

**Academic Year 2022**

**GRADUATE SCHOOL OF HEALTH SCIENCES  
SYLLABUS  
DOCTOR'S COURSE**

**FUJITA HEALTH UNIVERSITY  
GRADUATE SCHOOL OF HEALTH SCIENCES**

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## **Concerning the curriculum of the Graduate School of Health Sciences (Doctoral Program), Fujita Health University**

**Aiming to acquire an extensive knowledge in medical science and draft an original doctoral dissertation**

Yoshikiyo Kanada, Dean of the Graduate School of Health Sciences, Fujita Health University

The Major in Medical Sciences, Graduate School of Health Sciences (Doctoral Program), Fujita Health University, is based on the founding spirit of “creating one solid principle of your own.” We aim to cultivate versatile human resources who can respond widely to the sophistication, complexity, and diversification of modern medical care in addition to displaying the specialized knowledge and skills gained through the master’s program. In April 2015, we established the three fields of bioinformatics science (medical examination science), medical quantum science (radiation science), and rehabilitation therapy science (rehabilitation science). To become well-rounded educators, researchers, and leaders, students are exposed to the advanced academic foundation of health science common to medical science. In addition to the above fields, healthcare cooperation and healthcare evaluation (health science field) were established in the academic year of 2020.

At Fujita Health University, a unique curriculum is tailored in accordance with the aforementioned slogan, helping students gain a working knowledge in medical science. In the first year of each field, students learn rudimentary concepts of medical science that are common to each field through the common (collaboration) subjects of introduction to medical science, medical science research theory, and healthcare collaboration development. In the specialized course, students deepen their knowledge and skills of the medical profession and are exposed to the present-day theory and knowledge in each field. Seminars help students acquire basic ideas on exploring the problems to be solved and provide the right training for thinking to solve the problems. Through the specialized research conducted from the 1<sup>st</sup> to 3<sup>rd</sup> years and by exploring cutting-edge, up-to-date knowledge and examining issues in technological development, students are able to improve their creativity, theory-building skills, and active problem-solving abilities. As specialized research is built upon continuous investigation and accumulation of results, it is best to study this subject continuously for three years. During the first semester of the first year, a research plan will be decided, and the development of the research commences in the second semester. In the third year, a doctoral dissertation on the researched topics should be formulated, and as the lead authors, students ought to publish their research results in international journals to widely disseminate their research findings.

In the syllabi, the course periods, outline, goals, lesson plans, evaluation methods, teaching materials/textbooks/reference materials, preparatory learning, and points to note while pursuing a course are all listed for each subject to allow the graduate students decide on their learning activities as independently as possible. It is also vital for faculty members and graduate students to come up with effective ways to achieve learning outcomes, clearly understand their responsibilities and obligations, and work together. It is my hope that the graduate students maintain a broad view of the entire class in accordance with the syllabus and that they enthusiastically engage in learning activities with a strong sense of purpose.

It is the desire of all faculty and staff members that the three years of research will be a fulfilling experience, providing a strong basis for future career development for the graduate students at the Graduate School of Health Sciences, Fujita Health University.

## **The Three Policies of the Graduate School of Health Sciences**

### **1. Admissions Policy**

The Doctoral Course, Major in Medical Sciences, Graduate School of Health Sciences seeks prospective students who possess the following qualities:

- (1) Individuals with a desire to conduct research to resolve diverse issues through exploration of scientific evidence in all areas of medical and health care sciences
- (2) Individuals with the drive to pursue truth through the development of new expertise and techniques that are relevant to their individual research topics
- (3) Individuals who aspire to become educators, researchers, and instructors
- (4) Individuals with a strong desire to publish research results and contribute to the development of medical and health care sciences

### **2. Curriculum Policy**

In order to acquire the skills stated in the Diploma Policy, the Doctoral Course, Major in Medical Sciences, Graduate School of Health Sciences is structured in a way that allows for a systematic allocation of subjects between coursework (such as lectures, seminars and practical exercises) and research work (graduate thesis). It is based on the following policies:

- (1) Compulsory common subject provides the academic basis for students to become educators, researchers, and instructors through a wider study of essential medical science concepts that are common to each discipline.
- (2) Seminars and Exercises conducted in courses related to the major subject teach students the ability to tackle problems and solve them by gaining in-depth medical professional knowledge and studying latest techniques.
- (3) Graduate thesis helps students acquire the capacity to write academic essays, which can be submitted to international journals, through the exploration of cutting-edge knowledge and resolution of issues found in theoretical synthesis and technical developments.
- (4) Inter-disciplinary research seminars equip students with the ability to present their ideas and make proposals, through discussions involving all the supervisors who are involved in the teaching of graduate thesis.

### **3. Diploma Policy**

To be conferred the Doctoral Degree in Medical Sciences, Graduate School of Health Sciences, students have to be enrolled in the course for the stipulated minimum number of years, complete the stipulated number of stated units according to the educational philosophy and objectives, and demonstrate that they have acquired the following skills through an examination of the thesis and their final examinations.

- (1) Skills to articulate a problem and analyze it from a unique perspective based on an understanding of existing research
- (2) Skills to select and implement the appropriate research and analytical methods to solve problems
- (3) Skills to present new findings and propose new techniques or theories that can contribute to the development of the professionalism in relevant disciplines

## The number of total required credits

### 1) Medical Technology Sciences, Radiation Sciences, Rehabilitation Sciences

Course	Number of credits		Notes
	Required	Elective	
Common subjects	4 credits		
Medical Technology Sciences	8 credits	2 credits	10 credits for each fields
Radiation Sciences	10 credits		
Rehabilitation Sciences	8 credits	2 credits	
Total	14 credits or more		

### 2) Medical and Health Care Sciences

Course	Number of credits		Notes
	Required	Elective	
Common subjects	6 credits		
Medical and Health Care Collaboration	10 credits		10 credits for each fields
Health Care Regulatory Sciences	10 credits		
Total	16 credits or more		

**Curriculum table**

Field	Subject	Credit (Hours)		1st year		2nd year		3rd year	
		Required	Elective	Spring semester	Autumn semester	Spring semester	Autumn semester	Spring semester	Autumn semester
Common Subjects	Introduction to Medical Sciences	2 (30)		2					
	Research Methodology of Medical Sciences	2 (30)			2				
	Introduction to medical and health care professional collaboration		2 (30)	2					
Clinical Laboratory Sciences	Clinical Laboratory Sciences I, Advanced		2 (30)	2					
	Clinical Laboratory Sciences Exercise I (Development of Medical Technology)		2 (30)		2				
	Clinical Laboratory Sciences Exercise II (Molecular Pathogenesis Analysis)		2 (30)		2				
	Clinical Laboratory Sciences Exercise III (Bioinformatics and Physiological Sciences)		2 (30)		2				
	Graduate Thesis of Clinical Laboratory Sciences		6 (180)		1	1	2	1	1
Radiological Sciences	Radiological Sciences, Advanced		2 (30)	2					
	Radiological Sciences Exercise		2 (30)		2				
	Graduate Thesis of Radiological Sciences		6 (180)		1	1	2	1	1
Rehabilitation Therapy Sciences	Rehabilitation Therapy Science, AdvancedI (Rehabilitation Educational Sciences)		2 (30)	2					
	Rehabilitation Therapy Science, Advanced II (Motor Control Instrumentation Sciences)		2 (30)	2					
	Rehabilitation Therapy Sciences Exercise I (Rehabilitation Educational Sciences)		2 (30)		2				
	Rehabilitation Therapy Sciences Exercise II (Motor Control Instrumentation Sciences)		2 (30)		2				
	Graduate Thesis of Rehabilitation Therapy Science		6 (180)		1	1	2	1	1
Medical and Health Care Collaboratio	Medical and health care professional collaboration		2 (30)	2					
	Graduate Seminar of medical and health care professional collaboration		2 (30)		2				
	Graduate Thesis of medical and health care professional collaboration		6 (180)		1	1	2	1	1
Health Care Regulatory Sciences	Healthcare Regulatory Science Lecture		2 (30)	2					
	Healthcare Regulatory Science Seminar		2 (30)		2				
	Graduate Thesis of Healthcare Regulatory Science		6 (180)		1	1	2	1	1



## Subjects and instructors

Field	Course Title	Credits	Hours	Instructor
Common Subjects	Introduction to Medical Sciences	2	30	KANADA Yoshikiyo, SAITO Kuniaki TAKEMATSU Hiromu, NARUSE Hiroyuki SUZUKI Koji, IHIRA Masaru ASADA Yasuki, KOBAYASHI Shigeki TERAMOTO Atsushi, TERANISHI Toshio SAKURAI Hiroaki, YAMADA Kouji INAMOTO Yoko, SUGAMA Junko TANABE Shigeo
	Research Methodology of Medical Sciences	2	30	SAITO Kuniaki, TAKEMATSU Hiromu NARUSE Hiroyuki, SUZUKI Koji, IHIRA Masaru, MOURI Akihiro KOBAYASHI Shigeki, TERAMOTO Atsushi, TERANISHI Toshio YAMADA Kouji, TANABE Shigeo
	Introduction to medical and health care professional collaboration	2	30	TERANISHI Toshio, NAGAO Shizuko MOURI Akihiro, TERAMOTO Atsushi SEKO Rumi, ICHINO Naohiro KAWAI Kaoru, ONOGI Keiko ASADA Yasuki, KAMEI Tetsuya KOSEKI Takenao
Clinical Laboratory Sciences	Clinical Laboratory Sciences I, Advanced	2	30	SAITO Kuniaki, TAKEMATSU Hiromu NARUSE Hiroyuki, SUZUKI Koji IHIRA Masaru
	Clinical Laboratory Sciences Exercise I (Development of Medical Technology)	2	30	SAITO Kuniaki, SUZUKI Koji
	Clinical Laboratory Sciences Exercise II (Molecular Pathogenesis Analysis)	2	30	TAKEMATSU Hiromu, IHIRA Masaru
	Clinical Laboratory Sciences Exercise III (Bioinformatics and Physiological Sciences)	2	30	NARUSE Hiroyuki
	Graduate Thesis of Clinical Laboratory Sciences	6	180	SAITO Kuniaki, TAKEMATSU Hiromu NARUSE Hiroyuki, SUZUKI Koji IHIRA Masaru
Radiological Sciences	Radiological Sciences, Advanced	2	30	KOBAYASHI Shigeki
	Radiological Sciences Exercise	2	30	KOBAYASHI Shigeki
	Graduate Thesis of Radiological Sciences	6	180	KOBAYASHI Shigeki

Field	Course Title	Credits	Hours	Instructor
Rehabilitation Therapy Sciences	Rehabilitation Therapy Science, Advanced I (Rehabilitation Educational Sciences)	2	30	KANADA Yoshikiyo, SAKURAI Hiroaki INAMOTO Yoko
	Rehabilitation Therapy Science, Advanced II (Motor Control Instrumentation Sciences)	2	30	YAMADA Kouji, TANABE Shigeo TAKEDA Kotaro
	Rehabilitation Therapy Sciences Exercise I (Rehabilitation Educational Sciences)	2	30	KANADA Yoshikiyo, SAKURAI Hiroaki INAMOTO Yoko
	Rehabilitation Therapy Sciences Exercise II (Motor Control Instrumentation Sciences)	2	30	YAMADA Kouji, TANABE Shigeo TAKEDA Kotaro
	Graduate Thesis of Rehabilitation Therapy Science	6	180	KANADA Yoshikiyo, SAKURAI Hiroaki YAMADA Kouji, INAMOTO Yoko TANABE Shigeo, TAKEDA Kotaro
Medical and Health Care Collaboration	Medical and health care professional collaboration	2	30	TERANISHI Toshio, ICHINO Naohiro ASADA Yasuki, KAMEI Tetsuya SUGAMA Junko, TAKEHARA Kimie
	Graduate Seminar of medical and health care professional collaboration	2	30	TRERANISHI Toshio, ICHINO Naohiro ASADA Yasuki, KAMEI Tetsuya SUGAMA Junko, MURAYAMA Ryoko
	Graduate Thesis of medical and health care professional collaboration	6	180	ICHINO Naohiro, ASADA Yasuki TERANISHI Toshio, ONOGI Keiko SUGAMA Junko, MURAYAMA Ryoko
Health Care Regulatory Sciences	Healthcare Regulatory Science Lecture	2	30	TERAMOTO Atsushi, MOURI Akihiro KOSEKI Takenao, SUGIHARA Kazuhiro NAGAO Shizuko
	Healthcare Regulatory Science Seminar	2	30	NAGAO Shizuko, TERAMOTO Atsushi MOURI Akihiro, KOSEKI Takenao
	Graduate Thesis of Healthcare Regulatory Science	6	180	YAMADA Shigeeki, NAGAO Shizuko TERAMOTO Atsushi, MOURI Akihiro

