The Graduate School of Medical Sciences
Kumamoto University
(Master's Course)

AY2026 Syllabus

A1 Morphological Human Physiology
A2 Functional Human Physiology
A3 General Social Medicine
A4 General Clinical Medicine
A5 Research Ethics and Biomedical Ethics
B1 Clinical Pathology
B2 Infection and Immunology
B3 Metabolic Informatics
B4 Neuroscience
B5 Heredity Reproduction Medicine
B6 Medical Informatics
B7 Introduction for Laboratory Animal Experiments
B8 Basic Radiology
C1 Medical Experiment Course
C2 Medical and Life Science Seminar
C3 Medicine and Life Science Training (Master's course)
English (GSMS)

Course Coding(科目ナンバー)	Year/Semester/Term(年度・学期)	Faculty Offering Course(時間割所属・時間割コード)	Eligible Student Year(開講年次)	Credits(単位数)	Weekday and Period(曜日・時限)
RMM5-000-79-2	2026spring	Graduate School of Medical Sciences (10190)	1, 2	1	others

Course Title(Theme)(科目名(講義題目))	Instructor(s)(担当教員)
Morphological Human Physiology　(For students admitted in 2023 and later)(A1)	WAKAYAMA Tomohiko, SHIMAMURA Kenji, Arima Yuichiro, OGAWA Minetaro, Okae Hiroaki, KOMOHARA Yoshihiro, Fujihara Yukio, NUMAKAWA Tadahiro

Goals with their ratio(学修成果とその割合)
1.Advanced expert knowledge, skill and research capability ‥‥40% 2.Profound inter-disciplinary knowledge ‥‥30% 3.Global perspective and ability to take initiative action ‥‥20% 4.Social leadership drive ‥‥10%

Type of Class(授業の形態)	Lecture
Teaching Method(授業の方法)	Didactic manner, utilizing Power point.
Course Goals(授業の目的)	Understanding normal structure of human body by anatomy, histology and embryology and mechanism of disease by pathology.
Course Learning goals(学修目標)	【A level (A水準)】 【C level (C水準)】
Course Outline(授業の概要)	Explaining systematically normal structure of human body with gross anatomic and microscopic level, and ontogenic perspectives. Explaining the mechanism of diseases classified systematically.

Details for Individual Classes(各回の授業内容)

No.(回)	Date(月日)	Class Theme(授業テーマ)	Brief Outline of Class(内容概略)
1	04/14	Tue. 1st period Histology Wakayama Tomohiko	Structure, function and development of the reproductive system
2	04/14	Tue. 2nd period Pathology1 Komohara Yoshihiro	Inflammation
3	04/17	Fri. 1st Anatomy Arima Yuichiro	Structure and function of the circulatory system
4	04/17	Fri. 2nd period Embryology1 Okae Hiroaki	Placental development and pregnancy
5	04/22	Wed. 1st period Pathology2 Fujiwara Yukio	Metabolic disorder
6	04/22	Wed. 2nd period Embryology2 Numakawa Tadahiro	Function of neurons in the central nervous system and neurological diseases
7	04/27	Mon. 1st period Embryology3 Ogawa Minetaro	Specification of mesoderm cell lines
8	04/27	Mon. 2nd period Embryology4 Shimamura Kenji	Formation and regionalization of ectoderm

Estimated out-of-class study time	
Required Textbook(テキスト)	Nothing
Reading List(参考文献)	Developmental Biology (ISBN-10:1605358746) Histology: A Text and Atlas: With Correlated Cell and Molecular Biology (ISBN-10:1975115368)
Enrollment Conditions(履修条件)	
Assessment Methods and Criteria(評価方法・基準)	
Language Used in Instruction(使用言語)	Japanese and English
Textbook/Material Language(教科書・資料の言語)	Combination of Japanese and English
Course Based on Practical Work Experience(実務経験を活かした授業)	Not applicable

Course Coding(科目ナンバー)	Year/Semester/Term(年度・学期)	Faculty Offering Course(時間割所属・時間割コード)	Eligible Student Year(開講年次)	Credits(単位数)	Weekday and Period(曜日・時限)
RMM5-001-79-2	2026spring	Graduate School of Medical Sciences (10200)	1, 2	1	others

Course Title(Theme)(科目名(講義題目))	Instructor(s)(担当教員)
Functional Human Physiology (For students admitted in 2023 and later)(A2)	OSHIUMI Hiroyuki, TOMIZAWA Kazuhito, Shinya Oki, IWAMOTO Kazuya, Hitoshi Takizawa, YAMAGATA Kazuya, Sou Bunketsu, IRIE Atsushi

Goals with their ratio(学修成果とその割合)
1.Advanced expert knowledge, skill and research capability ‥‥25% 2.Profound inter-disciplinary knowledge ‥‥25% 3.Global perspective and ability to take initiative action ‥‥25% 4.Social leadership drive ‥‥25%

Type of Class(授業の形態)	Lecture
Teaching Method(授業の方法)	Face-to-face class.
Course Goals(授業の目的)	The goal of this course is to understand and discuss how the human body's molecules, cells, tissues, and organs function in light of physiology and cell biology.
Course Learning goals(学修目標)	【A level (A水準)】 1.The classes dealing with cell biology illustrate the structure of the cell membrane; transport and signal transduction across the membrane; protein transport, modification, arrangement, degradation, as well as the cell organelles involved in these functions; cytoskeletons; and the molecular motors that control cell type and motility, and molecular mechanisms of cancer development due to dysregulation of genes expression. 2. The classes that deal with physiology illuminate neurological functions (e.g. senses, motion, and memory) as well as cellular and molecular mechanisms that maintain the homeostasis of a living organism. 3.Classes dealing with biochemistry illustrate metabolic pathways in the human body and their relation to pathological conditions. 4.Classes of immunology cover the molecules, cells, tissues, and organs that comprise the immune system, and instruct the molecular mechanism by which the immune system recognizes and removes various infectious organisms. 【C level (C水準)】
Course Outline(授業の概要)	This course provides students with opportunities to understand and discuss how the human body's molecules, cells, tissues, and organs function in light of physiology and cell biology. Cell biology helps students understand how cells, the basic unit of the human body, work. Physiology, on the other hand, helps students understand the mechanisms behind the human body's physiological functions.

Details for Individual Classes(各回の授業内容)

No.(回)	Date(月日)	Class Theme(授業テーマ)	Brief Outline of Class(内容概略)
1	04/15	1st Hiroyuki Oshiumi	Immune response to viral infection
2	04/15	2nd Atsushi Irie	Autoimmune disorders
3	04/20	1st Kazuya Yamagata	Glucose metabolism and diabetes mellitus
4	04/20	2nd Wen-Jie Song	Sensorineural hearing loss
5	04/23	1st Shinya Oki	Spatial gene expression
6	04/23	2nd Hitoshi Takizawa	Hematopoietic stem cell
7	04/28	1st Kazuhito Tomizawa	Learning and emotional memory
8	04/28	2nd Kazuya Iwamoto	Roles of mobile elements in the brain

Estimated out-of-class study time	
Required Textbook(テキスト)	No textbooks have been specified but handouts summarizing the lecture will be distributed.
Reading List(参考文献)	1.Sylvia S. Mader, Human Biology, translated by Takeo Sakai and Takao Okada, Igaku-Shoin, October 2005 2.Bruce Alberts, Alexander Johnson, Peter Walter, Julian Lewis, Molecular Biology of the Cell, January 2008
Enrollment Conditions(履修条件)	Should have basic knowledge for biology.
Assessment Methods and Criteria(評価方法・基準)	Grading will be based on the student's understanding of the course subject matter. The students' understanding will be evaluated on the basis of papers and quizzes related to the topics dealt with in class to be scored from 0 to 100. Final grades will be based on the average score of the papers and quizzes as well as participation in class discussions.
Language Used in Instruction(使用言語)	Japanese
Textbook/Material Language(教科書・資料の言語)	Japanese
Course Based on Practical Work Experience(実務経験を活かした授業)	Not applicable

Course Coding(科目ナンバー)	Year/Semester/Term(年度・学期)	Faculty Offering Course(時間割所属・時間割コード)	Eligible Student Year(開講年次)	Credits(単位数)	Weekday and Period(曜日・時限)
RMM5-002-81-2	2026spring	Graduate School of Medical Sciences (10030)	1, 2	2	others

Course Title(Theme)(科目名(講義題目))	Instructor(s)(担当教員)
General Social Medicine(A3)	SANO Rie, Katou Takahiko, MATSUI Kunihiko, SASAO Ako, SOEJIMA Hirofumi, Lu Xi, MASUDA Shota, TSUTSUMI Hiroshi

Goals with their ratio(学修成果とその割合)
1.Advanced expert knowledge, skill and research capability ‥‥25% 2.Profound inter-disciplinary knowledge ‥‥25% 3.Global perspective and ability to take initiative action ‥‥10% 4.Social leadership drive ‥‥40%

Type of Class(授業の形態)	Lecture
Teaching Method(授業の方法)	PowerPoint will be used in the lectures, and active participation in the discussion is encouraged.
Course Goals(授業の目的)	Environmental and socio-medical sciences are vital spheres of medicine. Students will study health care and legal measures designed to protect an individual's basic human rights and ensure public safety.
Course Learning goals(学修目標)	【A level (A水準)】 Students will study health care and legal measures designed to protect an individual's basic human rights and ensure public safety. 【C level (C水準)】 Students will study health care and legal measures designed to protect an individual's basic human rights and ensure public safety.
Course Outline(授業の概要)	This course consists of some socio-medical fields; health medicine, public health, and forensic medicine. Classes on health medicine provide the clinical nutrition. Classes on public health include practical lectures on environmental dynamics; the relationship between the environment and people; environmental indicators and assessment; establishing and maintaining environmental standards; the concept of public health; nurturing a healthy society through preventive medicine; and epidemiology, the discipline that underpins public health. Lectures on forensic medicine lay the groundwork for everything from identifying and classifying causes of death to medical, legal, and social aspects of death.

