune, et al.	Achievement of Goals 4

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 and Assistant Prof. Yamamoto (K)	(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 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. Nakabayashi, Assistant Prof. Yamamoto (K)	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. Kondo, Prof. Mizutari, Prof. Nakabayashi, Assistant Prof. Yamamoto (K)	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. Kondo, Prof. Mizutari, Prof. Nakabayashi, Assistant Prof. Yamamoto (K)	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, Prof. Nakabayashi, Assistant Prof. Yamamoto (K)	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, Prof. Nakabayashi, Assistant Prof. Yamamoto (K)	10	Implementation of research (including genetic counseling research) and preparation of research papers
Genetic counseling training	Prof. Yamamoto, Prof. Kondo, Prof. Mizutari, Prof. Nakabayashi, Assistant Prof. Yamamoto (K)	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	

Gene Medicine (Syllabus 1)

（＊ ＝ for doctor license holders）

Syllabus	Human genetics
Supervisor	Prof. Yamamoto, Prof. Nakabayashi, Assistant Prof. Yamamoto (K)
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.	Wednesday 15: 30-16: 40
Achievement goal	・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	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	Mitochondrial inheritance
10	Prof. Yamamoto	Triple repeat
11	Prof. Yamamoto	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, Assistant Prof. Yamamoto (K)	DNA sequence determination method
17	Prof. Yamamoto, Assistant Prof. Yamamoto (K)	Molecular biology and gene recombination experiments
18	Prof. Yamamoto	Genome diversity
19	Prof. Yamamoto, Assistant Prof. Yamamoto (K)	Genome changes and genetic testing
20	Prof. Yamamoto, Prof. Nakabayashi	Linkage disequilibrium and linkage analysis
21	Prof. Yamamoto, Prof. Nakabayashi	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, Assistant Prof. Yamamoto (K)	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, Assistant Prof. Yamamoto (K)	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 (Syllabus 2)

（＊ ＝ for doctor license holders)

Syllabus	Clinical Genetics
Supervisor	Prof. Yamamoto, Prof. Kondo, Prof. Mizutari,Prof. Nakabayashi, Assistant Prof. Yamamoto (K)
Credits	4
Class format	Lecture / Practice
Theme	Lecture on the relationship between genomic diversity and disease
Day of the week, time limit, etc.	Wednesday 15: 30–16: 40
Achievement goal	・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, Assistant Prof. Yamamoto (K)	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, Prof. Nakabayashi	Prebirth / preimplantation genetic diagnosis
11	Prof. Yamamoto,Prof. Nakabayashi	Fertilization and infertility
12	Prof. Yamamoto,Prof. Nakabayashi	Customary miscarriage and recurrent miscarriage
13	Prof. Yamamoto	Abnormalities and malformations, teratogenic factors
14	Prof. Yamamoto, Prof. Mizutari	Hereditary diseases and their medical treatment
15	Prof. Yamamoto	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, Prof. Kondo	Oncogenes and tumor suppressor genes
19	Prof. Yamamoto, Prof. Kondo	Tumor development mechanism
20	Prof. Yamamoto, Prof. Kondo	Hereditary tumor
21	Prof. Yamamoto, Prof. Kondo	Cancer genomic medicine
22	Prof. Yamamoto	Advances in Comprehensive Genome Analysis Technology (Microarray)
23	Prof. Yamamoto, Assistant Prof. Yamamoto (K)	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 (Syllabus 3)

（＊ ＝ for doctor license holders）

Syllabus	Genetic counseling and genetics medicine
Supervisor	Prof. Yamamoto, Prof. Kondo, Prof. Mizutari, Prof. Nakabayashi, Assistant Prof. Yamamoto (K)
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.	Wednesday 15:30-16:40
Achievement goal	・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.	・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	Estimating genetic prognosis / recurrence risk (mitochondrial inheritance)
18	Prof. Yamamoto	Estimating genetic prognosis / recurrence risk (chromosomal abnormality)
19	Prof. Yamamoto	Estimating genetic prognosis / recurrence risk (multifactorial inheritance)
20	Prof. Yamamoto	Carrier identification method
21	Prof. Yamamoto	confidentiality
22	Prof. Yamamoto, Prof. Mizutari	Disability and society
23	Prof. Yamamoto	Disability and social security
24	Prof. Yamamoto, Assistant Prof. Yamamoto (K)	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,Prof.Nakabayashi	The practice of genetic counseling in prenatal diagnosis
29	Prof. Yamamoto	The practice of genetic counseling in presymptomatic diagnosis
30	Prof. Yamamoto, Prof. Kondo	The practice of genetic counseling in familial tumors