# **1. Common Subjects**

## Introduction to Medical Sciences

専攻分野 Major Field	common(collaboration)	学年 Grade	1st year	期間 Semester	1st semester
授業形態 Style	lecture	単位 Credits	2	時間数 Hours	30
授業方法 Class Methods	remote class	使用言語 Language	English		
担当教員名 Instructor	KANADA Yoshikiyo (Course Manager), SAITO Kuniaki, TAKEMATSU Hiromu, NARUSE Hiroyuki, SUZUKI Koji, IHIRA Masaru, SUGAMA Junko, ASADA Yasuki, KOBAYASHI Shigeki, TERAMOTO Atsushi, SAKURAI Hiroaki, INAMOTO Yoko, YAMADA Kouji, TANABE Shigeo, TERANISHI Toshio				
科目概要 Course Aims	<p>These lectures will be given on research topics in medical sciences (bioinformatics, medic quantum science, rehabilitation therapy science) by omnibus format. In these lectures, students will acquire a wide range of knowledge and ideas common to medical sciences, conduct Q &amp; A sessions, and build a research base for specialized subjects.</p> <p>These lectures will be instructed in English only, including questions, answers, and opinions. (Omnibus style / Total 15 chapters)</p>				
到達目標 Objectives	<p>The goals of this course are to be able to</p> <ul style="list-style-type: none"> <li>- respond to a wide variety of modern medical needs.</li> <li>- become a true leader in team medicine.</li> <li>- acquire a wide range of knowledge and ideas common to medical science and build a research foundation for specialized subjects.</li> </ul> <p>and final goal of these lectures are to be able to discuss in English.</p>				
回数 Chapters	授業計画 Course schedule (topic for each time)			担当教員 Instructor	
1	Introduction to medical sciences			KANADA Yoshikiyo	
2	Recent advances in Preemptive medicine			SAITO Kuniaki	
3	Evolutional medicine; human-specific inflammatory condition			TAKEMATSU Hiromu	
4	Risk stratification using biomarkers in cardiovascular disease			NARUSE Hiroyuki	
5	Molecular epidemiological study regarding life-style related diseases			SUZUKI Koji	
6	Detection of nucleic acid for POCT using isothermal amplification methods			IHIRA Masaru	
7	New pressure ulcer assessment using bioengineering nursing technologies			SUGAMA Junko	
8	The diagnostic reference levels			ASADA Yasuki	
9	Latest research of clinical use for photon-counting technology			KOBAYASHI Shigeki	
10	Artificial intelligence in medical imaging			TERAMOTO Atsushi	
11	Relationship between advanced clinical technical education using OSCE and clinical training			SAKURAI Hiroaki	
12	Swallowing physiology and swallowing disorders			INAMOTO Yoko	
13	Basic research that can be applied clinically from the viewpoint of functional anatomy			YAMADA Kouji	
14	Robotic systems for rehabilitation			TANABE Shigeo	
15	Fall risk management (Balance evaluation tools, Fall risk assessment tools)			TERANISHI Toshio	
評価法・基準 Grading Policies	<p>Grading will be described based on students' attitude (30%), Discussion with faculty members etc. (70%) by course manager KANADA Yoshikiyo.</p> <p>In order to measure the level of comprehension of the goals, assign tasks such as reports, material creation, etc., oral examinations for each.</p>				

教科書 Text Book	Distribute each time.	教材・参考書 Reference Book	If necessary, introduce appropriate.
オフィス アワー Office Hour	KANADA: by email SAITO: by email TAKEMASTU: by email NARUSE: by email SUZUKI: by email IHIRA: by email SUGAMA: by email ASADA: by email KOBAYASHI: by email TERAMOTO: by email SAKURAI: by email INAMOTO: by email YAMADA: by email TANABE: by email TERANISHI: by email	連絡先 Contact	KANADA: SAITO: TAKEMASTU: NARUSE: SUZUKI: IHIRA: SUGAMA: ASADA: KOBAYASHI: TERAMOTO: SAKURAI: INAMOTO: YAMADA: TANABE: TERANISHI:
準備学習 Preparation of study	These lectures will be instructed in English only, including questions, answers and opinions. Preparatory study of the specified theme for about 30 minutes. After the lecture, review the lecture with handout for about 1 hour and summarize them in a notebook.	履修上の注意点 Notice for Students	None

## Research Methodology of Medical Sciences

専攻分野 Major Field	Common (collaboration)	学年 Grade	1st year	期間 Semester	2nd semester
授業形態 Style	Lecture	単位 Credits	2	時間数 Hours	30
授業方法 Class Methods	remote class	使用言語 Language	Japanese		
担当教員名 Instructor	SAITO Kuniaki(Course Manager), TAKEMATSU Hiromu, SUZUKI Koji, IHIRA Masaru, MOURI Akihiro, NARUSE Hiroyuki, KOBAYASHI Shigeki, YAMADA Kouji, TANABE Shigeo, TERANISHI Toshio, TERAMOTO Atsushi				
科目概要 Course Aims	To provide instruction on the latest research in the fields of bioinformatics, medical quantum science, and rehabilitation therapy science based on concrete examples. The course is designed to engage students in active discussion to learn about collaborative research among the aforementioned three fields of medical science and utilize it in their own fields (Omnibus format/total of 15 lectures).				
到達目標 Objectives	To obtain working knowledge and skills related to research in physiology/biochemistry, statistical epidemiology, pathology, diagnostic imaging, motor control measurement science, and rehabilitation education science in the three fields of medical science as well as acquire the ability to utilize the aforesaid knowledge for research				
回数 Chapters	授業計画 Course schedule (topic for each time)			担当教員 Instructor	
1	Elegant dissertation writing and research ethics			SAITO Kuniaki	
2	Epidemiological research methods			SUZUKI Koji	
3	Omics analysis method			SAITO Kuniaki	
4	Molecular biological analysis (molecules vs phenomena)			TAKEMATSU Hiromu	
5	Molecular biological analysis (molecular techniques for detecting viruses)			IHIRA Masaru	
6	General discussion with students			SAITO SUZUKI TAKEMATSU IHIRA	
7	Etiology analysis method 1:			MOURI Akihiro	
8	Etiology analysis method : cardiovascular disease			NARUSE Hiroyuki	
9	Etiology analysis method 1: image analysis 1			TERAMOTO Atsushi	
10	Etiology analysis method 4: image analysis 2			KOBAYASHI Shigeki	
11	General discussion with students			MOURI NARUSE KOBAYASHI TERAMOTO	
12	Activity assistive devices used for rehabilitation			TANABE Shigeo	
13	Research in the field of medical rehabilitation			TERANISHI Toshio	
14	Basic research that can be applied clinically from the viewpoint of functional anatomy			YAMADA Kouji	
15	General discussion with students			TANABE Shigeo TERANISHI Toshio YAMADA Kouji	
評価法・基準 Grading Policies	Grading will be done based on students' attitude (30%) and discussion with faculty members and other staff (70%) by the Course Manager SAITO Kuniaki.				

教科書 Text Book	Distributed each time	教材・参考書 Reference Book	When necessary, introduced appropriately
オフィス アワー Office Hour	SAITO : by email SUZUKI : by email IHIRA : by email TAKEMATSU : by email MOURI : by email NARUSE : by email TERAMOTO: by email KOBAYASHI : by email TANABE : by email TERANISHI : by email YAMADA : by email	連絡先 Contact	SAITO : SUZUKI : IHIRA : TAKEMATSU : MOURI : NARUSE : TERAMOTO : KOBAYASHI : TANABE : TERANISHI : YAMADA :
準備学習 Preparation of study	Preparatory study of the specified theme for about 30 minutes. The lecture should be reviewed using the handout for about 1 hour after its delivery, and a summary should be written in a notebook.	履修上の注意点 Notice for Students	

## Introduction to medical and health care professional collaboration

専攻分野 Major Field	common(collaboration)	学年 Grade	1st year	期 間 Semester	1st semester
授業形態 Style	lecture	単位 Credits	2	時間数 Hours	30
授業方法 Class Methods	remote class	使用言語 Language	Japanese		
使用言語 Language	Japanese				
担当教員名 Instructor	TERANISHI Toshio, NAGAO Shizuko, MOURI Akihiro, TERAMOTO Atsushi, SEKO Rumi, ICHINO Naohiro, KAWAI Kaoru, ONOGI Keiko, ASADA Yasuki, KAMEI Tetsuya, KOSEKI Takenao				
科目概要 Course Aims	<p>By fusing existing fields (bioinformatics, medic quantum science, rehabilitation therapy science), pharmacy, nursing, nutrition, engineering, business administration, etc., we will conduct practical R &amp; D and foster human resources with various management abilities according to social needs.</p> <p>In these lectures the cross-disciplinary knowledge necessary for community-based human resource development through multi medical professional collaboration, development of pharmaceuticals and medical devices, and evaluation of efficacy and safety. (Omnibus style / Total 15 chapters)</p>				
到達目標 Objectives	<p>The goals of this course are to be able to</p> <ul style="list-style-type: none"> <li>- the effectiveness and safety evaluation of drug and medical device development.</li> <li>- explain the creation of unmet medical needs through medical and health care professionals collaboration.</li> <li>- explain the human resources development based on community based medicine through multi-professional collaboration.</li> </ul>				
回数 Chapters	授業計画(各回のテーマ) Course Schedule (topic for each time)			担当教員 Instructor	
1	Invitation to medical and health care professionals collaboration			TERANISHI Toshio	
2	Development of drug and medical devices from academia			MOURI Akihiro	
3	Evaluation of efficacy and safety of pharmaceuticals and medical devices in clinical practice			KOSEKI Takenao	
4	Drug development and evaluation using animal disease model			NAGAO Shizuko	
5	Advanced technology in the regenerative medicine			NAGAO Shizuko	
6	Unmet medical needs in the field of radiological technology			TERAMOTO Atsushi	
7	Unmet medical needs in the field of medical technology			MOURI Akihiro	
8	Pharmaceutical development by the omics analysis of functional molecules			MOURI Akihiro	
9	Roles and prospects of nursing staff in medical and health care professional collaboration			SEKO Rumi	
10	Transdisciplinary Approach for Dysphagia			ONOGI Keiko	
11	The forefront of medical technology			ICHINO Naohiro	
12	Possibility of medical information			KAMEI Tetsuya	
13	Safety management of diagnostic X-ray			ASADA Yasuki	
14	Development in activity reconstruction and assistive device by Next-generation collaboration in medical science			TERANISHI Toshio	
15	Biochemical evaluation of mental stress			KAWAI Kaoru	
評価法・基準 Grading Policies	<p>Grading will be described based on students' attitude (30%), Reports, seminar materials and oral examinations (70%).</p> <p>In order to measure the level of comprehension of the goals, assign tasks such as reports, material creation, etc., oral examinations for each.</p>				



教科書 Text Book	None	教材・参考書 Reference Book	None
オフィス アワー Office Hour	<p>TERANISHI Toshio: Building 8-7F-704 Monday 8:00-30, 21:10-30 NAGAO Shizuko: 12:00-13:00, Monday-Friday, building 1. TERAMOTO Atsushi: 17:00-18:00, Monday-Friday at 410, building 11. MOURI Akihiro: 10:30-11:30, Wednesday at 328, building 3. SEKO Rumi: Anytime by e-mail ONOGI Keiko: Building 8-7F-708 Monday 17:00-17:30 ICHINO Naohiro: 12:00-13:00, Monday at 208, building 3. KAMEI Tetsuya: 17:00-18:30, Monday-Friday at B108, building 3. ASADA Yasuki: 17:00-18:00, Monday-Friday at 507, building 11. KAWAI Kaoru: Building 11-1F. Monday 12:00-13:00. KOSEKI Takenao: 17:00-18:00, Monday-Thursday at building 9-7F</p>	連絡先 Contact	<p>TERANISHI Toshio: NAGAO Shizuko: TERAMOTO Atsushi: MOURI Akihiro: SEKO Rumi: ONOGI Keiko: ICHINO Naohiro: KAMEI Tetsuya: ASADA Yasuki: KAWAI Kaoru: KOSEKI Takenao:</p>
準備学習 Preparation of study	<p>Preparatory study of the specified theme for about 30 minutes. In addition, perform an extended review for about one hour as the lecture progresses. Be interested in everything and learn with a positive attitude.</p>	履修上の注意点 Notice for Students	<p>To make note books, you can use laptop computer. No things to prepare unless specified.</p>