Details for Individual Classes(各回の授業内容)

No.(回)	Date(月日)	Class Theme(授業テーマ)	Brief Outline of Class(内容概略)
1		Takahiko Katoh (e-learning only)	Public Health: Studies General Theory and Concepts
2		Takahiko Katoh (e-learning only)	Public Health: Epidemiology
3		Takahiko Katoh (e-learning only)	Public Health: Behavioral Medicine
4		Shota Masuda (e-learning only)	Public Health: Sets of statistics of a population in Japan
5		Shota Masuda(e-learning only)	Public Health: Infection control measures in Japan
6	04/24	2nd period: Kunihiko　Matsui	General Medicine：Clinical studies, design, and outcome settings
7		Xi Lu　(e-learning only)	Public Health: Medical Statistics
8		Xi Lu (e-learning only)	Public Health：Research Design of Epidemiology
9	05/01	1st period: Hirofumi Soejima	Health Medicine: Coronary Risk Factor
10	05/01	2nd period: Hirofumi Soejima	Health Medicine: Ischemic Heart Disease
11	05/07	1st period: Hiroshi Tsutsumi	Forensic Medicine: Think about abuse
12	05/07	2nd period: Ako Sasao	Forensic Medicine: Forensic Toxicology and Analytical Methods for Drug Screening
13	05/08	1st period: Rie Sano	Forensic Medicine: Social Aspects of Death
14		Shota Masuda (e-learning only)	Public Health：Social Security System and Medical Insurance System in Japan
15	05/11	4th period: Rie Sano	Forensic Medicine: Think about abuse
16	05/12	4th period: Rie Sano	Forensic Medicine: Returning forensic medicine to society

Estimated out-of-class study time	This course consists of contents that requires 96 hours of study. Snice the class is 32 hours (2h x 16 frames), approximately 64 hours of pre- and post- study is necessary to understand the class.
Required Textbook(テキスト)	Handouts summarizing lecture topics.
Reading List(参考文献)	・ “Public Health & Preventive Medicine” by Maxy-Rosenan-Last: (14 edit) Appleton & Lange. 1998, ・ “Forensic Pathology” by Bernard Knight, 2nded.., Arnold, London, Sydney and Auckland, 1996.
Enrollment Conditions(履修条件)	
Assessment Methods and Criteria(評価方法・基準)	Students will be graded on the basis of mini-reports submitted after each class. Students are required that the average score of mini-reports will be 60% or over.
Language Used in Instruction(使用言語)	Japanese
Textbook/Material Language(教科書・資料の言語)	Japanese (The lectures are provided in Japanese.)
Course Based on Practical	Applicable (A teacher with practical work experience in Public Health, Regional Medicine, or Forensic Medicine

Work Experience(実務経験を活かした授業)	will lecture)

Course Coding(科目ナンバー)	Year/Semester/Term(年度・学期)	Faculty Offering Course(時間割所属・時間割コード)	Eligible Student Year(開講年次)	Credits(単位数)	Weekday and Period(曜日・時限)
RMM5-003-82-2	2026spring	Graduate School of Medical Sciences (10040)	1, 2	2	others

Course Title(Theme)(科目名(講義題目))	Instructor(s)(担当教員)
General Clinical Medicine(A4)	MIYAMOTO Takeshi, KUBOTA Naoto, SAKAGAMI Takuro, Yasunaga Jiyunichirou, YOKOI Hideki, KONDO Eiji, NAKAMURA Kimitoshi, UEDA Mitsuharu, Matsumoto Shirou, INOUE Toshihiro, TSUJITA Kenichi, IWATSUKI Masaaki, Miyamoto Yuuji, SHINRIKI Satoru, FUKUI Toshihiro, IZUMI Yuichiro, TANAKA Yasuhito

Goals with their ratio(学修成果とその割合)

1.Advanced expert knowledge, skill and research capability ・・・・25% 2.Profound inter-disciplinary knowledge ・・・・50% 3.Global perspective and ability to take initiative action ・・・・20% 4.Social leadership drive ・・・・5%

Type of Class(授業の形態)	Lecture and Seminar
Teaching Method(授業の方法)	To provide lectures with bidirectional communications using slides and handouts.
Course Goals(授業の目的)	To learn about the art and science in various fields of clinical medicine and to get knowledge about recent topics on biomedical researches.
Course Learning goals(学修目標)	【A level (A水準)】 - To learn and understand the art and science in various fields of clinical medicine. - To get knowledge about recent topics on biomedical researches. - To learn about the history and recent advancement in clinical medicine, together with the clinical field where unmet needs reside. 【C level (C水準)】 - To learn the outline of the art and science in various fields of clinical medicine. - To get general knowledge about recent topics on biomedical researches.
Course Outline(授業の概要)	To provide lectures in the field of internal medicine (pulmonology, hepatology, hematology, cardiology, nephrology, neurology), surgery, pediatrics, obstetrics/gynecology, orthopedics, ophthalmology, and diagnostic medicine.

Details for Individual Classes(各回の授業内容)

No.(回)	Date(月日)	Class Theme(授業テーマ)	Brief Outline of Class(内容概略)
1		3rd period by Shiro MATSUMOTO (pediatrics)	Recent Neonatal Intensive Care ～ New Therapeutic Strategies for Neonatal Hypoxic Ischemic Brain Injury
2		3rd period by Masaaki IWATSUKI (surgery)	Surgical treatment for gastroenterological cancer
3		3rd period by Takuro Sakagami (pulmonology)	Recent advance in respiratory medicine
4		3rd period by Toshihiro Fukui (cardiovascular surgery)	Recent advancement in cardiovascular surgery
5		3rd period by Satoru Shinriki (diagnostic medicine)	Pathobiology and diagnostics of cancer
6		3rd period by Yuichiro Izumi (nephrology)	Renal sodium handling
7		3rd period by Eiji Kondoh (obstetrics/ gynecology)	Life-threatening complications in pregnancy
8		4rd period by Hideki YOKOI (nephrology)	Recent topics on nephrology and dialysis
9		3rd period by Mitsuharu Ueda (neurology)	Recent advances in the diagnosis and treatment for systemic amyloidosis
10		3rd period by Kimitoshi Nakamura (pediatrics)	Children’s health and screening test for diseases
11		3rd period by Toshihiro Inoue (ophthalmology)	The wonder of the visual system
12		3rd period by Kenichi Tsujita (cardiology)	Pathophysiology and treatment of acute myocardial infarction: Involvement of coronary spasm viewed from genetic and environmental factors
13		3rd period by Takeshi Miyamoto (orthopedics)	Pathophysiology of locomotive organs
14		3rd period by Yasuhito Tanaka (hepatology)	Recent advancement in hepatology and gastroenterology
15		3rd period by Naoto Kubota (metabolic medicine)	Disbetes Mellitus:Causes,Pathogenesis,andCurrent Treatment
16		3rd period by Junichro Yasunaga (hematology)	Cancers induced by pathogens

Estimated out-of-class study time	
Required Textbook(テキスト)	
Reading List(参考文献)	
Enrollment Conditions(履修条件)	
Assessment Methods and Criteria(評価方法・基準)	To assess with the attitude during lectures together with reports presented after lectures.
Language Used in Instruction(使用言語)	Japanese and English

Textbook/Material Language(教科書・資料の言語)	Combination of Japanese and English
Course Based on Practical Work Experience(実務経験を活かした授業)	Applicable

Course Coding(科目ナンバー)	Year/Semester/Term(年度・学期)	Faculty Offering Course(時間割所属・時間割コード)	Eligible Student Year(開講年次)	Credits(単位数)	Weekday and Period(曜日・時限)
RDM7-020-81-2	2026spring	Graduate School of Medical Sciences (10210)	1, 2	2	others

Course Title(Theme)(科目名(講義題目))	Instructor(s)(担当教員)
Research Ethics and Biomedical Ethics(Doctoral Course A1・Master's Course A5)	KADOOKA Yasuhiro

Goals with their ratio(学修成果とその割合)
1.Advanced expert knowledge, skill and research capability ‥‥50% 2.Profound inter-disciplinary knowledge ‥‥50%

Type of Class(授業の形態)	Lecture
Teaching Method(授業の方法)	active learning (discussion and presentation) and online learning
Course Goals(授業の目的)	This course aims to support students to have relevant knowledge and practical skills for biomedical ethics in order for graduate research and future career.
Course Learning goals(学修目標)	【A level (A水準)】 to deal with ethical issues in actual settings of biomedical research and medical practice by making interdisciplinary discussion and moral reasoning 【C level (C水準)】 to have basic knowledge for ethical conducts in biomedical research and medical practice
Course Outline(授業の概要)	eAPRIN (CITI) online program will be adopted to learn basic elements of research ethics. Active leaning methods will be adopted to gain skills for ethical conduct of biomedical research and medical decision-making.