Gene Medicine (Syllabus 4)

（＊ ＝ for doctor license holders）

Syllabus	Genetic medicine and ELSI
Supervisor	Prof. Yamamoto,Prof. Nakabayashi, Assistant Prof. Yamamoto (K)
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.	Wednesday 15:30-16:40
Achievement goal	・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.	・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, Assistant Prof. Yamamoto (K)	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,Prof.Nakabayashi	ELSI for prenatal diagnosis
23	Prof. Yamamoto,Prof.Nakabayashi	New prenatal diagnosis and ELSI
24	Prof. Yamamoto,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, Assistant Prof. Yamamoto (K)	Genome editing and ELSI
29	Prof. Yamamoto, Assistant Prof. Yamamoto (K)	Advances in genetic analysis technology and ELSI
30	Prof. Yamamoto	The future of genomic medicine

Gene Medicine (Syllabus 5)

（＊ ＝ for doctor license holders）

Syllabus	Intensive Discussion of Advanced Biomedical Engineering and Scinece
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	・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

Gene Medicine (Syllabus 6)

（＊ ＝ for doctor license holders）

Syllabus	Experiment / Practice (Problem Research)
Supervisor	Prof. Yamamoto,Prof. Nakabayashi, Assistant Prof. Yamamoto (K)
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	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	

Gene Medicine (Syllabus 7)

（＊ ＝ for doctor license holders）

Syllabus	Genetic counseling training
Supervisor	Prof. Yamamoto, Prof. Kondo, Prof. Mizutari, Prof.Nakabayashi,Assistant Prof. Yamamoto (K)
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	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.	・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	

Life Sciences for Co-creating the Future

Ⅰ Educational Policy

This division foucses on interdisciplinary research fields including biomaterials, regenerative medicine, and space life science. We covers the design of biomaterials and methodologies of production for substitutable organs. Replacement of organs such as organ transplants, artificial hearts, and dialysis has 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. Biomaterials research also contributes development of new food technolgoies accosiated with SDGs. Researches for regenerative medicine such as mass cell production will be applied for development of new food technologies including cell-cultured meat production. Moreover, these technologies have potentials to be diverted to life science researches in space in near future.

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 slides regarding experimental results for presentation at domestic and international conferences.
・To publish original research articles.
・To have a wide range of interests and discussions not only in themselves but also in the research of others related to advanced technology development, 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) Tetsutaro KIKUCHI (Assistant Professor)	(1) Fabrication of 3D tissues/organs based on cell sheet technology Tissue engineering technology allows us to replicate native tisseus for achievement of regeenrative medicine. In particular, cell sheet technology is effective to fabricate high density tissue/organ, such 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, liver, kidney, and uterus tissue/organ for regenerative medicine. In addition, tissue-engineered human tissue models can be a substitute for animal experiments. We are also studing to develop techniques to produce tissue models for pharmacological studies.
Tatsuya SHIMIZU (Professor) Hironobu TAKAHASHI (Assistant Professor) Tetsutaro KIKUCHI (Assistant Professor) Azumi YOSHIDA (Assistant Professor) Tsukasa HARA (Assistant Professor)	(2) Collaborative creation of new innovative technologies based on tissue engineering Tissue engineering technology allows us to develop new technologies including cellualr agriculture and life science research in spece. In addition to medical applications, we are studying tissue enginering technologies for vairous applications. Based on cell cutlure techniques, we are proposing to establish new food production process with microalgae-derived nutrients. The animal-free food production technology also has a potentil to be used for food production system in space for the future. Furthermore, we are also focusing on life science in space including research of relationships between gravity-induced stress and cultured cells, which will be important for humans linving in space in the future.
Tatsuya SHIMIZU (Professor) Hironobu TAKAHASHI (Assistant Professor) Azumi YOSHIDA (Assistant Professor) Tsukasa HARA (Assistant Professor)	(3)Technical development to engineer skeletal muscle tissue for precilincial study and cultured meat production To produce biomimetic muscle tissue, innovative techniques are required. We are studying to develop new tissue engineering techniques to produce functionally mature human muscle tissue for preclinical drug testing. In addition, based on the tissue engineering approach, we are studying to develop cutting-edge techniques to engineer biomimetic bovine muscle tissues for cultured meat production.
Tatsuya SHIMIZU (Professor) Jun KOBAYASHI (Assistant Professor)	(4)Construction of transplantable hepatic sheet tissues We pursue a method to construct hepatic sheet tissues, which are expected as a liver function support therapy for congenital metabolic liver disease and acute liver failure, through understanding the characteristics of liver parenchymal cells such as high oxygen consumption.