## **2. Medical Technology Sciences**

## Clinical Laboratory Sciences I, Advanced

専攻分野 Major Field	Clinical Laboratory Sciences	学年 Grade	1st year	期間 Semester	1st semester
授業形態 Style	lecture, seminar	単位 Credits	2	時間数 Hours	30
授業方法 Class Methods	remote class	使用言語 Language	Japanese		
担当教員名 Instructor	SAITO Kuniaki (subject manager), IHIRA Masaru, TAKEMASTU Hiromu,, SUZUKI Koji, NARUSE Hiroyuki				
科目概要 Course Aims	Clinical laboratory science is a field aimed to understand human health through metabolomic status of individuals' body fluids. Therefore, development of the field relies on the development of methodology, enabling actual measurements and analyses. In this advanced seminar, topics are chosen in relation to the development of the clinical laboratory science. Topics includes novel methodologies in mass-spectrometry measurements, gene amplifications, etc. Students will read and discuss their own opinions based on cutting edge articles in the field. This course also aimed for students to plan their own experimental studies.				
到達目標 Objectives	<ol style="list-style-type: none"> <li>1. Understand the current and future clinical laboratory science and able to plan own project.</li> <li>2. Understand fundamental aspects on genetics and genetic modification methods as a basis to understand current biomedical researches. Understand how glycan and lipid expression is regulated as a comparison with proteins, that are directly encoded by gene.</li> <li>3. Learn for gene amplification technology, and understand for the technology to construction of measurement system for gene expression.</li> <li>4. Learn epidemiological study design and field work in epidemiological studies, and understand statistical analysis according to the type of the data and purpose.</li> <li>5. The aim of this course is to help students acquire an understanding of the relationship between physiological cardiac electrical activity and respiratory dynamics in human development from newborn to adulthood.</li> </ol>				
回数 Chapters	授業計画 (各回のテーマ) Course Schedule (topic for each time)			担当教員 Instructor	
1	Scientific direction for the future genomic Research			SAITO Kuniaki	
2	Omix Analysis: Focus on the personalized Medicine			SAITO Kuniaki	
3	Pathological Analysis with using various genetically modified- animals			SAITO Kuniaki	
4	Genetics in biomedical research			TAKEMASTU Hiromu	
5	Genetic engineering and editing of cells			TAKEMASTU Hiromu	
6	Manipulation of glycan or lipids in gene modification			TAKEMASTU Hiromu	
7	Evaluation of reactivation herpesvirus infection by organ-transplantation (virus DNA detection system)			IHIRA Masaru	
8	Evaluation of reactivation Herpesvirus infection by organ-transplantation (Relationship between active infection and clinical symptoms)			IHIRA Masaru	
9	Reactivation of herpesvirus infection by organ-transplantation			IHIRA Masaru	
10	Overview of research design (Observational study)			SUZUKI Koji	
11	Community-based epidemiology			SUZUKI Koji	
12	Statistical analysis according to data types and purpose			SUZUKI Koji	
13	Current diagnosis in cardiovascular disease			NARUSE Hiroyuki	
14	Current treatment in cardiovascular disease			NARUSE Hiroyuki	
15	Impact of acute kidney injury in cardiovascular disease			NARUSE Hiroyuki	

評価法・基準 Grading Policies	Your overall grade in the class will be decided based on the presentation and short reports. Feedback of your presentation will be provided by each instructor.		
教科書 Text Book	Regimen will be provided in the class.	教材・参考書 Reference Book	Not specified
オフィス アワー Office Hour	Contact us by email if you have any questions.	連絡先 Contact	(SAITO Kuniaki) (IHIRA Masaru) (TAKEMASTU Hiromu) (SUZUKI Koji) (NARUSE Hiroyuki)
準備学習 Preparation of study	30 min preparation on each topics are needed.	履修上の注意点 Notice for Students	Doctoral students are advised to summarize each topics after the class.

## Clinical Laboratory Sciences Exercise I (Development of Medical Technology)

専攻分野 Major Field	Clinical Laboratory Sciences	学年 Grade	1st year	期間 Semester	2nd semester
授業形態 Style	exercise, seminar	単位 Credits	2	時間数 Hours	30
授業方法 Class Methods	face-to-face class	使用言語 Language	Japanese		
担当教員名 Instructor	SAITO Kuniaki (subject manager), SUZUKI Koji				
科目概要 Course Aims	<p>To master various technical theories, such as chemical, physical, biological, immunological and informatic methods, which are essential in the medical science field.</p> <p>For the development of new laboratory science and technology, it is necessary to comprehensively and practically learn the fundamentals of analytical technology supported by related academic systems such as analytical chemistry.</p> <p>You will learn these technical features and the knowledge necessary for data analysis and evaluation mainly by reading Japanese and foreign documents and practicing data analysis.</p> <p>Through the explanations and discussions, we will build a base of knowledge and technology that can contribute to the development of laboratory science, such as methods for improving laboratory science and technology, development of advanced analytical instruments, and searching for new biomarkers.</p>				
到達目標 Objectives	<p>The goals of this course are to</p> <ul style="list-style-type: none"> <li>- be able to explain the knowledge and skills of each research by development the ability to the research.</li> <li>- be able to explain the references searched of each research themes.</li> <li>- be able to develop the ability to make presentations with your own thoughts.</li> </ul>				
回数 Chapters	授業計画(各回のテーマ) Course Schedule (topic for each time)			担当教員 Instructor	
1	Medical innovation in the future			SAITO Kuniaki	
2	Relation between Amino acid metabolism and immune function			SAITO Kuniaki	
3	Omix Analyses for new blood biomarker development			SAITO Kuniaki	
4	Omix Analyses for new blood biomarker development: Advanced			SAITO Kuniaki	
5	Scientific evaluation for functional food in human health			SAITO Kuniaki	
6	Scientific evaluation for functional food in human health: Advanced			SAITO Kuniaki	
7	Role of Personal Health Record for mental illness			SAITO Kuniaki	
8	Design and information gathering for field survey			SUZUKI Koji	
9	Study on epigenetics and lifestyle related diseases			SUZUKI Koji	
10	Update on predictive markers of lifestyle related diseases			SUZUKI Koji	
11	Data analysis and evaluation			SUZUKI Koji	
12	Basic operations in R			SUZUKI Koji	
13-14	Practice of statistical analysis with R			SUZUKI Koji	
15	Data Visualization with R: drawing graphs			SUZUKI Koji	
評価法・基準 Grading Policies	<p>Evaluation: Grade is evaluated by the participation during the class.</p> <p>Feedbacks: Assignments are rated when returned.</p>				

教科書 Text Book	Lecture materials are provided in the class when needed.	教材・参考書 Reference Book	Not specified.
オフィス アワー Office Hour	Contact us by email if you have any questions.	連絡先 Contact	(SAITO Kuniaki) (SUZUKI Koji)
準備学習 Preparation of study	30 min preparation on each topics are needed. For exercises using R software, please refer to the materials and download R to your laptop in advance.	履修上の注意点 Notice for Students	Doctoral students are advised to summarize each topics after the class.

## Clinical Laboratory Sciences Exercise II (Molecular Pathogenesis Analysis)

専攻分野 Major Field	Clinical Laboratory Sciences	学年 Grade	1st year	期間 Semester	2nd semester
授業形態 Style	exercise, seminar	単位 Credits	2	時間数 Hours	30
授業方法 Class Methods	face-to-face class	使用言語 Language	Japanese		
担当教員名 Instructor	TAKEMATSU Hiromu (subject manager), IHIRA Masaru				
科目概要 Course Aims	<p>Practice for molecular analysis of pathogenesis from biological information.</p> <p>(IHIRA Masaru) The aim is to acquire the ability to understand cutting-edge diagnostic techniques using published data.</p> <p>(TAKEMASTU Hiromu) In this course, students will be trained to be able to give scientific presentation. This includes choice of original papers published in top-ranked international journals, reading of research papers, deep understanding on the issue and actual presentation. From these experiences, students will learn how to obtain cutting-edge research information needed to conduct their own research activities.</p> <p>(Omnibus method / 15 times in total)</p>				
到達目標 Objectives	<p>The goals of this course are to</p> <ul style="list-style-type: none"> <li>- be able to search and select articles related to the research theme.</li> <li>- be able to acquire knowledge and skills related to the research themes.</li> <li>- be able to present the novelty of the selected articles, its relevance to the research theme, and considerations.</li> </ul>				
回数 Chapters	授業計画(各回のテーマ) Course Schedule (topic for each time)			担当教員 Instructor	
1-3	Choose biomedical original research manuscript utilizing article search function in NCBI system. The paper of choice will be read, summarized in English, to understand how research articles are composed and written.			TAKEMATSU Hiromu	
4-5	Prepare presentation file using presentation software. Also accompanying oral script is prepared, learning what makes a good presentation.			TAKEMATSU Hiromu	
6-7	Present research findings of choice of manuscript as a presentation.			TAKEMATSU Hiromu	
8-12	Learn for the theory and application of gene amplification and quantification technology as a diagnostic method. PCR design method using Web BLAST			IHIRA Masaru	
13-15	Presentation and discussion for the principle of diagnostic methods from published data.			IHIRA Masaru	
評価法・基準 Grading Policies	<p>Evaluation : Grade is evaluated by the participation during the class.</p> <p>Feed-backs : Assignments are rated when returned.</p>				
教科書 Text Book	Lecture materials are provide in the class when needed.	教材・参考書 Reference Book	Not specified		
オフィス アワー Office Hour	Contact us by email if you have any questions.	連絡先 Contact	(TAKEMATSU Hiromu) (IHIRA Masaru)		
準備学習 Preparation of study	30 min preparation on each topics are needed.	履修上の注意点 Notice for Students	Doctoral students are advised to summarize each topics after the class.		

## Clinical Laboratory Sciences Exercise III (Bioinformatics and Physiological Sciences)

専攻分野 Major Field	Clinical Laboratory Sciences	学年 Grade	1st year	期間 Semester	2nd semester
授業形態 Style	exercise, seminar	単位 Credits	2	時間数 Hours	30
授業方法 Class Methods	face-to-face class	使用言語 Language	Japanese		
担当教員名 Instructor	NARUSE Hiroyuki (subject manager)				
科目概要 Course Aims	Exercises to analyze biological information in the physiological sciences and provide a basis for research. Applying the knowledge acquired in the special thesis, we will examine the method of collecting biological information and various analysis techniques required for research pursuing biological functions. In addition, an exercise to polish the thinking process from the idea of research to the application of method and technology is required. Further, students will conduct information retrieval and abstracting of papers necessary for special research projects, and practice on excellent techniques and data analysis methods. (Omnibus method / 15 times in total)				
到達目標 Objectives	<p>The goals of this course are to</p> <ul style="list-style-type: none"> <li>- be able to develop the ability to search and sort documents related to research subjects.</li> <li>- be able to acquire the knowledge and skills related to each research topic.</li> <li>- be able to present “Neues” with own thoughts on the relevance of my research from the literature.</li> </ul>				
回数 Chapters	授業計画(各回のテーマ) Course Schedule (topic for each time)			担当教員 Instructor	
1 - 15	<ol style="list-style-type: none"> <li>1. Simultaneous recording of respiratory movement and cardiac electrical activity.</li> <li>2. Physiological treatment of myocardial depolarization and repolarization.</li> <li>3. Cardiac electrophysiological assessment of human postnatal development.</li> </ol>			NARUSE Hiroyuki	
評価法・基準 Grading Policies	<p>Evaluation: Grade is evaluated by the participation during the class. Feed-backs: Assignments are rated when returned.</p>				
教科書 Text Book	"Gayton Physiology" Genyo Mitarai et al.: Elsevier Japan Distribute materials every time from faculty member.	教材・参考書 Reference Book	"Ganong Physiology", translated by Yasunobu Okada et al.: Maruzen Advanced Concepts in Arrhythmias. Marriott Conover Professional and academic journals in each field.		
オフィス アワー Office Hour	Contact us by email if you have any questions. Every after class Day and time: Appointment required Field: University Building No. 3, 2F-206	連絡先 Contact	(NARUSE Hiroyuki)		
準備学習 Preparation of study	30 min preparation on each topic are needed. Read and summarize the dissertation distributed by each faculty member (preparation study). • Read and summarize the basic knowledge about biological information distributed by teacher.	履修上の注意点 Notice for Students	Doctoral students are advised to summarize each topic after the class.		