Details for Individual Classes(各回の授業内容)

No.(回)	Date(月日)	Class Theme(授業テーマ)	Brief Outline of Class(内容概略)
1		Research integrity 1	eAPRIN online program
2		Research integrity 2	eAPRIN online program
3		Research integrity 3	eAPRIN online program
4		Research integrity 4	eAPRIN online program
5		Research ethics 1	eAPRIN online program
6		Research ethics 2	eAPRIN online program
7		Research ethics 3	eAPRIN online program
8	06/25	3rd period Step-up lecture on research ethics 1	Active learning will be held. (The instructor will set a related topic. Students will audit a small lecture, discuss and then make presentation or comment.)
9	06/25	4th period Step-up lecture on research ethics 1	Active learning will be held. (The instructor will set a related topic. Students will audit a small lecture, discuss and then make presentation or comment.)
10	07/02	3rd period Step-up lecture on research ethics 2	Active learning will be held. (The instructor will set a related topic. Students will audit a small lecture, discuss and then make presentation or comment.)
11	07/02	4th period Step-up lecture on research ethics 2	Active learning will be held. (The instructor will set a related topic. Students will audit a small lecture, discuss and then make presentation or comment.)
12	07/09	3rd period Step-up lecture on research ethics 3	Active learning will be held. (The instructor will set a related topic. Students will audit a small lecture, discuss and then make presentation or comment.)
13	07/09	4th period Step-up lecture on research ethics 3	Active learning will be held. (The instructor will set a related topic. Students will audit a small lecture, discuss and then make presentation or comment.)
14	07/16	3rd period Medical ethics 1	Active learning will be held. (The instructor will set a related topic. Students will audit a small lecture, discuss and then make presentation or comment.)
15	07/16	4th period Medical ethics 2	Active learning will be held. (The instructor will set a related topic. Students will audit a small lecture, discuss and then make presentation or comment.)

Estimated out-of-class study time	60 hours of self-learning (out-of-class study) is recommended in addition to 30-hours lecture (2hrs X 15 times).
Required Textbook(テキスト)	NA
Reading List(参考文献)	Principles of Biomedical Ethics. Beauchamp TL and Childress JF. OXFORD University Press. Bioethics Briefings. The Hastings Center. https://www.thehastingscenter.org/publications-resources/hastings-center-bioethics-briefings/ Responsible Conduct of Research. Shamoo AE and Resnik DB. OXFORD University Press. The Oxford Textbook of Clinical Research Ethics. Emanuel EJ, Crady C et al eds. OXFORD University Press. Medical Ethics Today. British Medical Association Ethics Department. Wiley-Blackwell. Resolving Ethical Dilemmas A Guide for Clinicians. Lo B. LWW.
Enrollment Conditions(履修条件)	Participating students are recommended to have basic knowledge life-sciences.
Assessment Methods and Criteria(評価方法・基準)	Students are evaluated for their grades and credits based on the course hours completed, understanding of each subject and abilities of discussion and ethical reasoning.

Textbook/Material Language(教科書・資料の言語)	Combination of Japanese and English
Course Based on Practical Work Experience(実務経験を活かした授業)	Applicable

Course Coding(科目ナンバー)	Year/Semester/Term(年度・学期)	Faculty Offering Course(時間割所属・時間割コード)	Eligible Student Year(開講年次)	Credits(単位数)	Weekday and Period(曜日・時限)
RMM5-005-99-2	2026spring	Graduate School of Medical Sciences (10080)	1, 2	1	others

Course Title(Theme)(科目名(講義題目))	Instructor(s)(担当教員)
Clinical Pathology(Clinical Pathology B1)	NAKAMURA Kimitoshi, KUBOTA Naoto, SAKAGAMI Takuro, NAKAYAMA Hideki, UEDA Mitsuharu, TSUJITA Kenichi, FUKUSHIMA Satoshi, TANAKA Yasuhito

Goals with their ratio(学修成果とその割合)
1.Advanced expert knowledge, skill and research capability ‥‥30% 2.Profound inter-disciplinary knowledge ‥‥30% 3.Global perspective and ability to take initiative action ‥‥30% 4.Social leadership drive ‥‥10%

Type of Class(授業の形態)	Lecture
Teaching Method(授業の方法)	PowerPoint will be used in lectures where active participation in discussion is encouraged.
Course Goals(授業の目的)	In Pathology and Pathological Conditions students learned about how diseases are classified and how they develop. Clinical Pathology picks up where that course left off with a focus on major diseases. This course provides students with opportunities to learn about specific clinical and pathological conditions along with their underlying molecular mechanisms so that they can expand their understanding of the nature of various diseases. Students will also learn about the particular characteristics of diseases that manifest themselves in the nervous system, motor system, and tissues as well as the mechanisms behind systemic conditions, such as immune deficiency.
Course Learning goals(学修目標)	【A level (A水準)】 Students learn about specific clinical and pathological conditions along with their underlying molecular mechanisms so that they can expand their understanding of the nature of various diseases. 【C level (C水準)】 Students learn about specific clinical and pathological conditions along with their underlying molecular mechanisms so that they can understand the nature of various diseases.
Course Outline(授業の概要)	Experts in eight representative fields such as congenital diseases, metabolic disorders, immunodeficiency as systemic diseases and circulatory disturbance, inflammation, tumor and degenerative diseases of specific organ systems will give a series of lectures. See the detailed schedule and topics below. The lectures address pathogenesis of each representative disease and underlining molecular mechanisms.

Details for Individual Classes(各回の授業内容)

No.(回)	Date(月日)	Class Theme(授業テーマ)	Brief Outline of Class(内容概略)
1		3rd period. Takuro Sakagami	Anti-cytokine antibody and respiratory disease.
2		3rd period. Mitsuharu Ueda	Diagnosis and Treatment of Intractable Neurological Diseases.
3		3rd period. Naoto Kubota	Diabetes/Metabolic disorder caused by impaired insulin action and its complications.
4		3rd period. Yasuhito Tanaka	Liver Cirrhosis and Liver Cancer: Etiology and Treatment
5		3rd period. Hideki Nakayama	Pathology of periodontal disease (PD) and the associations between PD and systemic diseases.
6		3rd period. Kenichi Tsujita	Pathology of acute coronary syndrome and antithrombotic therapy.
7		3rd period. Kimitoshi Nakamura	Pathology and organ damages of inborn errors of metabolism.
8		3rd period. Satoshi Fukushima	Clinical pathology of melanoma from the perspective of genomics.

Estimated out-of-class study time	
Required Textbook(テキスト)	Textbooks are not specified. Handouts may be distributed by instructors.
Reading List(参考文献)	Individual instructor introduces references of related topics.
Enrollment Conditions(履修条件)	
Assessment Methods and Criteria(評価方法・基準)	Evaluation of this lecture series will be weighted by scores in test or reports focusing on the following points. 1) Whether the student correctly understands the terms,background and the current state in the selected area. 2)Whether the student correctly grasps the subject matter discussed in class. 3)Whether the student offers his/her own view. The instructors evaluate the scores of test or and reports on a scale of 1 to 10 (10 x 8 would yield a maximum score of 80 points). The total score at the end of the semester is multiplied by 5/4 to calculate the final grade.
Language Used in Instruction(使用言語)	Japanese and English
Textbook/Material Language(教科書・資料の言語)	English
Course Based on Practical Work Experience(実務経験を活かした授業)	Applicable

Course Coding(科目ナンバー)	Year/Semester/Term(年度・学期)	Faculty Offering Course(時間割所属・時間割コード)	Eligible Student Year(開講年次)	Credits(単位数)	Weekday and Period(曜日・時限)
RMM5-006-79-2	2026spring	Graduate School of Medical Sciences (10090)	1, 2	1	others

Course Title(Theme)(科目名(講義題目))	Instructor(s)(担当教員)
Infection and Immunology(Infection and Immunology B2)	SAWA Tomohiro, OSHIUMI Hiroyuki, MOTOZONO Chihiro, IKEDA Terumasa, NOMURA Takushi, SATO Yorifumi (Hokkaido Univ.)