Tatsuya SHIMIZU (Professor) Yoshikatsu AKIYAMA (Assistant Professor)	(5) Development and application of smart biointerfaces to support cell sheet engineering We aim to create a new type of smart biointerface for the support of cell-sheet enginering by integrating new properties of soft materials (e.g., self-healing and high extensibility) and the concept of soft mechanochemistry. We will also develop new reusable cell culture substrates that contribute to the Sustainable Development Goals (SDGs) by combining the properties of metal-based hard materials (e.g., thermal conductivity and robustness) and the soft polymer materials
Tatsuya SHIMIZU (Professor) Masamichi NAKAYAMA (Assistant Professor)	(6) Development of smart surfaces by polymer coating technology for functional cell sheet fabrication We aim to develop micropatterned smart culture dishes by utilizing coating and printing technologies of stimuli-responsive polymers, construct biomimetic cell sheets with heterogeneous co-culture or cell orientation using these dishes, and pursue their histological applications.
Tatsuya SHIMIZU (Professor) Masamichi NAKAYAMA (Assistant Professor)	(7) Development of human cancer tissue models We aim to develop cancer cell sheets and in vitro and in vivo tissue models of malignant tumors using these cell sheets. We pursue the creation of human cancer model as an alternative to animal experiments, and demonstrate its usefulness in pharmacological studies and gain new knowledge.

Ⅳ Syllabus (＊ ＝ for doctor's license holders)

Title	Instructor	Credit	Theme
Biomaterials & biofabrication	Tatsuya SHIMIZU (Professor) Yoshikatsu AKIYAMA (Assistant Professor) Masamichi NAKAYAMA (Assistant Professor) Jun KOBAYASHI (Assistant Professor) Hironobu TAKAHASHI (Assistant Professor) Tetsutaro KIKUCHI (Assistant Professor) Azumi YOSHIDA (Assistant Professor) Tsukasa HARA (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) Tetsutaro KIKUCHI (Assistant Professor) Azumi YOSHIDA (Assistant Professor) Tsukasa HARA (Assistant Professor)	2	Lecture about biomedical engineering and science

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) Tetsutaro KIKUCHI (Assistant Professor) Azumi YOSHIDA (Assistant Professor) Tsukasa HARA (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) Tetsutaro KIKUCHI (Assistant Professor) Azumi YOSHIDA (Assistant Professor) Tsukasa HARA (Assistant Professor)	10	Publishing original research for doctoral degree
Total credits		15	

(Organ Replacement) Syllabus (1)