## Graduate Thesis of Clinical Laboratory Sciences

専攻分野 Major Field	Clinical Laboratory Sciences	学年 Grade	1st ・ 2nd ・ 3rd year	期間 Semester	full year
授業形態 Style	exercise, research	単位 Credits	6	時間数 Hours	180
授業方法 Class Methods	face-to-face class	使用言語 Language	Japanese		
担当教員名 Instructor	SAITO Kuniaki, SUZUKI Koji, IHIRA Masaru, TAKEMASTU Hiromu, NARUSE Hiroyuki				
科目概要 Course Aims	<p>Highly specialized knowledge can be acquired by conducting research activities on research themes.</p> <p>You will develop the ability to promote a series of research activities, such as setting research themes, drafting research plans, analyzing experiments, and writing dissertations.</p> <p>(SAITO Kuniaki)</p> <p>To understand the mechanism of biological responses from body in both healthy and various diseases condition, especially focus on the preemptive medicine, with using omics analysis such as proteome and metabolome analysis. To learn the impact for a personal health record and development for new technique for the new diagnostic system for drug efficacy, side effects, and companion diagnosis.</p> <ol style="list-style-type: none"> <li>1. Amino acid metabolism and immunity</li> <li>2. Preemptive medicine for blood new biomarker</li> <li>3. Scientific evaluation of functional foods</li> </ol> <p>(SUZUKI Koji)</p> <p>Through molecular epidemiological study using high-performance liquid chromatography and genomic analysis, we will contribute to elucidating the mechanism of lifestyle related diseases and aim to establish disease prevention from a new perspective.</p> <ol style="list-style-type: none"> <li>1. Molecular epidemiological study on prevention of lifestyle-related diseases</li> <li>2. Large-scale cohort study of cancer risk factors</li> </ol> <p>(IHIRA Masaru)</p> <p>Through clinical virological research, we will provide research for elucidate the pathogenesis of herpesvirus infection, such as HHV-6 and VZV, and reactivated infection following transplantation.</p> <ol style="list-style-type: none"> <li>1. Elucidation of pathogenesis of immunosuppressed patients who infected HHV-6, such as organ transplantation.</li> <li>2. Development of rapid diagnostic method for new biomarkers using isothermal amplification method</li> </ol> <p>(TAKEMASTU Hiromu)</p> <p>How to conduct research activity in the laboratory will be the starting point for development of researchers. Therefore, candidate students will be trained to acquire research skills.</p> <p>Following are projected studies students would be involved, aiming to understand still elusive functions of cellular glycans and lipids</p> <ol style="list-style-type: none"> <li>1. Glycan-mediated signal modification downstream of B cell antigen receptor to produce antibody</li> <li>2. CRISPR gene-editing screening for genetic understanding of cellular factors required for giant cell formation through endomitosis</li> <li>3. Glycan/Lipid functional analyses utilizing genetically modified model organisms/cells</li> </ol> <p>(NARUSE Hiroyuki)</p> <p>Comprehensively analyze clinical data of various cardiovascular diseases and clarify the pathophysiology of the diseases.</p> <ol style="list-style-type: none"> <li>1. Identification of high-risk plaques in patients with coronary artery disease</li> <li>2. Efficacy of the COVID-19 vaccine in patients with cardiovascular disease</li> </ol>				

到達目標 Objectives	The goals of this exercise are to - able to explain major methods and theories. - able to evaluate major studies in terms of their methods and results. - able to acquire the ability to write a dissertation in English.		
回数 Chapters	授業計画(各回のテーマ) Course Schedule (topic for each time)		担当教員 Instructor
1-10 (1st year)	1. Understanding of the background of research 2. Planning of research 3. Preparation for examination application 1) Clinical Research Ethics Review Committee 2) Recombinant DNA Experiment Safety Committee 3) Animal Experiment Committee		SAITO Kuniaki SUZUKI Koji IHIRA Masaru TAKEMASTU Hiromu NARUSE Hiroyuki
11-15 (1st year)	After reviewing the research plan and approval of each committee, promote research activities.		
16-60 (2nd year)	1. Analyze of experimental data. 2. Discuss the literature using the experiment data. 3. Create an academic paper and submit it to an academic journal.		
61-90 (3rd year)	1. Continue research activities and develop your research. 2. Summarize the results and create a dissertation		
長期履修 授業計画 Lecture plan for Long-term study	Students who wish to study for a long time will consult with their research advisor according to the duration of the course and make a class plan.		
評価法・基準 Grading Policies	Evaluation: Comprehensive evaluation based on presentations at academic conferences, a cademic papers and doctoral dissertations. Participation in a three-field joint research seminar is mandatory. Feedbacks: Assignments are rated when returned.		
教科書 Text Book	Lecture materials are provided in the class when needed.	教材・参考書 Reference Book	Not specified.
オフィス アワー Office Hour	Contact us by email if you have any questions.	連絡先 Contact	(SAITO Kuniaki) (SUZUKI Koji) (IHIRA Masaru) (TAKEMASTU Hiromu) (NARUSE Hiroyuki)
準備学習 Preparation of study	Efforts to create a doctoral dissertation are important. Respect for personal information and ethics.	履修上の注意点 Notice for Students	Doctoral students are advised to summarize each topic after the class.

## **3. Radiation Sciences**

## Radiological Sciences, Advanced

専攻分野 Major Field	Quantum and Radiological Science	学年 Grade	1st year	期間 Semester	1st semester
授業形態 Style	Lecture, Seminar	単位 Credits	2	時間数 Hours	30
授業方法 Class Methods	remote class	使用言語 Language	Japanese		
担当教員名 Instructor	KOBAYASHI Shigeki				
科目概要 Course Aims	Current course deals radiation technology, theory and methods concerning image information processing applied in the field of radiology. We will discuss the latest basic technologies and clinical applications in a wide range of fields, including X-ray diagnostic equipment, CT, MRI, flat panel detectors, contrast agents, nuclear medicine diagnostic devices (SPECT, PET), PACS, etc.				
到達目標 Objectives	<ol style="list-style-type: none"> <li>1. To understand the theory of medical image information processing.</li> <li>2. To understand the latest imaging technology for each modality in the field of radiology.</li> <li>3. To understand the clinical application of clinical image information processing for each modality.</li> </ol>				
回数 Chapters	授業計画(各回のテーマ) Course Schedule (topic for each time)			担当教員 Instructor	
1	Theory of Signal Imaging: Image Reconstruction by Analytical Methods			KOBAYASHI Shigeki	
2	Theory of Signal Imaging: Image Reconstruction by Iterative Approximation			KOBAYASHI Shigeki	
3	Theory of Signal Imaging: Image Reconstruction by Statistical Methods			KOBAYASHI Shigeki	
4	Latest Imaging Technology: CT			KOBAYASHI Shigeki	
5	Clinical Application of Clinical Image Information Processing: CT-1			KOBAYASHI Shigeki	
6	Clinical Application of Clinical Image Information Processing: CT-2			KOBAYASHI Shigeki	
7	Latest Imaging Technology: MRI			KOBAYASHI Shigeki	
8	Clinical Application of Clinical Image Information Processing: MRI-1			KOBAYASHI Shigeki	
9	Clinical Application of Clinical Image Information Processing: MRI-2			KOBAYASHI Shigeki	
10	Latest Imaging Technology: Nuclear Medicine			KOBAYASHI Shigeki	
11	Clinical Application of Clinical Image Information Processing: Nuclear Medicine-1			KOBAYASHI Shigeki	
12	Clinical Application of Clinical Image Information Processing: Nuclear Medicine-2			KOBAYASHI Shigeki	
13	State-of-the-art imaging technology: Mammography			KOBAYASHI Shigeki	
14	Clinical Application of Clinical Image Information Processing: Mamography-1			KOBAYASHI Shigeki	
15	Clinical Application of Clinical Image Information Processing: Mamography-2			KOBAYASHI Shigeki	
評価法・基準 Grading Policies	Presentations on issues (70%) and discussion content (30%) will be comprehensively evaluated.				
教科書 Text Book	Handout the necessary materials.		教材・参考書 Reference Book		

オフィス アワー Office Hour	Kobayashi: Perform by e-mail.	連絡先 Contact	KOBAYASHI :
準備学習 Preparation of study	Be interested in everything and take a positive attitude.	履修上の注意点 Notice for Students	Bring a laptop with Office installed.

## Radiological Sciences Exercise

専攻分野 Major Field	Quantum and Radiological Science	学年 Grade	1st year	期間 Semester	2nd semester
授業形態 Style	Practice, Seminar	単位 Credits	2	時間数 Hours	30
授業方法 Class Methods	face-to-face class	使用言語 Language	Japanese		
担当教員名 Instructor	KOBAYASHI Shigeki				
科目概要 Course Aims	We will read original papers and explanatory papers related to radiology, medical radiology, medical imaging informatics, etc., and discuss the contents of the paper and the description method. Students will be able to read English papers quickly, understand outlines quickly, find important matters, and understand them correctly. The purpose of this practice is to learn how to conduct research and experiments, and to build papers, and to make use of them in their own research. (Omnibus system / 15 classes in total)				
到達目標 Objectives	<ol style="list-style-type: none"> <li>1. Can understand and briefly explain key English terminology in radiology, medical radiology, radiology management, and medical imaging informatics.</li> <li>2. Can read abstracts of English papers in about 10 minutes and understand the outline.</li> <li>3. In the text of an English paper, can read a page in less than 30 minutes and understand the outline.</li> <li>4. Can understand and explain the diagrams and tables of English papers.</li> <li>5. It is possible to verify and comment on the method, result, and closing of the English paper that I have subscribed to.</li> </ol>				
回数 Chapters	授業計画(各回のテーマ) Course Schedule (topic for each time)			担当教員 Instructor	
1	Reading new literature related to nuclear medicine diagnostic equipment			KOBAYASHI Shigeki	
2-5	Reading new literature related to clinical image information processing technology			KOBAYASHI Shigeki	
6	Reading an English paper on the application of magnetic resonance imaging (MRI) to medical research			KOBAYASHI Shigeki	
7	Reading an English paper on preclinical MRI for experimental small animals			KOBAYASHI Shigeki	
8	Reading an English paper on preclinical MRI (Brain Function Imaging)			KOBAYASHI Shigeki	
9	Reading an English paper on preclinical MRI (perfusion imaging method for the brain)			KOBAYASHI Shigeki	
10	Reading an English paper on preclinical MRI (diffusion-weighted imaging method for the brain)			KOBAYASHI Shigeki	
11	PET Latest English Papers on Diagnostic Radiopharmaceuticals			KOBAYASHI Shigeki	
12	Subscribe to the latest English paper on PET diagnosis 1			KOBAYASHI Shigeki	
13	Subscribe to the latest English paper on PET diagnosis 2			KOBAYASHI Shigeki	
14	Reading the latest English paper on photon counting technology 1			KOBAYASHI Shigeki	
15	Reading the latest English paper on photon counting technology 2			KOBAYASHI Shigeki	
評価法・基準 Grading Policies	Issue report (70%) and discussion content (30%). The subject manager (Kobayashi ) will evaluate it comprehensively.				
教科書 Text Book	Handout the necessary materials.	教材・参考書 Reference Book	Bring a laptop with Office installed.		

オフィス アワー Office Hour	Kobayashi: Perform by e-mail.	連絡先 Contact	Kobayashi
準備学習 Preparation of study	Be interested in everything and take a positive attitude. Understand the outline of the English paper and briefly summarize the important matters.	履修上の注意点 Notice for Students	Bring a laptop with Office installed.