Goals with their ratio(学修成果とその割合)
1.Advanced expert knowledge, skill and research capability ‥‥70% 2.Profound inter-disciplinary knowledge ‥‥20% 3.Global perspective and ability to take initiative action ‥‥10%

Type of Class(授業の形態)	Lecture
Teaching Method(授業の方法)	PowerPoint and/or an overhead projector will be used in lectures where active participation in discussion is encouraged.
Course Goals(授業の目的)	Updated knowledge of various pathogenic microorganisms such as bacteria and viruses that are associated with infectious diseases in human-being is addressed to learn the route of transmission, mechanism of the diseases, prevention measures and treatment strategies. The lecture series especially focus on protective immunity to viral diseases including HIV-1.
Course Learning goals(学修目標)	【A level (A水準)】 To understand molecular bases for infections diseases,that may help development of effective prevention,treatment,and diagnosis of the diseases. 【C level (C水準)】
Course Outline(授業の概要)	The course addresses the introduction (bacteriology, virology) and particulars of various pathogenic organisms (including gram-positive and negative bacteria, a DNA or RNA viruses) focusing on topics of pathogenesis, control and prevention of infectious diseases and emerging and reemerging infectious diseases. The course addresses protective immunity of host against infectious diseases including HIV-1 infection. Especially, recent topics such as the mechanism of T-cell recognition of the viral antigens, differentiation of immune cells from hematopoietic stem cells and the strategy for the development of effective vaccine against HIV-1 infection will be discussed.

Details for Individual Classes(各回の授業内容)

No.(回)	Date(月日)	Class Theme(授業テーマ)	Brief Outline of Class(内容概略)
1	05/11	1nd period Tomohiro Sawa	Introduction to bacterial infections/diseases.
2	05/11	2nd period Tomohiro Sawa	Basic and practical medical virology.
3	05/15	1nd period Tomohiro Sawa	Pathogenic mechanisms of bacterial infections.
4	05/15	2nd period Hiroyuki Oshiumi	Viral infection and innate immunity.
5	05/25	1nd period Takushi Nomura	Animals model of viral infection
6	05/25	2nd period Yorifumi Sato	Pathogenesis of virus infection and diseases.
7	06/01	1nd period Chihiro Motozono	Cellular immune responses to viral infections.
8	06/01	2nd period Terumasa Ikeda	Virus infection and restriction factors

Estimated out-of-class study time	
Required Textbook(テキスト)	No textbooks are specified for this lecture series. Some instructors may have handouts for the lecture.
Reading List(参考文献)	・“Fundamentals of Microbiology” by I. E. Alamoco. The Benjamin / Cummmings Publishing Company, Inc. ・McMichael AJ, Haynes BF: Lessons learned from HIV-1 vaccine trials: newpriorities and directions. Nat Immunol 2012, 13(5):423?427. ・Mouquet H, Nussenzweig MC: HIV: Roadmaps to a vaccine. Nature 2013, 496(7446):441?442.
Enrollment Conditions(履修条件)	
Assessment Methods and Criteria(評価方法・基準)	Evaluation will be weighted by active participation, brief evaluating test and/or a report for the theme announced after the lecture. Instructors look at the following when grading the tests and reports: 1) Whether the student correctly understands the background of the selected area under study. 2) Whether the student correctly grasps the subject matter discussed in class. 3) Whether the student offers his/her own view. The final score is calculated from the mean value of upper 6 score in the evaluations of tests and reports by 8 lectures.
Language Used in Instruction(使用言語)	Japanese
Textbook/Material Language(教科書・資料の言語)	Japanese
Course Based on Practical Work Experience(実務経験を活かした授業)	Not applicable

Course Coding(科目ナンバー)	Year/Semester/Term(年度・学期)	Faculty Offering Course(時間割所属・時間割コード)	Eligible Student Year(開講年次)	Credits(単位数)	Weekday and Period(曜日・時限)
RMM5-007-79-2	2026spring	Graduate School of Medical Sciences (10100)	1, 2	1	others

Course Title(Theme)(科目名(講義題目))	Instructor(s)(担当教員)
Metabolic Informatics(B3)	IWAMOTO Kazuya, IRIE Atsushi, MIHARADA Kenichi, NAKACHI Yutaka, KADOMATSU Tsuyoshi

Goals with their ratio(学修成果とその割合)
1.Advanced expert knowledge, skill and research capability ‥‥70% 2.Profound inter-disciplinary knowledge ‥‥25% 3.Global perspective and ability to take initiative action ‥‥5%

Type of Class(授業の形態)	Lecture
Teaching Method(授業の方法)	PowerPoint will be used in the lectures, and active participation in the discussion is encouraged.
Course Goals(授業の目的)	Biological environment in vivo is controlled by various signals. Recent remarkable improvement of studies such as genomics, epigenomics, proteomics, metabolomics made it possible to analyze changes of in vivo environment systematically as well as comprehensively. In addition, analysis of the mechanism underlying disease onset, identification of therapeutic target and development of biomarker are also becoming possible by applying these methods. In the class, academic backgrounds of genomics, epigenomics, proteomics, metabolomics, principles of analytic technology and applications to disorder analysis are going to be lectured.
Course Learning goals(学修目標)	【A level (A水準)】 Students understand the academic backgrounds and principles of omics technologies such as genomics, epigenomics, proteomics, and metabolomics, and also understand how to apply omics technologies to the disease research. 【C level (C水準)】 Students understand the academic backgrounds and principles of omics technologies such as genomics, epigenomics, proteomics, and metabolomics.
Course Outline(授業の概要)	In relation to genomics, epigenomics, proteomics and metabolomics, outlines of the academic backgrounds, the histories, the recent progresses will be given. Also, practical usage cases for development of therapeutic methods and drug discoveries including analysis of the mechanisms underlying disease onset, identification of therapeutic target will be explicated.

Details for Individual Classes(各回の授業内容)

No.(回)	Date(月日)	Class Theme(授業テーマ)	Brief Outline of Class(内容概略)
1	05/12	1st period Kazuya Iwamoto	General remarks of DNA epigenetics (1)
2	05/12	2nd period Kazuya Iwamoto	General remarks of DNA epigenetics (2)
3	05/19	1st period Atsushi Irie	Basic principle of genomics, proteomics and metabolomics (1)
4	05/19	2nd period Atsushi Irie	Basic principle of genomics, proteomics and metabolomics (2)
5	05/26	1st period Kenichi Miharada	Introduction to proteomics and proteostasis (1)
6	05/26	2nd period Kenichi Miharada	Introduction to proteomics and proteostasis (2)
7	06/02	1st period Yutaka Nakachi	Introduction of bioinformatics
8	06/02	2nd period Tsuyoshi Kadomatsu	Clarification of molecular and cellular mechanisms underlying aging and its associated diseases

Estimated out-of-class study time	This course consists of content that requires 45 hours of study. Since the class is 16 hours (2h X 8 frames), 29 hours of pre- and post-study including assignments is necessary to understand the class.
Required Textbook(テキスト)	Not specified.
Reading List(参考文献)	Not specified.
Enrollment Conditions(履修条件)	Not specified.
Assessment Methods and Criteria(評価方法・基準)	The students' understanding will be evaluated on the basis of papers and quizzes related to the topics dealt with in class to be scored from 0 to 100. Final grades will be based on the average score of the papers and quizzes.
Language Used in Instruction(使用言語)	Japanese and English
Textbook/Material Language(教科書・資料の言語)	Combination of Japanese and English
Course Based on Practical Work Experience(実務経験を活かした授業)	Not applicable

Course Coding(科目ナンバー)	Year/Semester/Term(年度・学期)	Faculty Offering Course(時間割所属・時間割コード)	Eligible Student Year(開講年次)	Credits(単位数)	Weekday and Period(曜日・時限)
RMM5-008-79-2	2026spring	Graduate School of Medical Sciences (10110)	1, 2	1	others

Course Title(Theme)(科目名(講義題目))	Instructor(s)(担当教員)
Neuroscience(B4 Neuroscience)	SONG Wen-Jie, MIZUNO Hidenobu, TODA Chitoku, SHIMAMURA Kenji, IWAMOTO Kazuya, MUKASA Akitake, TAKEBAYASHI Minoru, Misumi Youhei

Goals with their ratio(学修成果とその割合)
1.Advanced expert knowledge, skill and research capability ‥‥70% 2.Profound inter-disciplinary knowledge ‥‥12% 3.Global perspective and ability to take initiative action ‥‥13% 4.Social leadership drive ‥‥5%

Type of Class(授業の形態)	Lecture
Teaching Method(授業の方法)	Lectures and multimedia presentations.
Course Goals(授業の目的)	The goal of this lecture is to assist students to learn the following from molecular to organism level, from neurodevelopmental, neuroanatomical, neurophysiological, and neurological perspectives: differentiation and development of the nervous system, structure and function of the neuronal circuits, etiology, symptom, and treatment of neurological disorders.
Course Learning goals(学修目標)	【A level (A水準)】 Classes on the development of the nervous system cover topics including induction and regionalization of the central nervous system, and development of the cerebral cortex. Classes on neuroanatomy and neurophysiology focus on the structure and function of the cerebral cortex, with a stress on the auditory and somatosensory systems. Classes on clinical neurological diseases cover the etiology, symptom, and treatment of disorders such as Parkinson’s disease, Alzheimer’s disease, intractable neurological diseases including cerebral amyloid angiopathy, and other neurological disorders that require neurosurgery. Students are required to understand the latest progress and important questions in the above research fields. 【C level (C水準)】 This course covers topics on the development of the nervous system, neuroanatomy, neurophysiology, and clinical neuroscience. Students are required to understand the basic concepts in each of these research fields.
Course Outline(授業の概要)	Neuroscience is about our brain and is a currently rapidly growing discipline. Not only our sensory and motor functions but higher functions such as learning and memory, cognitive function, emotion, and mental function are all attributable to the function of our brain. The lecture is an introduction to the nervous system.