Syllabus Title	Bbiomaterials & biofabrication
Instructor	Tatsuya SHIMIZU (Professor), Yoshikatsu AKIYAMA (Assistant Professor), Masamichi NAKAYAMA (Assistant Professor), Jun KOBAYASHI (Assistant Professor), Hironobu TAKAHASHI (Assistant Professor), Tetsutaro KIKUCHI (Assistant Professor), Azumi Yoshida (Assistant Professor), Tsukasa HARA (Assistant Professor)
Credit	2
Type of Class	Lecture
Theme	Lecture on biomaterials and tissue/organ fabrication methods used in advanced collaborative creation technologies
Schedule	Tuesday 18:00～19:30
Course Objective	・To understand and develop advanced biomaterials technologies for medical, food, and space sciences. ・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	Reference books and related literature will be informed upon request.
Independent Study Outside of Class	Read the reference books and related literature that will be informed upon request.
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 enginnering
2	Jun KOBAYASHI	Quantitative analyses in Biomaterials
3	Hironobu TAKAHASHI	Tissue engineering approach for producing functional muscle tissue
4	Masamichi NAKAYAMA	Biomaterials and artificial organs
5	Tetsutaro KIKUCHI	Biomaterials for cell culture
6	Yoshikatsu AKIYAMA	Mechanobiology
7	Tsukasa HARA	Energy metabolism in cell/tissue culture system
8	Tatsuya SHIMIZU	Life science research for space development
9	Jun KOBAYASHI	Biocompatibility in Biomaterials and Tissue Engineering
10	Masamichi NAKAYAMA	Drug Delivery System
11	Yoshikatsu AKIYAMA	Design for functional biointerfaces
12	Tetsutaro KIKUCHI	Three-dimensional cell culture
13	Azumi YOSHIDA	Method for fabrication of three-dimensional tissue and its application
14	Hironobu TAKAHASHI	Biomaterial research for tissue engineering and regenerative medicine
15	Tsukasa HARA	Cutting-edge technology in cellular agriculture

(Organ Replacement) Syllabus (2)

Syllabus Title	Biomedical engineering
Instructor	Tatsuya SHIMIZU (Professor), Yoshikatsu AKIYAMA (Assistant Professor), Masamichi NAKAYAMA (Assistant Professor), Jun KOBAYASHI (Assistant Professor), Hironobu TAKAHASHI (Assistant Professor), Tetsutaro KIKUCHI (Assistant Professor), Azumi YOSHIDA (Assistant Professor), Tsukasa HARA (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	・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	Reference books and related literature will be informed upon request.
Independent Study Outside of Class	Read the reference books and related literature that will be informed upon request.
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 (3)

Syllabus Title	Intensive Discussion of Advanced Biomedical Engineering and Scinece		
Instructor	Tatsuya SHIMIZU (Professor), Yoshikatsu AKIYAMA (Assistant Professor), Masamichi NAKAYAMA (Assistant Professor), Jun KOBAYASHI (Assistant Professor), Hironobu TAKAHASHI (Assistant Professor), Tetsutaro KIKUCHI (Assistant Professor), Azumi YOSHIDA (Assistant Professor), Tsukasa HARA (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), Tetsutaro KIKUCHI (Assistant Professor), Azumi YOSHIDA (Assistant Professor), Tsukasa HARA (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	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)	(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 populaton) 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) Hidekazu SEKINE (Associate 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 thema, 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.
Masayuki YAMATO (Professor) Hidekazu Sekine (Associate Professor)	(4) Research on capillary and lymphatic vessel regeneration using cell sheets A technology has been developed to induce capillaries ex vivo, enabling the construction of perfusible vascularized tissues. As with vivo, not only the cardiovascular system but also the lymphatic system is essential for the homeostasis of regenerative tissues. In this theme, regeneration of capillaries and lymphatic vessels are pursued, and the mechanism of their formation process is analyzed. Establishing this technology as a platform technology for maintaining microcirculation homeostasis, it is planned to challenge the regeneration of organs such as the brain, heart, pancreas, and kidney.