## Graduate Thesis of Radiological Sciences

専攻分野 Major Field	Quantum and Radiological Science	学年 Grade	1st・2nd・3rd year	期間 Semester	full year
授業形態 Style	Practice	単位 Credits	6	時間数 Hours	180
授業方法 Class Methods	face-to-face class	使用言語 Language	Japanese		
担当教員名 Instructor	KOBAYASHI Shigeki				
科目概要 Course Aims	<p>In this course, we conduct extensive research essential for the development of researchers and educators with knowledge of cutting-edge radiological science and technology.</p> <p>We analyze and understand the functions and structure of the human body using biometric information obtained from medical images, and practice and provide guidance on cutting-edge radiation medicine application research with a focus on research themes related to diagnostic imaging based on morphology and functional information. We provide paper guidance that can transmit information to society by presenting them in academic societies and academic journals in radiological sciences.</p> <p>(KOBAYASHI Shigeki)</p> <p>To understand the principles of photon-counting X-ray measurement and how to utilize energy information. We conduct a basic study on the imaging image and material identification function using a photon counting type X-ray detector and conduct research on the development of next-generation mammography for clinical use. For imaging modalities such as CT, MRI, and RI, we also conduct research on clinically useful software development using artificial intelligence (A.I.).</p>				
到達目標 Objectives	<ol style="list-style-type: none"> <li>1. Can decide on research topics and research related literature.</li> <li>2. Can decide on the framework of research promotion, gain research methods, and conduct research.</li> <li>3. The interpretation and consideration of the research results can be logically established.</li> <li>4. To write a doctoral dissertation</li> </ol>				
回数 Chapters	授業計画(各回のテーマ) Course Schedule (topic for each time)			担当教員 Instructor	
1-10 (1st year)	To examine and organize the previous research and understand the research trends in Japan and overseas. To set up research topics and develop research plans, and to prepare applications for examination of the Ethics Review Committee on Epidemiology and Clinical Research and the Animal Experiment Committee.			Each supervisor	
11-15 (1st year)	Review the research plan and ethics review committee for epidemiology and clinical research, and the Animal Experiment Committee. To prepare for research and develop research activities.				
16-60 (2nd year)	Data collection, investigation, and experimentation in line with research plans, data analysis, discussion of research results, interpretation and evaluation of data, and consideration using relevant literature are carried out. To create an academic paper and submit it to a specialized academic journal.				
61-90 (3rd year)	Continue research activities, develop research content, and compile the results to produce a dissertation.				
長期履修 授業計画 Long-term study Class plan	Long-term students should consult with their research supervisor simply according to the duration of the course and make a lesson plan.				
評価法・基準 Grading Policies	Participation in three fields joint research seminars in the field is mandatory. Evaluations are comprehensively based on academic presentations, academic papers, and doctoral dissertations.				



教科書 Text Book		教材・参考書 Reference Book	
オフィス アワー Office Hour	Kobayashi: Perform by e-mail.	連絡先 Contact	Kobayashi:
準備学習 Preparation of study	Actively explore themes with autonomy.	履修上の注意点 Notice for Students	

## **4. Rehabilitation Sciences**

## Rehabilitation Therapy Science, Advanced I (Rehabilitation Educational Sciences)

専攻分野 Major Field	Rehabilitation Science	学年 Grade	1st year	期間 Semester	1st semester
授業形態 Style	lecture	単位 Credits	2	時間数 Hours	30
授業方法 Class Methods	remote class	使用言語 Language	Japanese		
担当教員名 Instructor	KANADA Yoshikiyo, SAKURAI Hiroaki, INAMOTO Yoko				
科目概要 Course Aims	Education for therapists can be divided into pre-graduate education, such as classroom and clinical training, post-graduate education for novice therapists, and education for clinical training instructors. In this course, students attend lectures and discussions on 1) standardization of clinical skills in physical therapist education, 2) reliability, validity, and usefulness of Objective Structured Clinical Examination (OSCE), and 3) educational methods in clinical training for students, training for novice therapists, and training for clinical training instructors.				
到達目標 Objectives	<ol style="list-style-type: none"> <li>1. Explain the present state and problems of physical therapist education in Japan.</li> <li>2. Explain the techniques for clinical skill standardization and the reliability, validity, and effectiveness of OSCE.</li> <li>3. Explain student clinical training, training of novice physical therapists, and training of clinical training instructors.</li> </ol>				
回数 Chapters	授業計画(各回のテーマ) Course Schedule (topic for each time)			担当教員 Instructor	
1	Current knowledge of physical therapist student education in Japan			KANADA Yoshikiyo INAMOTO Yoko	
2	Current knowledge of physical therapists' clinical training in Japan			KANADA Yoshikiyo INAMOTO Yoko	
3	Current knowledge of physical therapy postgraduate education in Japan			KANADA Yoshikiyo INAMOTO Yoko	
4	Current knowledge of the OSCE in physical therapist education			KANADA Yoshikiyo INAMOTO Yoko	
5	Reliability and validity study of OSCE in physical therapist education			SAKURAI Hiroaki INAMOTO Yoko	
6	Current knowledge of clinical skill standardization using OSCE			SAKURAI Hiroaki INAMOTO Yoko	
7	Clinical Skills Assessment using OSCE (Level 1: Communication and nursing care techniques)			SAKURAI Hiroaki INAMOTO Yoko	
8	Clinical Skills Assessment using OSCE (Level 2: Assessment and measurement techniques)			SAKURAI Hiroaki INAMOTO Yoko	
9	Clinical Skills Assessment using OSCE (Level 3: Motion analysis)			SAKURAI Hiroaki INAMOTO Yoko	
10	Clinical Skills Assessment using OSCE (Level 3: Therapeutic techniques)			SAKURAI Hiroaki INAMOTO Yoko	
11	Effects of clinical training in physical therapist education			SAKURAI Hiroaki INAMOTO Yoko	
12	Effects of clinical technical education in physical therapist education			SAKURAI Hiroaki INAMOTO Yoko	
13	Relationship between advanced clinical technical education using OSCE and clinical training			SAKURAI Hiroaki INAMOTO Yoko	
14	Education methods for clinical training			SAKURAI Hiroaki INAMOTO Yoko	
15	Education methods for novice therapists			SAKURAI Hiroaki INAMOTO Yoko	
評価法・基準 Grading Policies	Grading will be considered comprehensively based on discussions held during the lecture (30%), and reports (70%) by course instructor. The points which do not reach the goal are fed back in the lecture.				

<p>教科書 Text Book</p>	<p>Distribute materials each lecture.</p>	<p>教材・参考書 Reference Book</p>	<p>Saitoh E, general ed., Kanada Y, et al., eds. OSCE for PT/OT Practical text for developing clinical skills. Kanehara Shuppan.</p>
<p>オフィス アワー Office Hour</p>	<p>KANADA Yoshikiyo Building 8-1F-106 Monday 12:00-13:00 SAKURAI Hiroaki Building 8-1F-106 Monday 12:00-13:00 INAMOTO Yoko Building 8-7F-703</p> <p>E-mail us if you have any questions.</p>	<p>連絡先 Contact</p>	<p>KANADA Yoshihiro  SAKURAI Hiroaki  INAMOTO Yoko</p>
<p>準備学習 Preparation of study</p>	<p>Prepare each theme for 30 minutes and gather the opinions. After the lecture, review for about 60 minutes using handouts and compile in a notebook.</p>	<p>履修上の注意点 Notice for Students</p>	

## Rehabilitation Therapy Science, Advanced II (Motor Control Instrumentation Sciences)

専攻分野 Major Field	Rehabilitation Science	学年 Grade	1st year	期間 Semester	1st semester
授業形態 Style	lecture	単位 Credits	2	時間数 Hours	30
授業方法 Class Methods	remote class	使用言語 Language	Japanese		
担当教員名 Instructor	YAMADA Kouji, TANABE Shigeo, TAKEDA Kotaro				
科目概要 Course Aims	In this lecture, students will learn practical methods to summarize related studies for motor control and functional recovery in rehabilitation, and deepen their understanding by discussing critically the latest knowledge with clinical, anatomical, and physiological principles. In order to understand related studies and to promote the students' thesis, they will also learn about measurement instruments, biomedical measurements, signal processing, statistical methods, and programming.				
到達目標 Objectives	<ol style="list-style-type: none"> <li>1. Explain the latest researches and trends in motion control and functional recovery.</li> <li>2. Interpret and explain the data and methods of biological measurement.</li> <li>3. Explain the programming of biological measurement, signal processing, and statistics.</li> <li>4. Select optimal statistical processing methods and interpret the data appropriately.</li> </ol>				
回数 Chapters	授業計画(各回のテーマ) Course Schedule (topic for each time)			担当教員 Instructor	
1	Survey of previous findings and significance of researches			TAKEDA Kotaro	
2	Investigation of research trends			TAKEDA Kotaro	
3	Perception of manuscript structure, and reading comprehension from a critical perspective			TAKEDA Kotaro	
4	Measurement and evaluation from an anatomical point of view			YAMADA Kouji	
5	Measurement and evaluation from a physiological point of view			YAMADA Kouji	
6	Measurement and evaluation from a biochemical perspective			YAMADA Kouji	
7	Measurement and evaluation from a molecular biology perspective			YAMADA Kouji	
8	Concept and implementation of virtual instrumentation in rehabilitation engineering			TANABE Shigeo	
9	Data acquisition and signal processing from various biometric instruments			TANABE Shigeo	
10	Statistical analysis method used for research on motion control			TANABE Shigeo	
11	Programming in instrument technology (Concept)			TANABE Shigeo	
12	Programming in instrument technology (Implementation)			TANABE Shigeo	
13	Programming in signal and statistical processing (Concept)			TAKEDA Kotaro	
14	Programming in signal and statistical processing (Algorithm)			TAKEDA Kotaro	
15	Programming in signal and statistical processing (Implementation)			TAKEDA Kotaro	
評価法・基準 Grading Policies	Grading will be comprehensively based on assigned reports (70%) and contributions to discussions including oral examinations (30%) in each lecture.				
教科書 Text Book	Distribute materials each lecture.		教材・参考書 Reference Book		

<p>オフィス アワー Office Hour</p>	<p>YAMADA Kouji Building 8-7F-707 Monday, Wednesday 19:00-20:00 TANABE Shigeo Building 8-1F-112 Monday 12:10-13:00 TAKEDA Kotaro Nanakuri Memorial Hospital In the day of lecture</p>	<p>連絡先 Contact</p>	<p>YAMADA Kouji TANABE Shigeo TAKEDA Kotaro</p>
<p>準備学習 Preparation of study</p>	<p>Students prepare each theme for 30 minutes and gather the opinions. After the lecture, review for about 60 minutes using handouts and compile in their notebook.</p>	<p>履修上の注意点 Notice for Students</p>	

## Rehabilitation Therapy Sciences Exercise I (Rehabilitation Educational Sciences)

専攻分野 Major Field	Rehabilitation Science	学年 Grade	1st year	期間 Semester	2nd semester
授業形態 Style	seminar	単位 Credits	2	時間数 Hours	30
授業方法 Class Methods	face-to-face class	使用言語 Language	Japanese		
担当教員名 Instructor	KANADA Yoshikiyo, SAKURAI Hiroaki, INAMOTO Yoko				
科目概要 Course Aims	<p>For the training of therapists who can respond to advanced medical care and diversified needs of patients, this practicum provides a place to discuss more effective teaching methods for pre-graduate education, including classroom and clinical training; post-graduate education for novice therapists; and instructor education for clinical training instructors. Specifically, the discussion proceeds through the topic of clinical skills education using Objective Structured Clinical Examination (OSCE). The discussions also include topics on the content of training for instructors to ensure effective clinical training. In addition, the discussions include topics on a new education system in which university teachers and clinical training instructors work together. Students practice statistical processing using statistical software. By practicing the process from data analysis to presentation, students learn basic research methods.</p>				
到達目標 Objectives	<ol style="list-style-type: none"> <li>1. Explain the problem of physical therapist education in Japan and the solution.</li> <li>2. Explain the clinical technical competence assessment of physical therapists using OSCE.</li> <li>3. Select appropriate statistical processing methods, implement and interpret.</li> </ol>				
回数 Chapters	授業計画(各回のテーマ) Course Schedule (topic for each time)			担当教員 Instructor	
1	Problems and Solutions for Physical Therapist Education in Japan 1			KANADA Yoshikiyo INAMOTO Yoko	
2	Problems and Solutions for Physical Therapist Education in Japan 2			KANADA Yoshikiyo INAMOTO Yoko	
3	Problems and Solutions for Physical Therapist Education in Japan 3			KANADA Yoshikiyo INAMOTO Yoko	
4	Problems and Solutions for Physical Therapist Education in Japan 4			KANADA Yoshikiyo INAMOTO Yoko	
5	Exercises using data from OSCE to assess clinical technical competence (Level 1)			SAKURAI Hiroaki INAMOTO Yoko	
6	Exercises using data from OSCE to assess clinical technical competence (Level 2)			SAKURAI Hiroaki INAMOTO Yoko	
7-8	Exercises using data from OSCE to assess clinical technical competence (Level 3)			SAKURAI Hiroaki INAMOTO Yoko	
9	Examination of the adequacy of clinical technical education and clinical training using OSCE			SAKURAI Hiroaki INAMOTO Yoko	
10	Examination of the training contents in the training of clinical training instructors			SAKURAI Hiroaki INAMOTO Yoko	
11	Examination of a new education system for university teachers and training instructors			SAKURAI Hiroaki INAMOTO Yoko	
12	Statistical Analysis (1) Learning statistical concepts			SAKURAI Hiroaki INAMOTO Yoko	
13	Statistical analysis (2) Learning basic statistical methods			SAKURAI Hiroaki INAMOTO Yoko	
14	Statistical analysis (3) Learning statistical analysis methods using clinical data 1			SAKURAI Hiroaki INAMOTO Yoko	
15	Statistical analysis (4) Learning statistical analysis methods using clinical data 2			SAKURAI Hiroaki INAMOTO Yoko	
評価法・基準 Grading Policies	Grading will be considered comprehensively based on students' attitude, performance, and discussions during the lecture (30 %), and reports (70%) by course instructor.				