Details for Individual Classes(各回の授業内容)

No.(回)	Date(月日)	Class Theme(授業テーマ)	Brief Outline of Class(内容概略)
1	05/13	1st period Kenji Shimamura; Neural development	Induction and regionalization of the central nervous system
2	05/13	2nd period Kazuya Iwamoto; Molecular Brain Sciences	Molecular genetics of psychiatric disorders
3	05/20	1st period Chitoku Toda; Neuroscience for Metabolic Control	Role of the central nervous system in metabolic and endocrine control
4	05/20	2nd period Hidenobu Mizuno; Somatic sensation	Somatosensory neuroscience
5	05/26	3rd period Yohei Misumi; Neurodegenerative diseases	Neuroscience in neurodegenerative diseases
6	05/27	2nd period Minoru Takebayashi; Psychiatry	Neuroscience from a mental disorder perspective
7	05/27	3rd period Wen-Jie Song; Hearing	Auditory neuroscience
8	06/03	3rd period Akitake Mukasa; Neurosurgery	Clinical neuroscience in Neurosurgery

Estimated out-of-class study time	
Required Textbook(テキスト)	No textbook is specified but handouts summarizing the lecture will be distributed.
Reading List(参考文献)	Eric Kandel, James Schwartz, Thomas Jessell, Steven Siegelbaum, A.J. Hudspeth, Principles of Neural Science, Fifth Edition, 2012. Mark F. Bear, Barry W. Connors, Michael A. Paradiso, Neuroscience: Exploring the Brain, 2007.
Enrollment Conditions(履修条件)	
Assessment Methods and Criteria(評価方法・基準)	Grading will be based on active class participation, paper summaries, and reports related to the topics dealt with in each class.
Language Used in Instruction(使用言語)	Japanese and English
Textbook/Material Language(教科書・資料の言語)	Combination of Japanese and English
Course Based on Practical Work Experience(実務経験を活かした授業)	Applicable

Course Coding(科目ナンバー)	Year/Semester/Term(年度・学期)	Faculty Offering Course(時間割所属・時間割コード)	Eligible Student Year(開講年次)	Credits(単位数)	Weekday and Period(曜日・時限)
RMM5-009-79-2	2026spring	Graduate School of Medical Sciences (10120)	1, 2	1	others

Course Title(Theme)(科目名(講義題目))	Instructor(s)(担当教員)
Heredity Reproduction Medicine(B5)	NISHINAKAMURA Ryuichi, SUGAWARA Yasuhiko, TATEISHI Satoshi, TERADA Kazutoyo, NIWA Hitoshi, NAKAMURA Kimitoshi, Hino Shinjirou, ARIMA Yuichiro, KOGA Tomoaki

Goals with their ratio(学修成果とその割合)
1.Advanced expert knowledge, skill and research capability ‥‥50% 2.Profound inter-disciplinary knowledge ‥‥25% 3.Global perspective and ability to take initiative action ‥‥20% 4.Social leadership drive ‥‥5%

Type of Class(授業の形態)	Lecture
Teaching Method(授業の方法)	PowerPoint will be used in the lectures, and active participation in the discussion is encouraged.
Course Goals(授業の目的)	Heredity Reproduction Medicine aims at obtaining basic knowledge on molecular biology, developmental biology and genetics for the understanding of regenerative medicine, genetic medicine and transplant medicine. In this course, you will obtain essential knowledge on normal embryonic development and organ morphogenesis, and the origin and mechanism of diseases, their treatments. Furthermore, this course will up-to-date the knowledge on regenerative medicine, genetic defects, transplantations, kidney & liver transplantations, from basic and clinical views.
Course Learning goals(学修目標)	【A level (A水準)】 Obtain basic knowledge on molecular biology, developmental biology and genetics for the understanding of regenerative medicine, genetic medicine and transplant medicine. Is able to apply such knowledge to the unsolved problems. 【C level (C水準)】 Obtain basic knowledge on molecular biology, developmental biology and genetics for the understanding of regenerative medicine, genetic medicine and transplant medicine.
Course Outline(授業の概要)	・Embryonic development and embryonic stem cells and tissue stem cells ・Kidney development and regenerative medicine ・Tumor suppression via regulation of mitosis and DNA repair ・Hereditary mitochondrial disease ・Diagnosis and gene therapy ・Epigenetic medicine ・Tissue and organ grafts ・Cardiac disease and regenerative medicine,

Details for Individual Classes(各回の授業内容)

No.(回)	Date(月日)	Class Theme(授業テーマ)	Brief Outline of Class(内容概略)
1	05/14	1st period　Ryuichi Nishinakamura	Developmental and regenerative medicine
2	05/14	2nd period　Hitoshi Niwa	Embryonic development and stem cells
3	05/18	1st period Satoshi Tateishi	Tumor suppression via regulation of cell cycle and DNA repair
4	05/18	2nd period　Shinjiro Hino	Epigenetics in health and diseases
5	05/21	1st period　Yasuhiko Sugawara	Organ transplantation
6	05/21	2nd period　Kimitoshi Nakamura	DNA diagnosis and therapy for genetic diseases
7	05/22	1st period　Yuichiro Arima	Cardiac disease and regenerative medicine
8	05/22	2nd period　Kazutoyo Terada	Mitochondrial disease

Estimated out-of-class study time	29 hrs
Required Textbook(テキスト)	Textbooks are not specified, and handouts will be distributed.
Reading List(参考文献)	
Enrollment Conditions(履修条件)	
Assessment Methods and Criteria(評価方法・基準)	The students' understanding will be evaluated on the basis of papers and quizzes related to the topics dealt with in class to be scored from 0 to 100. Final grades will be based on the average score of the papers and quizzes, as well as the final report and active participation in class discussions.
Language Used in Instruction(使用言語)	Japanese
Textbook/Material Language(教科書・資料の言語)	Combination of Japanese and English
Course Based on Practical Work Experience(実務経験を活かした授業)	Not applicable

Course Coding(科目ナンバー)	Year/Semester/Term(年度・学期)	Faculty Offering Course(時間割所属・時間割コード)	Eligible Student Year(開講年次)	Credits(単位数)	Weekday and Period(曜日・時限)
RMM5-010-79-2	2026spring	Graduate School of Medical Sciences (10130)	1, 2	1	others

Course Title(Theme)(科目名(講義題目))	Instructor(s)(担当教員)
Medical Informatics(Learning how to handle and manage information when providing medical care from the perspectives of medical information, critical pathways, community medicine, clinical research practice, and EBM.)	NAKAMURA Taishi, OGATA Ken, YAMANOUCHI Yoshinori, ISHII Masanobu

Goals with their ratio(学修成果とその割合)
1.Advanced expert knowledge, skill and research capability ‥‥25% 2.Profound inter-disciplinary knowledge ‥‥25% 3.Global perspective and ability to take initiative action ‥‥25% 4.Social leadership drive ‥‥25%

Type of Class(授業の形態)	Lecture and Seminar
Teaching Method(授業の方法)	Lecture-based teaching using PowerPoint and e-learning etc.
Course Goals(授業の目的)	An appropriate handling of informations occurring in the healthcare setting is essential to accomplish the purpose of medical care. The aim of lectures in Medical Informatics is to acquire ability to handle information appropriately in the field of the healthcare setting through learning types of information in this field, the way of handle information including personal information protection, and methods to take useful information from patients and literatures.
Course Learning goals(学修目標)	【A level (A水準)】 You may be able to learn how to handle information safely in the field of medical informatics and be familiar with clinical researches after accomplishing this course, by which you may be able to put them into practice. 【C level (C水準)】 You may be able to learn how to handle information safely in the field of medical informatics and be familiar with clinical researches after followinging this course.
Course Outline(授業の概要)	In medical informatics, an outline is how to handle medical records from the viewpoint of personal information protection, information literacy and information ethics that should be acquired as a medical worker when using information electronically, and an electronic exchange. Lectures will be given on problems in exchanging medical information, including points to keep in mind when using Information and Comunication Technology (ICT) for medical records, and the advantages and problems of electronic medical records. In addition, students will also study electronic clinical pathways and regional medical cooperation. In International Medical Cooperation Studies, an outline is research design in clinical research, procedures for creating research plans, research methods, ethical considerations, data analysis methods, statistical analysis and methods, EBM practice procedures, and the critical examination method of English papers using computers.