Masayuki YAMATO (Professor) Jun Homma (Assistant Professor)	(5) Pancreas regeneration using cell sheet engineering The pancreas as an endocrine organ controls blood glucose cooperatively with insulin and glucagon secreted by the pancreatic islets, and is one of the most important target organs for regenerative medicine. On the other hand, it is also a difficult organ to maintain its function due to its extremely high oxygen demand, and there are many challenges in its clinical application. In this theme, we challenge this issue from a multifaceted perspective by adding vascular network introduction technology and perfusion culture technology based on cell sheet technology.
Masayuki YAMATO (Professor) Ryo TAKAGI (Assistant Professor)	(6) Applying regenerative medicine for refractory diseases by using MSCs The purpose of this study is the development of therapeutic methods for mitigating and preventing the progression of refractory diseases related to excessive inflammation. Inflammation is a biological reaction caused by bacterial or viral infections, tissue damage, wounds, etc., and is usually cured when the cause is removed. However, it is a well-known fact that there are many refractory diseases caused by chronic inflammation and that persistent inflammation is closely associated with the worsening of various refractory diseases. Mesenchymal stem/stromal cells (MSCs), which can be easily prepared from stromal tissues such as bone marrow and adipose tissue, have attracted attention as a cellular material for regenerative medicical products and tissue engineering studies due to the multilineage potency. On the other hand, since MSCs suppress excessive immune responses and have anti-inflammatory properties, the cells are also used to develop therapeutic methods to suppress tissue dysfunction associated with immune disorders and fibrosis. We have conducted a study to evaluate MSC transplantation for mitigating the progression of muscular dystrophy and are in the process of demonstrating the efficacy of the transplantation.

Ⅳ Syllabus （＊ ＝ for doctor's license holders）

Title	Instructor	Credit	Theme
Tissue Regeneration (Introduction)	Masayuki YAMATO (Professor) Hidekazu SEKINE (Associate 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) Hidekazu SEKINE (Associate 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) Hidekazu SEKINE (Associate Professor) Ryo TAKAGI (Assistant Professor) Jun HOMMA (Assistant Professor)	1	Pressentation and discussion about biomedical engineering and science
Research for Doctoral Degree	Masayuki YAMATO (Professor) Hidekazu SEKINE (Associate 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), Hidekazu SEKINE (Associate 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	To acquire knowledge of the current status of regenerative medicine development in various fields. 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. To acquire the knowledge necessary to complete pre-clinical and non-clinical research.
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	Reference books and related literature will be informed upon request.
Independent Study Outside of Class	Read the reference books and related literature that will be informed upon request.
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 medicne
3	Masayuki YAMATO	History of tissue engineering
4	Ryo TAKAGI	Stem cells and regenerative medicine
5	Hidekazu SEKINE	Imaging technologies for regenerative medicine research
6	Jun HOMMA	Regenerative medicne and disease model
7	Hidekazu SEKINE	Cardiac regenerative medicine
8	Hidekazu SEKINE	Regenerative medicine for blood vessels and lymphatic vessels
9	Hidekazu SEKINE	Relevance of organ preservation technologies and regenerative medicine
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), Hidekazu SEKINE (Associate 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	・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	Reference books and related literature will be informed upon request.
Independent Study Outside of Class	Read the reference books and related literature that will be informed upon request.
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), Hidekazu SEKINE (Associate 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), Hidekazu SEKINE (Associate 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	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	

Integrated Medical Science

Ⅰ Educational Policy

In the field of integrative medical science, we organically integrate molecular and clinical medical research based on bioinformatics, and develop preventive, diagnostic, and therapeutic methods for human genetic diseases.and cancers.

Ⅱ Goals

1. To be able to perform basic molecular biology experiments including genomic sequencing.
2. To be able to perform advanced bioinformatics including artificial intelligence.
3. To make full use of the internet and human networks to collect high-quality information necessary for research.
4. To conduct and report scientific studies with high ethical standards.

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

Name and position	Research theme
Associate professor Hiroyuki Akagawa	Analysis of molecular mechanisms of diseases using comprehensive genomic analysis and bioinformatics. In this theme, we conduct bioinformatics analysis of large-scale genomic data obtained by next-generation sequencing to identify genetic mutations, structural changes in the genome, and gene-expression profiles associated with the onset and exacerbation of diseases. The obtained knowledges will be utilized in clinical practice as new diagnostic methods.