<p>教科書 Text Book</p>	<p>Distribute materials each lecture.</p>	<p>教材・参考書 Reference Book</p>	<p>Saitoh E, general ed., Kanada Y, et al., eds. OSCE for PT/OT Practical text for developing clinical skills. Kanehara Shuppan. Takehara T. SPSS Recommendations. Kitaoji Shobo Publishing.</p>
<p>オフィス アワー Office Hour</p>	<p>KANADA Yoshikiyo Building 8-1F-106 Monday 12:00-13:00 SAKURAI Hiroaki Building 8-1F-106 Monday 12:00-13:00 INAMOTO Yoko Building 8-7F-703  E-mail us if you have any questions.</p>	<p>連絡先 Contact</p>	<p>KANADA Yoshihiro  SAKURAI Hiroaki  INAMOTO Yoko</p>
<p>準備学習 Preparation of study</p>	<p>Prepare each theme for 30 minutes and gather the opinions. After the lecture, review for about 60 minutes using handouts and compile in a notebook.</p>	<p>履修上の注意点 Notice for Students</p>	



## Rehabilitation Therapy Sciences Exercise II (Motor Control Instrumentation Sciences)

専攻分野 Major Field	Rehabilitation Science	学年 Grade	1st year	期間 Semester	2nd semester
授業形態 Style	seminar	単位 Credits	2	時間数 Hours	30
授業方法 Class Methods	face-to-face class	使用言語 Language	Japanese		
担当教員名 Instructor	YAMADA Kouji, TANABE Shigeo, TAKEDA Kotaro				
科目概要 Course Aims	<p>In this exercise, students read original papers and reviews related to motor control, functional recovery, biomedical measurements, and rehabilitation engineering, and discuss the contents of the papers and how to describe them. In the discussion, the students deeply understand the physiological meaning of motor control, signal processing of biomedical signals, and statistical methods, and utilized them for their own research. The students also learn the techniques necessary to present research results, such as how to create figures and tables, through the preparation of materials for discussion.</p>				
到達目標 Objectives	<ol style="list-style-type: none"> <li>1. Explain research trends and latest knowledge on motor control, functional recovery, biomedical measurements, and rehabilitation engineering.</li> <li>2. Verify and state opinions on the methods, results, and discussions of the paper.</li> <li>3. Deliver relevant presentations using appropriate figures / tables.</li> <li>4. Select appropriate statistical processing methods and implement them.</li> </ol>				
回数 Chapters	授業計画(各回のテーマ) Course Schedule (topic for each time)			担当教員 Instructor	
1-5	Reading and discussion of latest English papers on motor control and functional recovery			YAMADA Kouji TANABE Shigeo TAKEDA Kotaro	
6-10	Reading and discussion of latest English papers on biomedical measurements			YAMADA Kouji TANABE Shigeo TAKEDA Kotaro	
11-15	Reading and discussion of latest English papers on rehabilitation engineering			YAMADA Kouji TANABE Shigeo TAKEDA Kotaro	
評価法・基準 Grading Policies	Grading will be comprehensively based on assigned reports (70%) and contributions to discussions including oral examinations (30%) in each lecture.				
教科書 Text Book	Distribute materials each lecture.		教材・参考書 Reference Book		
オフィス アワー Office Hour	YAMADA Kouji Building 8-7F-707 Monday, Wednesday 19:00-20:00 TANABE Shigeo Building 8-1F-112 Monday 12:10-13:00 TAKEDA Kotaro Building 8-1F-112 In the day of lecture		連絡先 Contact	YAMADA Kouji TANABE Shigeo TAKEDA Kotaro	
準備学習 Preparation of study	Students spend more than 60 minutes preparing English papers related to each topic and understand the outline before participating in the seminar. After the seminar, students review them for about 30 minutes and write down important points in their notebook.		履修上の注意点 Notice for Students		

## Graduate Thesis of Rehabilitation Therapy Science

専攻分野 Major Field	Rehabilitation Science	学年 Grade	1st ・ 2nd ・ 3rd year	期 間 Semester	full year
授業形態 Style	seminar	単位 Credits	6	時間数 Hours	180
授業方法 Class Methods	face-to-face class	使用言語 Language	Japanese		
担当教員名 Instructor	KANADA Yoshikiyo, SAKURAI Hiroaki, YAMADA Kouji, INAMOTO Yoko, TANABE Shigeo, TAKEDA Kotaro				
科目概要 Course Aims	<p>In this seminar, students will conduct research related to rehabilitation, the science of helping recover the activities. In research on physical therapist education, we will examine educational methods for training medical staff who can contribute to team medical care and have high teaching ability. This study also includes topics on the adequacy of clinical education and clinical training using Objective Structured Clinical Examination (OSCE) in physical therapists. This study also includes the topic of practical training in training instructors. Also, a new educational system that strengthens cooperation between university teachers and practical training instructors will be explained. Specifically, to standardize clinical skills, clinical skills will be practiced through simulated patients with stroke and osteoarticular systems. In research on motor systems, we will research motor control, motor learning, and rehabilitation engineering. Specifically, we will conduct basic research in simulated patients and clinical research in patients on postural control during movement, therapeutic learning, rehabilitation robots, etc. Through advice for the thesis, the students will have the skills to present their findings at academic conferences and academic journals in their specialized fields and disseminate information to society.</p> <p>KANADA Yoshikiyo</p> <p>We will try to explain all topics related to physical therapist education from a scientific perspective and the perspective of Evidence-Based Medicine (EBM). Specifically, the following points: 1. What is a physical therapist with high quality? 2. The evaluation scale of the skills of physical therapists. The following are specific themes.</p> <ol style="list-style-type: none"> <li>1. Studies on the outcomes of physical therapist education</li> <li>2. Studies on the standardization of treatment techniques for physical therapists</li> <li>3. Studies on the clinical training guide for physical therapists</li> <li>4. Studies on the student, novice physical therapist, and patient education</li> </ol> <p>SAKURAI Hiroaki</p> <p>We will try to explain how to train highly skilled medical staff who can contribute to team medical care.</p> <ol style="list-style-type: none"> <li>1. Studies on the clinical technical education and clinical training using Objective Structured Clinical Examination (OSCE)</li> <li>2. Studies on the efficiency improvement of clinical training by training of practical training instructors</li> <li>3. Studies on the new educational guidance system for physical therapists</li> <li>4. Studies on the standardization of treatment techniques for physical therapists</li> <li>5. Studies on the usefulness of Objective Structured Clinical Examination (OSCE), Problem Based Learning (PBL), and Team-Based Learning (TBL)</li> <li>6. Studies on the development of clinical competence assessment methods</li> <li>7. Studies on the postgraduate education of novice physical therapists</li> <li>8. Studies on the patient guidance methods</li> </ol>				

科目概要 Course Aims	<p>YAMADA Kouji</p> <p>Based on gross and histological knowledge and theory of skeletal muscle, bone, ligaments, tendons, and joints, based on morphological and structural observations regarding problems that occur in the rehabilitation treatment process in clinical practice, judgment of prognosis, etc. Research on the functional analysis that does not stay in range, and create a doctoral dissertation. Further, the present invention is similarly carried out in the biological control field of neural control and humoral control. In this process, students learn the attitude toward research as a scientist through a series of doctoral dissertation creation processes, such as devising research themes, clarifying the progress of prior research, drafting research plans, conducting experiments, and studying.</p> <ol style="list-style-type: none"> <li>1. Research from a preventive medical point of view applied to humans from basic research using disease model animals.</li> <li>2. Structural analysis methods such as bone morphometry and biochemical analysis of humoral factors.</li> <li>3. Research on biological control mechanism by humoral factors represented by myokines.</li> </ol>	
	<p>INAMOTO Yoko</p> <p>This course will conduct a research related to swallowing and dysphagia rehabilitation. Research aims to elucidate the physiology of swallowing and to elaborate the swallowing exercise using kinematic and/or kinetic analysis, such as swallowing CT and high resolution manometry.</p> <ol style="list-style-type: none"> <li>1. Studies on the physiology of swallowing</li> <li>2. Studies of the pathophysiology of dysphagia</li> <li>3. Studies on the swallowing exercise and maneuvers</li> </ol>	
	<p>TANABE Shigeo</p> <p>We will conduct research related to rehabilitation therapy science, especially rehabilitation engineering. Rehabilitation engineering is research field to develop practical devices and methods based on clinical problems and requests. The following are specific themes.</p> <ol style="list-style-type: none"> <li>1. Studies on the rehabilitation robots</li> <li>2. Studies on the development of motion analysis and treatment methods</li> </ol>	
	<p>TAKEDA Kotaro</p> <p>Based on instrumentation engineering, rehabilitation engineering, neuroscience, and cognitive science, the following studies on biomedical measurement, clinical evaluation, and intervention will be conducted.</p> <ol style="list-style-type: none"> <li>1. Studies on the scalp electroencephalogram and surface electromyogram</li> <li>2. Studies on the clinical evaluation and database</li> <li>3. Studies on motion analysis</li> <li>4. Studies on motor imagery</li> </ol>	
到達目標 Objectives	<ol style="list-style-type: none"> <li>1. Choose a research topic and search for relevant literature.</li> <li>2. Determine the framework for promoting research, learn the research methods, and conduct.</li> <li>3. Interpretant and consider the research results logically.</li> <li>4. Write a doctoral thesis.</li> </ol>	
回数 Chapters	授業計画(各回のテーマ) Course Schedule (topic for each time)	担当教員 Instructor
1-4 (1st year)	Search for previous studies and related literature	Each instructor
5-10 (1st year)	Review of related literature	
11-15 (1st year)	Research planning	

16-18 (2nd year)	Pre-experiment		
19-20 (2nd year)	Preparation of documents to the epidemiology and clinical research ethics review board		
21-24 (2nd year)	Data measurement		
25-28 (2nd year)	Data review		
29-60 (2nd year)	Data measurement, write an academic paper and submit to a journal		
61-75 (3rd year)	Flow creation of the thesis		
76-90 (3rd year)	Preparation of a thesis		
長期履修 授業計画 Long-term study Class plan	Long-term students should discuss with their research advisors and plan research schedule according to the period of study.		
評価法・基準 Grading Policies	Grading will be considered comprehensively based on the contents of academic conferences, academic papers (40%), and doctoral thesis (60%). However, participation in 4-field joint research seminars is mandatory.		
教科書 Text Book		教材・参考書 Reference Book	
オフィス アワー Office Hour	KANADA Yoshikiyo Building 8-1F-106 Monday 12:00-13:00 SAKURAI Hiroaki Building 8-1F-106 Monday 12:00-13:00 YAMADA Kouji Building 8-7F-707 Monday, Wednesday 19:00-20:00 INAMOTO Yoko Building 8-7F-703 Monday, Wednesday, Friday 8:00-9:00 TANABE Shigeo Building 8-1F-112 Monday 12:10-13:00 TAKEDA Kotaro Nanakuri Memorial Hospital, Building 8-1F-112 In the day of lecture  E-mail us if you have any questions.	連絡先 Contact	KANADA Yoshikiyo  SAKURAI Hiroaki  YAMADA Kouji  INAMOTO Yoko  TANABE Shigeo  TAKEDA Kotaro
準備学習 Preparation of study	Students should actively pursue their own themes.	履修上の注意点 Notice for Students	