Details for Individual Classes(各回の授業内容)

No.(回)	Date(月日)	Class Theme(授業テーマ)	Brief Outline of Class(内容概略)
1	04/16	4th period　Taishi Nakamura【eEJ-L】	Critical Path : its design and the utilization
2	04/17	4th period　Yoshinori Yamanouchi 【eEJ-L】	Handling of electronic information and Electronic Health Records
3	04/23	4th period　Masanobu Ishii【eEJ-L】	Hypothesis and design of clinical research
4	04/24	4th period　Yoshinori Yamanouchi 【eEJ-L】	Standardization medical information to support the secondary use
5	04/30	4th period　Taishi Nakamura【eEJ-L】	Regional Medical Cooperation
6	05/01	4th period　Ken Ogata【eEJ-L】	Handling medical records from the privacy protection view
7	05/07	4th period　Masanobu Ishii【eEJ-L】	Handling of clinical data and statistical analysis in clinical research
8	05/08	4th period　Ken Ogata【eEJ-L】	Learning about risk management for medical information systems

Estimated out-of-class study time	This course consists of content that requires 45 hours of study. Since the class lasts 16 hours, 29 hours worth of pre- and post-study (including assignments) is required to deepen the understanding of the class.
Required Textbook(テキスト)	Handouts will offer thorough e-Learning system.
Reading List(参考文献)	Informations will offer in each lecture.
Enrollment Conditions(履修条件)	No Prerequisite required.
Assessment Methods and Criteria(評価方法・基準)	Grading will be based on active class participation, paper summaries, and the final report. Grading will be based on the student's understanding of the course subject matter. The students' understanding will be evaluated on the basis of papers and quizzes related to the topics dealt with in class to be scored from 0 to 100. Final grades will be based on the average score of all the papers and quizzes as well as participation in class discussions.
Language Used in Instruction(使用言語)	Japanese and English
Textbook/Material Language(教科書・資料の言語)	Combination of Japanese and English
Course Based on Practical Work Experience(実務経験を活かした授業)	Applicable (Lectures will be given by faculty members who are familiar with the planning of clinical research, statistical analysis, the management of hospital information systems, critical pathways, and regional medical cooperation.)

Course Coding(科目ナンバー)	Year/Semester/Term(年度・学期)	Faculty Offering Course(時間割所属・時間割コード)	Eligible Student Year(開講年次)	Credits(単位数)	Weekday and Period(曜日・時限)
RMM5-011-79-2	2026spring	Graduate School of Medical Sciences (10140)	1, 2	1	others

Course Title(Theme)(科目名(講義題目))	Instructor(s)(担当教員)
Introduction for Laboratory Animal Experiments(B7)	Takeo Tooru, TORIGOE Daisuke, NAKAMURA Akira, OKI Shinya, GOTO Hiroki, NODA Taichi, Ohguchi Hiroto

Goals with their ratio(学修成果とその割合)
1.Advanced expert knowledge, skill and research capability ‥‥80% 2.Profound inter-disciplinary knowledge ‥‥10% 3.Global perspective and ability to take initiative action ‥‥10%

Type of Class(授業の形態)	Lecture
Teaching Method(授業の方法)	Mainly PowerPoint will be used in lectures and active participation in discussions is encouraged.
Course Goals(授業の目的)	To provide students with opportunities to gain an understanding of laboratory animals (especially mice).
Course Learning goals(学修目標)	【A level (A水準)】 To understand and explain the basics for experimental model animals, manipulation of mouse embryos, genetically engineered mice and experiments using animals. Moreover, to develop it to the leading life science and pharmacy. 【C level (C水準)】 To understand and explain the basics for experimental model animals, manipulation of mouse embryos, genetically engineered mice and experiments using animals.
Course Outline(授業の概要)	1) Reproductive engineering technology in mice 2) Infectious diseases of laboratory animals 3) Imaging and Therapy with Radioisotopes (RI) in Experimental Animals 4) Production of genetically engineered mice 5) Phenotyping analysis of disease model mice 6) Principle of the RNA silencing technology 7) Understanding the regulatory mechanism of gene expressions through bioinformatics

Details for Individual Classes(各回の授業内容)

No.(回)	Date(月日)	Class Theme(授業テーマ)	Brief Outline of Class(内容概略)
1		(Dates to be determined) 2nd period　Reproductive engineering technology in mice I by TAKEO Tooru	Lecture and discussion about reproductive engineering technology in mice I
2		(Dates to be determined)3rd period　Reproductive engineering technology in mice II by TAKEO Tooru	Lecture and discussion about reproductive engineering technology in mice II
3		(Dates to be determined) 4th period　Infectious diseases of laboratory animals by TORIGOE Daisuke	Lecture and discussion about infectious diseases of laboratory animals
4		(Dates to be determined) 3rd period　Imaging and Therapy with Radioisotopes (RI) in Experimental Animals by GOTO Hiroki	Lecture and discussion about principle of the RNA silencing technology
5		(Dates to be determined) Production of transgenic mice by ARAKI Kimi	Lecture and discussion about production of transgenic mice
6		(Dates to be determined) Phenotyping analysis of disease model mice by OHGUCHI Hiroto	Lecture and discussion about knock-out mice and genome editing
7		(Dates to be determined) Principle of the RNA silencing technology by NAKAMURA Akira	Lecture and discussion about production of gene trap mice
8		(Dates to be determined) 4th period　Understanding the regulatory mechanism of gene expressions through bioinformatics by OKI Shinya	Lecture and discussion about small animal experiment using molecular imaging

Estimated out-of-class study time	
Required Textbook(テキスト)	Handouts
Reading List(参考文献)	・ Behringer, Richard/Nagy, Kristina/Gertsenstein, Marina, R. Manipulating the mouse embryo: a laboratory manual (4 th ed.). Cold Spring Harbor Laboratory Press, 2013. ・ Virginia E. Papaiannou and Richard R. Behringer. Mouse Phenotypes: A Handbook of Mutation Analysis. Cold Spring Harbor Laboratory Press 2005. ・ Fox, J.G., Barthold, S.W., Davisson, M.T., Newcomer, C.E., Quimby, F.W. &Smith, A.L. ・The mouse in biomedical research, vol.2 diseases (2nd ed.). Academic Press, 2007.
Enrollment Conditions(履修条件)	Knowledge about molecular biology
Assessment Methods and Criteria(評価方法・基準)	Grading will be based on active participation in a class,quizzes, paper summaries, and the final report to evaluate the student's understanding of the course subject matter. Final grades will be based on the average score of the papers and quizzes as well as participation in class discussions.
Language Used in Instruction(使用言語)	Japanese
Textbook/Material Language(教科書・資料の言語)	Combination of Japanese and English
Course Based on Practical Work Experience(実務経験を活かした授業)	Applicable (Instructors have work experience with development of reproductive technology, transgenic technology, and a web tool for analysing big data of transcriptome factors and management of mouse bank, animal facility, and RI facility.)

Course Coding(科目ナンバー)	Year/Semester/Term(年度・学期)	Faculty Offering Course(時間割所属・時間割コード)	Eligible Student Year(開講年次)	Credits(単位数)	Weekday and Period(曜日・時限)
RMM5-012-79-2	2026spring	Graduate School of Medical Sciences (10150)	1, 2	1	others

Course Title(Theme)(科目名(講義題目))	Instructor(s)(担当教員)
Basic Radiology(B8)	GOTO Hiroki

Goals with their ratio(学修成果とその割合)
1.Advanced expert knowledge, skill and research capability ‥‥40% 2.Profound inter-disciplinary knowledge ‥‥30% 3.Global perspective and ability to take initiative action ‥‥20% 4.Social leadership drive ‥‥10%

Type of Class(授業の形態)	Practice and Training
Teaching Method(授業の方法)	Lecture and practical training
Course Goals(授業の目的)	To learn the basic knowledge, and handling and the application of radiation and radioisotope (RI) for medical sciences.
Course Learning goals(学修目標)	【A level (A水準)】 (1) To receive the certificate of “education and training for radiation workers” to use radiation or radioisotopes safely in the master course research (2) To understand the usefulness and reasonableness of radiation or radioisotopes, and measure radiation dose or radioactivity effectively in the life science experiment (3) To understand basic protocols for typical radioisotopes and perform some basic experiments using real radioisotopes 【C level (C水準)】
Course Outline(授業の概要)	Radiation and radioisotopes are very useful tools in the study of science. Also they significantly contribute to our daily life, especially clinical medicine. Excessive exposure of radiation, however, causes the harmful effect on the human body. This lecture series focus on the application of radiation and radioisotope (RI) for life or medical science after training safe handling of radiation and radioisotope to prevent radiation hazards.