Ⅳ Syllabus (＊ ＝ for doctor's license holders)

Title	Instructor	Credit	Theme
Integrated Medical Sciences, Overview	Associate professor Hiroyuki Akagawa	1	The concept of integrated medical sciences
Integrated Medical Sciences, Chapter 1	Associate professor Hiroyuki Akagawa	2	Genomic information and disease 1
Integrated Medical Sciences, Chapter 2	Associate professor Hiroyuki Akagawa	2	Genomic information and disease 2
Experiments	Associate professor Hiroyuki Akagawa, assistant professor Kenko Azuma	10	Genetic analysis using human clinical samples
Total credits		15	

(Integrated Medical Science) Syllabus (1)

Syllabus Title	Integrated Medical Sciences, Overview
Instructor	Associate professor Hiroyuki Akagawa
Credit	1
Type of Class	Lecture
Theme	The concept of integrated medical sciences
Schedule	One period 70 minutes, Thursday
Course Objective	1. To be able to explain the significance of organically integrating basic medical research and clinical medical research. 2. To be able to understand papers on the related fields and to explain their significance.
Evaluation Methods	Attendence (50%), Reports on the course (50%)
Grading Scale	S(90-100 points)、A(80-89 points)、B(70-79 points)、C(60-69 points)、D(less than 60), S、A、B、C:pass、D: failure
Textbooks/References	T.Strachan & A.P.Read (eds.): Human Molecular Genetics 5th edition. ISBN 9780815345893. Current important papers in the related fields.
Independent Study Outside of Class	Graduate students are advised to check the relevant literatures.
Room	Tokyo Women's Medical University Heart Institute B1F, Electron microscope room.
Special Note	If the schedul is difficult to attend, please contact us.

Course Plan

Number	Instructor	Contents
1	Hiroyuki Akagawa	The concept of integrative medical science
2	Hiroyuki Akagawa	Circulation and integration of knowledge
3	Hiroyuki Akagawa	Challenges in integrating basic medicine and clinical medicine
4	Hiroyuki Akagawa	Feedback from EBM to basic research
5	Hiroyuki Akagawa	Fundamentals and applications of genetic data analysis
6	Hiroyuki Akagawa	The role of genetics in clinical medicine
7	Hiroyuki Akagawa	Genetic information in disease treatment
8	Hiroyuki Akagawa	Genetic testing and informed consent

(Integrated Medical Science) Syllabus (2)

Syllabus Title	Integrated Medical Sciences, Chapter 1
Instructor	Associate professor Hiroyuki Akagawa
Credit	2
Type of Class	Lecture
Theme	Genomic information and disease 1
Schedule	One period 70 minutes, Thursday
Course Objective	1. To be able to explain the human genome and its diversity. 2. To be able to explain technological innovations and their principles for current technologies for genetic analysis. 3. To be able to select an appropriate analytical method for genetic diagnosis. 4. To be able to understand and explain the significance of papers in the related fields.
Evaluation Methods	Attendence (50%), Reports on the course (50%)
Grading Scale	S(90-100 points)、A(80-89 points)、B(70-79 points)、C(60-69 points)、D(less than 60), S、A、B、C:pass、D: failure
Textbooks/References	T.Strachan & A.P.Read (eds.): Human Molecular Genetics 5th edition. ISBN 9780815345893. Current important papers in the related fields.
Independent Study Outside of Class	Graduate students are advised to check the relevant literatures.
Room	Tokyo Women's Medical University Heart Institute B1F, Electron microscope room.
Special Note	If the schedul is difficult to attend, please contact us.

Course Plan

Number	Instructor	Contents
1	Hiroyuki Akagawa	Diversity of the human genome
2	Hiroyuki Akagawa	Methods of genetic analysis #1
3	Hiroyuki Akagawa	Methods of genetic analysis #2
4	Hiroyuki Akagawa	Methods of genetic analysis #3
5	Hiroyuki Akagawa	Germline genomic abnormalities and phenotypes
6	Hiroyuki Akagawa	Genetic susceptibility to multifactorial traits
7	Hiroyuki Akagawa	Genomic structural variations in disease susceptibility
8	Hiroyuki Akagawa	Methods for identifying human disease genes #1
9	Hiroyuki Akagawa	Methods for identifying human disease genes #2
10	Hiroyuki Akagawa	Large-scale genetic information analysis
11	Hiroyuki Akagawa	Genomic information and diseases #1
12	Hiroyuki Akagawa	Genomic information and diseases #2
13	Hiroyuki Akagawa	Genetic engineering of animals and cells
14	Hiroyuki Akagawa	Gene therapy and nucleic acid-based drugs
15	Hiroyuki Akagawa	Artificial intelligence used for genetic analysis