## **5. Medical and Health Care Sciences**

## Medical and health care professional collaboration

専攻分野 Major Field	Medical and health care professional collaboration	学年 Grade	1st year	期間 Semester	1st semester
授業形態 Style	lecture	単位 Credits	2	時間数 Hours	30
授業方法 Class Methods	remote class	使用言語 Language	Japanese		
担当教員名 Instructor	TERANISHI Toshio, ICHINO Naohiro, ASADA Yasuki, KAMEI Tetsuya, SUGAMA Junko, TAKEHARA Kimie				
科目概要 Course Aims	Professional collaboration, regional partnerships and international partnerships have become important key words with the progress in healthcare. In these lectures the cross-disciplinary knowledge necessary for community-based human resource development through multi medical professional collaboration, development of pharmaceuticals and medical devices, and evaluation of efficacy and safety. (Omnibus style / Total 15 chapters)				
到達目標 Objectives	The goals of this course are to be able to - classify and explain various collaborations in the health and medical fields. - explain the current status of research on various collaborations in the health and medical fields. - explain the problems of various collaborations in the health and medical fields.				
回数 Chapters	授業計画(各回のテーマ) Course Schedule (topic for each time)			担当教員 Instructor	
1	Invitation to advanced course for medical and health care professional collaboration			TERANISHI Toshio	
2	Introduction to Information Science			KAMEI Tetsuya	
3	Information Science Practical Theory			KAMEI Tetsuya	
4	An orientation to Implementation science			SUGAMA Junko	
5	Theories, frameworks, and models in implementation science			SUGAMA Junko	
6	Measures and outcomes in Implementation science			SUGAMA Junko	
7	Implementation strategies			SUGAMA Junko	
8	Role of Medical technology in medical and health care professional collaboration			ICHINO Naohiro	
9	Relationship between ultrasonography and pathophysiology			ICHINO Naohiro	
10	Role of the X-ray examination in the medical and health care professional collaboration			ASADA Yasuki	
11	Safety use of diagnostic X-ray examinations			ASADA Yasuki	
12	Cooperation of professionals for activity reconstruction using support system			TERANISHI Toshio	
13	Epidemiology and health statistics in clinical research			SUGAMA Junko TAKEHARA Kimie	
14	Epidemiology and health statistics in international joint research			SUGAMA Junko TAKEHARA Kimie	
15	Utilization of 3D motion analysis system for professionals cooperation			TERANISHI Toshio	
評価法・基準 Grading Policies	Grading will be described based on students' attitude (30%), Reports, seminar materials and oral examinations (70%). In order to measure the level of comprehension of the goals, assign tasks such as reports, material creation, etc., oral examinations for each.				
教科書 Text Book	None		教材・参考書 Reference Book	None	

<p>オフィス アワー Office Hour</p>	<p>TERANISHI Toshio: Building 8-7F-704 Monday 8:00-30, 21:10-30 ICHINO Naohiro: 12:00-13:00, Monday at 208, building 3. ASADA Yasuki: 17:00-18:00, Monday-Friday at 507, building 11. KAMEI Tetsuya: 17:00-19:00, Monday-Friday at B1 108, building 3. SUGAMA Junko: at 405, building 8.</p>	<p>連絡先 Contact</p>	<p>TERANISHI Toshio: ICHINO Naohiro: ASADA Yasuki: KAMEI Tetsuya: SUGAMA Junko:</p>
<p>準備学習 Preparation of study</p>	<p>Preparatory study of the specified theme for about 30 minutes. In addition, perform an extended review for about one hour as the lecture progresses. Be interested in everything and learn with a positive attitude.</p>	<p>履修上の注意点 Notice for Students</p>	<p>To make note books, you can use laptop computer. No things to prepare unless specified.</p>

## Graduate Seminar of medical and health care professional collaboration

専攻分野 Major Field	Medical and health care professional collaboration	学年 Grade	1st year	期間 Semester	2nd semester
授業形態 Style	Seminar	単位 Credits	2	時間数 Hours	30
授業方法 Class Methods	face-to-face class	使用言語 Language	Japanese		
担当教員名 Instructor	TRERANISHI Toshio, ICHINO Naohiro, ASADA Yasuki, KAMEI Tetsuya, SUGAMA Junko, MURAYAMA Ryoko				
科目概要 Course Aims	With the progress in healthcare, professional collaboration, regional partnerships and international partnerships have become important key words. However, the scientific study on the system is not sufficient. In this exercise, we will visit a job site, experience, and read the research papers. We will explanations and discussions on interprofessional collaboration with practical practices. Then, we will explore the problems and their solutions and create a foothold for special research. In this way, we will explore the problems and their solutions and use them as a starting point for special research. (Omnibus style / Total 15 chapters)				
到達目標 Objectives	The goals of this course are to be able to - propose solutions to various problems of cooperation in the fields of health, medical care and welfare.				
回数 Chapters	授業計画(各回のテーマ) Course Schedule (topic for each time)			担当教員 Instructor	
1	Introduction of medical and health care professional collaboration			TERANISHI Toshio	
2	Literature introduction and reading on ICT utilization			KAMEI Tetsuya	
3	Literature introduction and reading on data science			KAMEI Tetsuya	
4	Structure and content of clinical practice guideline			SUGAMA Junko	
5	Systematic review in clinical practice guideline			SUGAMA Junko	
6	Critical assessment of quality of clinical practice guideline 1			MURAYAMA Ryoko SUGAMA Junko	
7	Critical assessment of quality of clinical practice guideline 2			MURAYAMA Ryoko SUGAMA Junko	
8	Usefulness of pathophysiology in interprofessional Health-care collaboration 1			ICHINO Naohiro	
9	Usefulness of pathophysiology in interprofessional Health-care collaboration 2			ICHINO Naohiro	
10	Introduction and subscription of literature on utilization of diagnostic X-ray examinations 1			ASADA Yasuki	
11	Introduction and subscription of literature on safety use of diagnostic X-ray examinations 2			ASADA Yasuki	
12	Current status of medical and health care professional collaboration (Mini review presentation and discussion 1)			TERANISHI Toshio	
13	Current status of medical and health care professional collaboration (Mini review presentation and discussion 2)			TERANISHI Toshio	
14	Current status of medical and health care professional collaboration (Mini review presentation and discussion 3)			TERANISHI Toshio	
15	Current status of medical and health care professional collaboration (Mini review presentation and discussion 4)			TERANISHI Toshio	
評価法・基準 Grading Policies	Grading will be described based on students' attitude (30%), Reports, seminar materials and oral examinations (70%). In order to measure the level of comprehension of the goals, assign tasks such as reports, material creation, etc., oral examinations for each.				



教科書 Text Book	None	教材・参考書 Reference Book	None
オフィス アワー Office Hour	<p>TERANISHI Toshio: Building 8-7F-704 Monday 8:00-30, 21:10-30</p> <p>ICHINO Naohiro: 12:00-13:00, Monday at 208, building 3.</p> <p>ASADA Yasuki: 17:00-18:00, Monday-Friday at 507, building 11.</p> <p>KAMEI Tetsuya: 17:00-19:00, Monday-Friday at B1 108, building 3.</p> <p>SUGAMA Junko: Building 8-4F-405 Monday 17:00-18:00</p>	連絡先 Contact	<p>TERANISHI Toshio:</p> <p>ICHINO Naohiro:</p> <p>ASADA Yasuki:</p> <p>KAMEI Tetsuya:</p> <p>SUGAMA Junko:</p>
準備学習 Preparation of study	<p>Preparatory study of the specified theme for about 30 minutes. In addition, perform an extended review for about one hour as the lecture progresses.</p> <p>Be interested in everything and learn with a positive attitude.</p>	履修上の注意点 Notice for Students	<p>To make note books, you can use laptop computer.</p> <p>No things to prepare unless specified.</p>

## Graduate Thesis of medical and health care professional collaboration

専攻分野 Major Field	Medical and health care professional collaboration	学年 Grade	1st ・ 2nd ・ 3rd year	期 間 Semester	full year
授業形態 Style	Seminar	単位 Credits	6	時間数 Hours	180
授業方法 Class Methods	face-to-face class	使用言語 Language	Japanese		
担当教員名 Instructor	ICHINO Naohiro, ASADA Yasuki, TERANISHI Toshio, ONOGI Keiko, SUGAMA Junko MURAYAMA Ryoko				
科目概要 Course Aims	<p>In the special research, clarify your own theme for research regarding cooperation among professionals, regional alliances, international alliances, and regional comprehensive care, and prepare a research plan. Next, submitting the research plan to the Ethics Committee for approval. In addition to conducting research, preparing and publishing a reference tarticle, creating and presenting a doctoral thesis.</p> <p>(ICHINO Naohiro)</p> <p>We will make a progress with doctor's thesis focused on the ultrasonography which is increasingly needed in home medical care. Students will learn a doctoral dissertation writing progresses such as selection of research theme, review of previous studies, planning of research plan, research methods and discussion of results. Through writing a doctoral dissertation, students will also learn important things for research, such as scientist conscience, attitude toward research and creative ideas. We have three research themes.</p> <ol style="list-style-type: none"> <li>1. A novel scoring system for non-invasive and differential diagnosis of NAFLD/NASH.</li> <li>2. Development of biomarkers for pre-arteriosclerosis diagnosis to preemptive medicine.</li> </ol> <p>(ASADA Yasuki)</p> <p>The aim is to study on radiation exposure of the diagnostic X-ray which the medical stuff included, to write a doctoral thesis. In that, to learn the choice of the study theme, the review of previous studies, planning of the study plan, experiment, and discussion in a series of process of writing paper. In addition, through the writing of the doctoral thesis, to learn the conscience of the scientist, the attitude toward study, an original idea, the way of the study. The theme is gathered to following three.</p> <ol style="list-style-type: none"> <li>1. Study on evaluation of the patient doses for diagnostic X-ray examinations</li> <li>2. Study on measurement of the patient doses for diagnostic X-ray examinations</li> <li>3. Study on occupational radiation exposure of the medical stuff</li> </ol> <p>(TERANISHI Toshio)</p> <p>With the advancement of medical specialization and differentiation, problems that cannot be solved without the cooperation of professionals are occurring. In this special research, a doctoral thesis will be created using keywords such as activity, intervention, and behavior change. In the course, students will learn a series of a doctoral thesis writing processes, such as selecting a research theme, reviewing previous research, drafting a research plan, experimenting, and considering. In addition, through writing a doctoral thesis, students will learn how to conduct research, including the conscience of scientists, attitudes toward research, and creative ideas. Themes are summarized in the following four.</p> <ol style="list-style-type: none"> <li>1. Research on posture and movement of patients and healthcare workers.</li> <li>2. Research on quantitative measurement of spasticity</li> <li>3. Research on fall prevention, fall risk evaluation and patient management.</li> <li>4. Research on time study and consequences of rehabilitation intervention.</li> </ol>				

<p>科目概要 Course Aims</p>	<p>(ONOGI Keiko) The seamless medical cooperation from the acute stage to the maintenance stage is needed in the aging society. In this course, a doctoral dissertation will be created using the key words 'elderly care'. Students will master writing processes of articles such as consideration of a research theme, review of previous researches, drafting a research plan, experiment, and discussion. And students will learn the conscience of scientists, the attitude toward research, the original ideas, and the way of research. Themes are grouped into the following three, 1. Research for deconditioning of elderly 2. Research for relationship of functional independence of patients and burden of caregivers 3. Research for dysphagia of patients with cognitive disorders</p> <p>(SUGAMA Junko) 1. Development of evidence and its implementation for prevention and management of chronic wound and vulnerable skin tissue 2. Development of evidence and its implementation for nursing interventions and clinical skills 3. Evaluation of nursing role and function in the interdisciplinary approach to the health care</p> <p>(MURAYAMA Ryoko) 1. Research on the creation of evidence-based care technology and the construction of system for social implementation 2. Research on the development and implementation of education tools for dissemination of care technology</p>		
<p>到達目標 Objectives</p>	<p>The goals of this course are to be able to - decide the research subject and investigate the related literature. - determine the framework for promoting research, learn the research methods, and conduct research. - interpret and discuss your research results logically. - write a doctoral thesis.</p>		
<p>回数 Chapters</p>	<p>授業計画(各回のテーマ) Course Schedule (topic for each time)</p>	<p>担当教員 Instructor</p>	
<p>1-10 (1st year)</p>	<p>Continue research activities and summarize the results to create a thesis. Creating a research plan and making research planning document. Applying for a document to the relevant ethics committee.</p>	<p>Each research supervisor</p>	
<p>11-15 (1st year)</p>	<p>With the approval of the relevant ethics committee, proceeding with research preparations and starting research activities.</p>		
<p>16-60 (2nd year)</p>	<p>Data collection / survey / experiment, data analysis, discussion of research results, interpretation and evaluation of data, and consideration using relevant literature according to the research plan.</p>		
<p>61-90 (3rd year)</p>	<p>Continuing research activities. Compilation the results and creating a thesis.</p>		
<p>長期履修 授業計画 Long-term study Class plan</p>	<p>Long-term students will consult with their research supervisor according to the duration of the course and make a course plan.</p>		
<p>評価法・基準 Grading Policies</p>	<p>Grading will be described based on students' attitude (30%), Reports, seminar materials and oral examinations (70%). In order to measure the level of comprehension of the goals, assign tasks such as reports, material creation, etc., oral examinations for each.</p>		
<p>教科書 Text Book</p>	<p>None</p>	<p>教材・参考書 Reference Book</p>	<p>None</p>