Details for Individual Classes(各回の授業内容)

No.(回)	Date(月日)	Class Theme(授業テーマ)	Brief Outline of Class(内容概略)
1	04/15	3rd period Hiroki Goto	Basics of Radioisotope (1)
2	04/15	4th period Hiroki Goto	Basics of Radioisotope (2)
3	04/22	3rd period Hiroki Goto	Basics of Radioisotope (3)
4	04/22	4th period Hiroki Goto	Basics of Radioisotope (4)
5	05/25	3rd period Hiroki Goto	Measurement of radioisotope
6	06/01	3rd period Hiroki Goto	Physical imaging modalities and diagnostic agents
7	06/02	3rd period Hiroki Goto	Biological effects of irradiation
8	06/03	2nd period Hiroki Goto	Use of RI for biological research

Estimated out-of-class study time	
Required Textbook(テキスト)	
Reading List(参考文献)	Basic Knowledge of Radiation and Radioisotopes 2019 (Scientific Basis, Safe Handling of Radioisotopes and Radiation Protection). Japan Radioisotope Association, 2019. 細胞工学別冊「ＲＩの逆襲」アイソトープを活用した簡単・安全バイオ実験. 監修：岡田誠治　秀潤社（2007年12月）: In Japanese
Enrollment Conditions(履修条件)	
Assessment Methods and Criteria(評価方法・基準)	Grading will be based on active class participation, paper summaries, and the final report. Grading will be based on the student's understanding of the course subject matter. The students' understanding will be evaluated on the basis of papers and quizzes related to the topics dealt with in class to be scored from 0 to 100. Final grades will be based on the average score of the papers and quizzes as well as participation in class discussions.
Language Used in Instruction(使用言語)	Japanese
Textbook/Material Language(教科書・資料の言語)	Japanese
Course Based on Practical Work Experience(実務経験を活かした授業)	Applicable (・Teachers hold the national licence of senior ［first class］ radiation protection supervisor will lecture how to use radiation and radioisotopes for biomedical science. ・Practical training of radioisotopes are included.)

【Timetable code : 10170（Master's Elective Subject）】【Timetable code : 20200（Doctoral Compulsory Subject）】

***Note that the codes are different for master's and doctoral students.**

Academic Year 2026 Graduate School's Medical Experiment Course

Location: Lecture Room 2(Medical Education & Library Building 3F)

Date	AM			PM		
April 6 (Mon.)	1	8:45 ～ 10:15	Introduction to recombinant DNA technique 【eEJ-L】 (Molecular Genetics: TERADA Kazutoyo)	3	13:15 ～ 14:45	Fundamentals and Applications of PCR 【eEJ-L】 (Medical Biochemistry: SATO Yoshifumi)
	2	10:30 ～ 12:00	Gene Trasfer Technique 【eEJ-L】 (Molecular Physiology: CHUJO Takeshi)	4	15:00 ～ 16:30	Practice and Guidance for Biological Laboratory Safety 【eEJ-L】 (Clinical Microbiology: TSUTSUKI Hiroyasu)
April 7 (Tue.)	5	8:45 ～ 10:15	Introduction to Cell Imaging and Image Analysis 【eEJ-L】 (Gastroenterological Surgery: OKABE Hirohisa)	6	13:15 ～ 14:45	Analysis of Transcriptional Regulation 【eEJ-L】 (Molecular and Medical Pharmacology: SAKAMOTO Yasuhisa)
		10:30 ～ 12:00		7	15:00 ～ 16:30	Pharmacokinetics 【eEJ-L】 (Pharmacology and Therapeutics: SARUWATARI Junji)
April 8 (Wed.)	8	8:45 ～ 10:15	Production of polyclonal and monoclonal antibodies 【eEJ-L】 (Immunology: IRIE Atsushi)	10	13:15 ～ 14:45	Analytical methods for intracellular signaling 【eEJ-L】 (Infection and Hematopoiesis: SUZU Shinya)
	9	10:30 ～ 12:00	How to use ChIP-Atlas 【eEJ-L】 (Institute of Resource Development and Analysis: OKI Shinya)		15:00 ～ 16:30	
April 9 (Thu.)	11	8:45 ～ 10:15	Immunohistochemistry 【eEJ-L】 (Tumor Pathology: YANO Hiromu)		13:15 ～ 14:45	
	12	10:30 ～ 12:00	Basic Methods in Immunology 【eEJ-L】 (Immunology: IRIE Atsushi)	13	15:00 ～ 16:30	Proteomics 【eEJ-L】 (Tumor Genetics and Biology: ARAKI Norie)
April 10 (Fri.)	14	8:45 ～ 10:15	Experimental animals and animal Experimentations I 【eJ-L】 (Division of Microbiology and Genetics: TORIGOE Daisuke)		13:15 ～ 14:45	
	15	10:30 ～ 12:00	Experimental animals and animal Experimentations II 【eJ-L】 (Division of Microbiology and Genetics: TORIGOE Daisuke)		15:00 ～ 16:30	
April 13 (Mon.)		8:45 ～ 10:15		17	13:15 ～ 14:45	Reproductive Engineering Techniques (Reproductive Engineering: TAKEO Toru)
	16	10:30 ～ 12:00	Introduction to flowcytometry 【eEJ-L】 (Immunology : IRIE Atsushi))		15:00 ～ 16:30	
e-learning only	18		Experiment study and safety control 【eEJ-0】 (Environmental Safety Center: YAMAGUCHI Yoshihiro)			

Elective subject : C2 Medical & Life Science Seminar (1 credit) **Subject code 10180**

(Medical and Life Science Seminar, Learning from Experience Doctors Seminar,
International Biomedical Research Seminars)

Academic Year 2026, D1 Medicine & Life Science Seminar【eE-L】

Place: Lecture room 2, Medical Education & Library Building 3F. Time & Date: From 17:30 (Usually on Wednesday)

№	Schedule	Speaker	Title	Affiliation	Host Dept.
1	Apr 22 (Wed)	Kozo Tomita	Structure and mechanism of RNA processing machinery	Professor / Department of Computational Biology and Medical Sciences, The University of Tokyo	Molecular Physiology
2	May 13 (Wed)	Kei Sato	Evolution of sarbecoviruses including SARS-CoV-2	Professor / The Institute of Medical Science, The University of Tokyo	Hematology, Rheumatology and Infectious Disease
3	Jul 1 (Wed)	Daisuke Nanba	Analysis of Human Epidermal Stem Cell Dynamics and Application to Regenerative Medicine	Professor / Division of Regenerative Medicine and Therapeutics, Department of Genomic Medicine and Regenerative Therapy, School of Medicine, Faculty of Medicine, Tottori University	Immunology
4	Aug 18 (Tue)	Toshiyuki Ko	Single cell RNA seq analysis of cardiovascular diseases.	Assistant Professor / Department of Frontier Cardiovascular Science, Graduate School of Medicine, The University of Tokyo	Anatomy
5	Sep 9 (Wed)	Ayuko Hoshino	Exosomes in pathophysiological conditions	Professor / RCAST, University of Tokyo	Neuropsychiatry
6	Oct 2 (Fri)	Kunimasa Ota	Regulation of neural stem cells by extracellular factors (Tsukushi and Akhirin)	Professor / Department of Stem Cell Biology, Faculty of Arts and Science, Kyushu University	Histology
7	Oct 16 (Wed)	Motohiro Yamauchi	Roles of mRNA splicing factors in DNA repair and the maintenance of genome integrity	Division Head / Central Radioisotope Division, National Cancer Center Research Institute	Radioisotope and Tumor Pathobiology
8	Oct 21 (Wed)	Yusuke Kishi	The role of epigenetics in neurons and brain function	Associate Professor / Institute for Quantitative Biosciences, The University of Tokyo	Molecular Brain Science
9	Nov 18 (Wed)	Nobuaki Takahashi	Life and Stress: An Evolutionary Journey Through Adaptive Strategies	Professor / Synthetic Chemistry and Biological Chemistry, Kyoto University	Microbiology

Note: The date, time or place of these lectures are subject to change.
Please check the details with the seminar guide leaflet distributed to each department beforehand.
Also please check our website for the latest information.
We might add a seminar other than the above. (http://www.medphas.kumamoto-u.ac.jp/en/medgrad/gakunai/seminar/)

***** Each seminar will be held in English *****

C2 (cont.)