(Integrated Medical Science) Syllabus (3)

Syllabus Title	Integrated Medical Sciences, Chapter 2
Instructor	Associate professor Hiroyuki Akagawa
Credit	2
Type of Class	Lecture and exercise
Theme	Genomic information and disease 2
Schedule	One period 70 minutes, Friday
Course Objective	1. To be able to interpret the results of genetic data analysis. 2. To be able to perform basic genetic data analyses. 3. To be able to explain the difference between somatic and germline mutations. 4. To be able to exlain genetic structural variation. 5. To be able to understand and explain the significance of papers in the related fields.
Evaluation Methods	Attendence (50%), Reports on the course (50%)
Grading Scale	S(90-100 points)、A(80-89 points)、B(70-79 points)、C(60-69 points)、D(less than 60), S、A、B、C:pass、D: failure
Textbooks/References	T.Strachan & A.P.Read (eds.): Human Molecular Genetics 5th edition. ISBN 9780815345893. Current important papers in the related fields.
Independent Study Outside of Class	Graduate students are advised to check the relevant literatures.
Room	Tokyo Women's Medical University Heart Institute B1F, Electron microscope room.
Special Note	If the schedul is difficult to attend, please contact us.

Course Plan

Number	Instructor	Contents
1	Hiroyuki Akagawa	How to use public databases to perform genetic data analysis
2	Hiroyuki Akagawa	Construction of Linux environment for genetic data analysis
3	Hiroyuki Akagawa	Fundamentals of data analysis using R
4	Hiroyuki Akagawa	Introduction to genetic data analysis, Reference paper #1
5	Hiroyuki Akagawa	Discussion on the paper #1
6	Hiroyuki Akagawa	Lecture on additional data analyses using the paper #1, Introduction to Reference paper #2
7	Hiroyuki Akagawa	Discussion on the paper #2
8	Hiroyuki Akagawa	Lecture on additional data analyses using the paper #2
9	Hiroyuki Akagawa	Analytical methods for determining pathogenicity of somatic and germlin mutations.
10	Hiroyuki Akagawa	Cancer genomics
11	Hiroyuki Akagawa	Introduction to analysing structural variation, Reference paper #3
12	Hiroyuki Akagawa	Discussion on the paper #3
13	Hiroyuki Akagawa	Lecture on additional data analyses using the paper #3, Introduction to Reference paper #4
14	Hiroyuki Akagawa	Discussion on the paper #4
15	Hiroyuki Akagawa	Lecture on additional data analyses using the paper #4

(Integrated Medical Science) Syllabus (4)

Syllabus Title	Experiments
Instructor	Associate professor Hiroyuki Akagawa, and assistant professor Kenko Azuma
Credit	10
Type of Class	Eperiments and Exercises
Theme	Genetic analysis using human clinical samples
Schedule	According to the experimental plan and progress
Course Objective	1. To e able to perform basic molecular experiments including genome sequencing. 2. To be able to perform advanced bioinformatics. 3. To be abl use of the internet and human networks to collect high-quality information necessary for research. 4. To be able to design a research plan with high ethical standards. 5. To be able to present and discuss research contents at academic conferences, submit them as research papaers, and achieve publication.
Evaluation Methods	Drafting a manuscript (60%), Conference presentation (10%), Case report when experiencing an interesting case (10%), Oral discussion/Presentation at clinical conferences (10%)
Grading Scale	S(90-100 points)、A(80-89 points)、B(70-79 points)、C(60-69 points)、D(less than 60), S、A、B、C:pass、D: failure
Textbooks/References	T.Strachan & A.P.Read (eds.): Human Molecular Genetics 5th edition. ISBN 9780815345893. Current important papers in the related fields.
Independent Study Outside of Class	Graduate students are advised to check the relevant literatures.
Room	Tokyo Women's Medical University Heart Institute B1F, 1st Laboratory, 4th Laboratory, 7th Laboratory, and 12th Laboratory.
Special Note	If the schedul is difficult to attend, please contact us.