<p>オフィス アワー Office Hour</p>	<p>ICHINO Naohiro: 12:00-13:00, Monday at 208, building 3. ASADA Yasuki: 17:00-18:00, Monday-Friday at 507, building 11. TERANISHI Toshio: Building 8-7F-704 Monday 8:00-30, 21:10-30 ONOGI Keiko: Building 8-7F-708 Monday 17:00-17:30 SUGAMA Junko: at 405, building 8.</p>	<p>連絡先 Contact</p>	<p>ICHINO Naohiro:  ASADA Yasuki:  TERANISHI Toshio:  ONOGI Keiko:  SUGAMA Junko:</p>
<p>準備学習 Preparation of study</p>	<p>None</p>	<p>履修上の注意点 Notice for Students</p>	<p>None</p>

## Healthcare Regulatory Science Lecture

専攻分野 Major Field	Healthcare Regulatory Science	学年 Grade	1st year	期間 Semester	1st semester
授業形態 Style	lecture, seminar	単位 Credits	2	時間数 Hours	30
授業方法 Class Methods	remote class	使用言語 Language	Japanese (partly in English)		
担当教員名 Instructor	TERAMOTO Atsushi, MOURI Akihiro, KOSEKI Takenao, SUGIHARA Kazuhiro, NAGAO Shizuko,				
科目概要 Course Aims	In this seminar, instructors will give lectures on regulatory science, which applies the outcomes obtained from basic and clinical research to the development and evaluation of new medicine (diagnostic agents, therapeutics) and medical devices. Concretely, this seminar conduct discussion about 1) development of diagnostic drugs, therapeutic agents, medical devices and functional foods, physiology, pharmacology, pharmacokinetic, and statistics, 2) past health hazard by diagnostic drugs, therapeutic agents, medical devices and functional foods and safety evaluation using cell culture and animal experiments.				
到達目標 Objectives	The goals of this course are to - be able to understand regulatory science that applies the outcomes obtained from basic and clinical research to the development and evaluation of new drugs (diagnostic drugs and therapeutics) and medical devices.				
回数 Chapters	授業計画(各回のテーマ) Course Schedule (topic for each time)			担当教員 Instructor	
1	Pathophysiological hypothesis of depression and development of antidepressants			MOURI Akihiro	
2	Validity of animal models in the development of antidepressants			MOURI Akihiro	
3	Pathophysiological hypothesis of schizophrenia and development of antipsychotics			MOURI Akihiro	
4	Validity of animal models in the development of antipsychotics			MOURI Akihiro	
5	Basics of medical information analysis and processing (Statistical analysis)			TERAMOTO Atsushi	
6	Application of medical information analysis and processing (Artificial intelligence)			TERAMOTO Atsushi	
7	Basics of image analysis technology (Basic image processing techniques)			TERAMOTO Atsushi	
8	Application of image analysis technology (Clinical applications of image processing techniques)			TERAMOTO Atsushi	
9	Clinical development strategies for new drugs			KOSEKI Takenao	
10	Regulatory science in pharmaceutical regulatory affairs			KOSEKI Takenao	
11	The concept of quality in cell and gene therapy products			MOURI Akihiro	
12	The concept of efficacy and safety in cell and gene therapy products			MOURI Akihiro	
13	Development of diagnosis agents for the hereditary diseases			NAGAO Shizuko	
14	Development of therapeutics for the hereditary diseases			NAGAO Shizuko	
15	Development of therapeutics for cancer			SUGIHARA Kazuhiro	
評価法・基準 Grading Policies	Your overall grade in the class will be decided based on the presentation 60% and short reports 40%. Feedback of your presentation will be provided by each instructor.				
教科書 Text Book			教材・参考書 Reference Book	Lecture materials are provided in the class when needed.	

<p>オフィス アワー Office Hour</p>	<p>Representative contact SUGIHARA Kazuhiro: Anytime by e-mail NAGAO Shizuko: 12:00-13:00, Monday-Friday, building 1. TERAMOTO Atsushi: 17:00-18:00, Monday-Friday at 410, building 11. MOURI Akihiro: 10:30-11:30, Wednesday at 328, building 3. KOSEKI Takenao: 9:30-11:30, Wednesday at 7<sup>th</sup> floor, building 9.</p>	<p>連絡先 Contact</p>	<p>(SUGIHARA Kazuhiro)  (NAGAO Shizuko)  (TERAMOTO Atsushi)  (MOURI Akihiro)  (KOSEKI Takenao)</p>
<p>準備学習 Preparation of study</p>	<p>Students are expected to read the documents for 30 minutes before class.</p>	<p>履修上の注意点 Notice for Students</p>	<p>Students are advised to summarize each seminar after the class.</p>

## Healthcare Regulatory Science Seminar

専攻分野 Major Field	Healthcare Regulatory Science	学年 Grade	1st year	期 間 Semester	2nd semester
授業形態 Style	lecture, seminar	単位 Credits	2	時間数 Hours	30
授業方法 Class Methods	face-to-face class	使用言語 Language	Japanese (partly in English)		
担当教員名 Instructor	NAGAO Shizuko, TERAMOTO Atsushi, MOURI Akihiro, KOSEKI Takenao				
科目概要 Course Aims	This seminar is an educational meeting in which a group of individuals discuss research articles, to keep themselves abreast of new knowledge, promoting in them the awareness of current research findings, teaching them to critique and appraise research, and encourage them to utilize research in evidence based practice of the specialty.				
到達目標 Objectives	<p>The goals of this course are to</p> <ul style="list-style-type: none"> <li>- be able to introduce research articles about hot experimental topics</li> <li>- be able to understand the experimental procedure in research articles</li> <li>- be able to perform conference presentation and write articles about their own research results</li> </ul>				
回数 Chapters	授業計画(各回のテーマ) Course Schedule (topic for each time)			担当教員 Instructor	
1	Screening for the psychiatric drug discovery (1)			MOURI Akihiro	
2	Screening for the psychiatric drug discovery (2)			MOURI Akihiro	
3	Statistical analysis-based medical information analytical technics (1)			TERAMOTO Atsushi	
4	Statistical analysis-based medical information analytical technics (2)			TERAMOTO Atsushi	
5	Drug development of based on the signal transduction analysis (1)			NAGAO Shizuko	
6	Drug development of based on the signal transduction analysis (2)			NAGAO Shizuko	
7	Artificial intelligence-based medical information analytical technics (1)			TERAMOTO Atsushi	
8	Artificial intelligence-based medical information analytical technics (2)			TERAMOTO Atsushi	
9	Latest information of biomarker development for mental illness			MOURI Akihiro	
10	Latest information of cell and gene therapy			MOURI Akihiro	
11	Latest information of therapeutic expand indication			NAGAO Shizuko	
12	Trend of translational research in mental illness			MOURI Akihiro	
13	Technology of image biomarker development using artificial intelligence			TERAMOTO Atsushi	
14	Clinical research using electronic medical record data			KOSEKI Takenao	
15	Clinical research using real world data			KOSEKI Takenao	
評価法・基準 Grading Policies	Your overall grade in the class will be decided based on the presentation 60% and short reports 40%. Feedback of your presentation will be provided by each instructor.				
教科書 Text Book			教材・参考書 Reference Book		

<p>オフィス アワー Office Hour</p>	<p>Representative contact NAGAO Shizuko: 12:00-13:00, Monday-Friday, building 1. TERAMOTO Atsushi: 17:00-18:00, Monday-Friday at 410, building 11. MOURI Akihiro: 10:30-11:30, Wednesday at 328, building 3. KOSEKI Takenao: 9:30-11:30, Wednesday at 7<sup>th</sup> floor, building 9.</p>	<p>連絡先 Contact</p>	<p>(NAGAO Shizuko)  (TERAMOTO Atsushi)  (MOURI Akihiro)  (KOSEKI Takenao)</p>
<p>準備学習 Preparation of study</p>	<p>Students are expected to read the documents for 30 minutes before class.</p>	<p>履修上の注意点 Notice for Students</p>	<p>Students are advised to summarize each seminar after the class.</p>



## Graduate Thesis of Healthcare Regulatory Science

専攻分野 Major Field	Healthcare Regulatory Science	学年 Grade	1st・2nd・3rd year	期間 Semester	full year
授業形態 Style	practice, seminar	単位 Credits	6	時間数 Hours	180
授業方法 Class Methods	face-to-face class	使用言語 Language	Japanese (partly in English)		
担当教員名 Instructor	YAMADA Shigeki, NAGAO Shizuko, TERAMOTO Atsushi, MOURI Akihiro				
科目概要 Course Aims	<p>With the aim of developing medicine (diagnostic agents, therapeutics), medical devices, and functional foods, students will cultivate the ability to promote a series of research activities (1. acquiring advanced expertise, 2. setting up research topics, 3. making research plans, 4. conducting experiments, research, and analysis, and 5. preparing research papers) in according with the research themes by instructors.</p> <p>Instructor: YAMADA Shigeki            1. Evaluation of efficacy and safety of pharmaceuticals in clinical practice            2. Proper use of pharmaceuticals based on pharmacokinetics</p> <p>Instructor: NAGAO Shizuko            1. Drug development targeting signal transduction            2. Drug development using comprehensive omics analysis of in vitro/in vivo disease model</p> <p>Instructor: TERAMOTO Atsushi            1. Development of disease detection and analysis technology using artificial intelligence            2. Development of high-resolution CT imaging technology</p> <p>Instructor: MOURI Akihiro            1. Development of pharmaceuticals and functional foods using animal models            2. Exploration of biomarkers and development of diagnostic drugs</p>				
到達目標 Objectives	<p>The goals of this course are to</p> <ul style="list-style-type: none"> <li>- be able to clarify the research theme and search the related research articles.</li> <li>- be able to create the experimental plan, acquire advanced expertise and conduct researches.</li> <li>- be able to explain and discuss research data,</li> <li>- be able to prepare manuscript for doctor's thesis</li> </ul>				
回数 Chapters	授業計画(各回のテーマ) Course Schedule (topic for each time)			担当教員 Instructor	
1-15 (1st year)	Students review previous researches, understand research trends in Japan and abroad, build research topics and develop research plans. Based on the research plans, students prepare applications for the ethics review committee, the recombinant DNA laboratory safety committee, and the animal experiment committee.			YAMADA Shigeki NAGAO Shizuko TERAMOTO Atsushi MOURI Akihiro	
16-60 (2nd year)	Students search and read articles related to research topics, acquire advanced expertise, conduct researches and analyze obtained data.				
61-90 (3rd year)	Students summarize and analyze experimental data focused on research topics, present at academic meeting in Japan and abroad, and prepare and present doctor's thesis.				
長期履修 授業計画 Long-term study Class plan	Long-term course students should consult with their research supervisor and make an experiment plan based on the duration of the course.				

評価法・基準 Grading Policies	<ul style="list-style-type: none"> <li>•Your overall grade is comprehensively evaluated based on attendance attitude, submitted conference papers, conference presentations, and doctor's thesis.</li> <li>•Feedback of your presentation at the group meeting or conference will be provided by an each instructor.</li> </ul>		
教科書 Text Book		教材・参考書 Reference Book	
オフィス アワー Office Hour	Representative contact YAMADA Shigeki: 17:00-18:00, Wednesday at outpatient building B1F director of pharmacy room NAGAO Shizuko: 12:00-13:00, Monday-Friday, building 1. TERAMOTO Atsushi: 17:00-18:00, Monday-Friday at 410, building 11. MOURI Akihiro: 10:30-11:30, Wednesday at 328, building 3.	連絡先 Contact	(YAMADA Shigeki)  (NAGAO Shizuko)  (TERAMOTO Atsushi)  (MOURI Akihiro)
準備学習 Preparation of study	Describing an experiment notebook to check progress of doctor's thesis.	履修上の注意点 Notice for Students	