Course Plan	Number	Instructor	Contents
	1 ～ 90	Associate professor Hiroyuki Akagawa, assistant professor Kenko Azuma	Implementation of tasks under the guidance of instructors with the aim of pablishing papers.
	91 ～ 120	Associate professor Hiroyuki Akagawa, assistant professor Kenko Azuma	Same as above.
	121 ～ 150	Associate professor Hiroyuki Akagawa, assistant professor Kenko Azuma	Same as above.

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	(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	(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	(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	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	2	To understand the genotyping and phenotyping methods of genetically engineered mice.
New technique of gene manupilation: CRISPR/Cas9	Professor Honda	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	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
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	Professor Honda	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		
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 (MEDSi)		
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	Professor Honda	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
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	Professor Honda	General introduction to genome editing methods
3	Professor Honda	Genome Editing Methods
4	Professor Honda	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	Professor Honda	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	Professor Honda	Cesarean section in mice and identification of target transgenic mice
12	Professor Honda	Sperm extraction from the epididymis and in vitro fertilization
13	Professor Honda	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
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	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	Achievement of Course Objectives 1 – 2
	91 ~ 120	Professor Honda, Lecturer Iwasaki, Assistant Professor Sera	Achievement of Course Objectives 3-4
	121 ~ 150	Professor Honda, Lecturer Iwasaki, Assistant Professor Sera	Achievement of Course Objectives 5-6

Cooperative Major in Advanced Biomedical Sciences Syllabus

(Ⅰ)Research Theme

(Doctoral Program)

Divison	Field of Research	Instructor
Advanced Medical Devices	Development & Evaluation of Advanced Therapeutic Devices	○Kiyotaka Iwasaki, Manabu Tamura, Shuji Kitahara, Kaoru Hattori
	Clinical Application & Evaluation of Advanced Therapeutic Devices	○Manabu Tamura, Kiyotaka Iwasaki, Ken Masamune, Shuji Kitahara
	Cardiovascular Biomedical Engineering	○Kiyotaka Iwasaki, Manabu Tamura
Drug Discovery & Regenerative Medicine	Tissue Regenerative Medicine	○Atsuko Deguchi, Masayuki Yamato, Manabu Tamura, Shinji Takeoka
	Molecular Cell Therapy	○Atsuko Deguchi, Manabu Tamura, Shinji Takeoka Etsuro Ito, Takeo Kubo
	Nano Medical Engineering	○Shinji Takeoka, Atsuko Deguchi, Etsuro Ito, Takeo Kubo
		○Supervisor

(Ⅱ)Lecture Course

Advanced Course	Credit	Schedule	
		Spring Term	Autumn Term
◎ Clinical Study	2	Spring Q	
◎ Medical Regulatory Science	2	Spring Q	
◎ Biostatics	2	Summer Q	
◎ Biomedical Ethics (TWMU)	2	Summer Q	
GLP/GCP/GMP Outline(TWMU)	2	Intensive	

(Ⅲ)Pracitice Course

Practice Course	Credit	Schedule	
		Spring Term	Autumn Term
Biostatics	3		Autum Q
Advanced Medicine (TWMU)	3		Autum Q
Clinical Study	3		Winter Q
Medical Regulatory Science	3		Winter Q
Medical RS Seminar B (TWMU)	3		Intensive
Medical RS Seminar A	3	○	
Medical RS Seminar D	3		○

(Ⅳ)Training Course

Title	Credit	Schedule	
		Spring Term	Autumn Term
◎ Joint Advanced Medical Site	2	Intensive	Intensive
◎ Medical RS Seminar C (TWMU)	2		Intensive

※Q: Quarter