Academic Year 2026, D2 Learning from Experienced Doctors Seminar【eJ-L】

Place: Lecture room 2, Medical Education & Library Building 3F.　　Time & Date: From 17:30 (Usually on Wednesday)

№	Schedule	Speaker	Title	Affiliation	Host Dept.
1	May 20 (Wed)	Noriko Osumi	Exploring molecular pathogenesis of microcephaly	Executive Director / Japan Society for the Promotion of Science	Molecular Brain Science
2	Jun 5 (Fri)	Koki Ueda	Platelets as a Readout of Stem Cell Dysfunction in Myeloproliferative Neoplasms	Associate Professor / Department of Blood Transfusion and Transplantation Immunology, School of Medicine, Fukushima Medical University	Radioisotope and Tumor Pathobiology
3	Jun 24 (Wed)	Makoto Yamagishi	Integrated multi-omics for HTLV-1-associated diseases: from analysis to therapeutic discovery	Associate Professor / Laboratory of Viral Oncology and Genomics, Department of Computational Biology and Medical Sciences, Graduate School of Frontier Sciences, The University of Tokyo	Hematology, Rheumatology and Infectious Disease
4	Jul 8 (Wed)	Seitaro Nomura	Single-cell omics analysis for the development of precision cardiovascular medicine	Associate Professor / Department of Frontier Cardiovascular Science, The University of Tokyo Graduate School of Medicine	Molecular Genetics
5	Jul 15 (Wed)	Kamimoto, Kenji	Decode, predict, and control biological systems through omics and AI modeling approaches.	Professor / Research Institute for Microbial Diseases, Osaka University	Functional Genomics
6	Jul 29 (Wed)	Takahiro A. Kato	Multidimensional Approach toward Hikikomori and Modern-Type Depression: From Psychoanalysis to Digital Intervention	Professor / Department of Psychiatry, Hokkaido University Graduate School of Medicine	Psychiatry and Neuroscience
7	Aug 5 (Fri)	Shinji Kume	Metabolism and Kidney Diseases	Professor / Department of Medicine, Division of Diabetology, Endocrinology and Nephrology, Shiga University of Medical Science	Anatomy
8	Sep 16 (Wed)	ODA, Jun	Medicine at Mass Gatherings: Establishing Healthcare Systems and Clinical Outcomes: The Case of Osaka-Kansai Expo 2025	Professor / The University of Osaka Graduate School of Medicine	Disaster and Critical Care Medicine
	Dec 2 (Wed)	Shingo Iwami	Analyzing Clinical Data through Data Science	Graduate School of Science, Nagoya University	Neuropsychiatry
9	Jan 15, 2027 (Fri)	Mitsutoshi Nakada	Neuroscience conducted by neurosurgeon	Professor / Department of Neurosurgery, Kanazawa University	Histology

Note: The date, time or place of these lectures are subject to change.
Please check the details with the seminar guide leaflet distributed to each department beforehand.
Also please check our website for the latest information.
We might add a seminar other than the above. (http://www.medphas.kumamoto-u.ac.jp/en/medgrad/gakunai/seminar/)

***** Each seminar will be held in Japanese *****

C2 (cont.)

Academic Year 2026, D5: International Biomedical Research Seminars

●Place: Meeting Lounge, IRCMS 1F or online

●Time & Date: From 16:00 (usually on Wednesday; may be adjusted due to time difference)

The "D5 International Biomedical Research Seminars" course will be offered by International Research Center for Medical Sciences (IRCMS). It will run from April 2025 to March 2026, with lectures given by scientists who are affiliated with IRCMS or in collaboration with researchers at IRCMS. The lectures will be given in English, and by leading scientists in the relevant research field. Students will be taught: 1) how normal physiological functions are maintained in the human body; 2) how these systems become abnormal under certain pathophysiologic conditions; 3) why stem cells are important in animal development and homeostasis; 4) how stem cell-based approaches can help us understand disease mechanisms and find potential cure for diseases related to stem cell malfunction (e.g., cancer, aging).

No	Schedule	Lecturer	Research Field/The title for the lecture	Title / Affiliation
1.	May (onsite)	Kazu Kikuchi	Cardiomyocyte, Live imagind of tissue homeosasis and regeneration	Director of Department of Cardiac Regeneration Biology, National Cerebral and Cardiovascular Center, Japan
2.	June (online)	Els Mansell	Hematopoietic Cell, Cellular Senescence	Assistant Professor, Erasmus MC, Hematology the Netherlands
3.	July (onsite)	Anne Goriely	Genetics, Development, Mutations	Associate Professor of Human Genetics, Medical Sciences Division, University of Oxford, UK
4.	August (onsite)	Yusuke Nasu	Lactate, Biosensors, Fluorescent proteins, Protein Engineering	Assistant Research Fellow, Institute of Biological Chemistry, Academia Sinica, Taiwan
5.	September (online)	Cristian Bellodi	RNA, Stem Cell Biology	Professor, Biotech Research & Innovation Centre, University of Copenhagen, Denmark
6.	October (onsite)	Mikiko Tanaka	Molecular genetic mechanisms	Professor, Department of Life Science and Technology, Institute of Science Tokyo, Japan
7.	November (onsite)	Jun Nagai	Neurophysiology, General neuroscience, Neurochemistry	PI, Center for Brain Science, RIKEN, Japan
8.	December (online)	Andres Hidalgo	Inflammation, Neutrophils, Platelets, HSC	Professor, Department of Immunobiology, Yale University School of Medicine, USA
9.	January (onsite)	Naoyuki Matsumoto	Neuroscience	Associate Research Scientist, Department of Neuroscience, Yale University School of Medicine, USA
10.	February (onsite)	Yosuke Kurashima	Experimental pathology, Gastroenterology, Immunology	Associate Professor, Institute for Advanced Academic Research, Chiba University, Japan
11.	March (online)	Daniel Lacorazza	HSC, LSC, Leukemias	Professor, Department of Pathology & Immunology, Baylor College of Medicine, USA

Note: The schedule or venue of these lectures might change due to various reasons. Please check the details with the seminar guide leaflet distributed to each Department beforehand. Also, please check our website for the latest information. We might add a seminar other than the above.
http://www.medphas.kumamoto-u.ac.jp/medgrad/gakunai/seminar/seminar3/

***** Each seminar will be held in English *****

A report format of "C2: Medical and Life Science Seminar"

(Medical and Life Science Seminar, Learning from Experienced Doctors Seminar and International Biomedical Research Seminars)

Write 1 essay based on 1 talk chosen from the seminar "C2: Medicine and Life Science Seminar". Length of the essays should be 250-500 words. "C2 :"Medical and Life Science Seminar" requires students to attend more than 8 lectures for credits. Send each essay to the supervisor *(inviter of the talker) of the talk in one month by e-mail (neither by hard copy nor any other digital media). The file of the essay should be attached and also copied to the text of the e-mail. GSMS Student affairs office (iyg-igaku-3@jimu.kumamoto-u.ac.jp) should be in CC of such e-mail. Sign your name at the entrance of the lecture room so that your attendance will be counted.

* If you are writing a report on International Biomedical Research Seminars , email it to IRCMS(ircms@jimu.kumamoto-u.ac.jp) and GSMS Student affairs office (iyg-igaku-3@jimu.kumamoto-u.ac.jp).

Graduate schools of medicine, Medical Course ,(Master's)C2"Medical and Life Science Seminar" Report

Student : Grade	Registered number	Division	Name
Title of talk:			
Talker:			
Date:			
A body of essay: Fill this A4 sheet with 250-500 words			

(Subject code：10220)

Medicine and Life Science Training (Master's Course)

1． Credits are granted for attending and auditing academic meetings, lectures, symposiums, and other scholarly gatherings sponsored by academia and the private sector.

2． The University establishes "Life Science Training (Master's Course)" as an elective subject in the Master's program and grants one credit.

3． The following provisions shall apply to the granting of credits. The determination of academic conferences, lectures, symposia, and other academic gatherings to which credits can be granted shall be made by the committee of the postgraduate education.

(1) The academic meeting must be held for a period of at least one and a half days.

(2) The language of presentation must be either Japanese or English, and international, national, or regional lecture meetings are also acceptable.

(3) Regional lecture meetings organized by the private sector are also acceptable if the presenter and the content of the lecture are of sufficient academic value.

4．　How to apply for credits and the procedure for approving credits

1) Graduate students should, in principle, prepare an application and report using the prescribed forms and submit them to the GSMS Student Affairs Office during the academic year in which they participated in the academic meeting. Applications and reports are reviewed by the committee of the postgraduate education (generally held on the third Wednesday of each month).

2) The faculty supervisor will sign the application form after confirming that the applying graduate student has attended the academic meeting indicated in the application form and that satisfactory academic results have been obtained.

3) The committee of the postgraduate education will check the submitted documents to verify the validity of the academic meeting attended and award one credit.

Application Form for Credits of Life Science Training

(Master's Course)

Application date: (year/month/day)

Name:	Student number:
_____Year	Affiliation:
Phone number:	E-mail address:
Name of academic meeting:	
Date of meeting (y/m/d):	
City and venue of meeting:	
Supervisor's confirmation: Affiliation/Title/ Name (signature)	

Please submit this application form together with the academic meeting participation certificate to the GSMS Student Affairs Office. (Screening for approval of credits is generally conducted by the committee of the postgraduate education, which meets on the third Wednesday of each month.)

Meeting Report

(Note: Provide a one-page report on the academic meeting you attended. The description should include the date, time, place, number of participants, and theme of the academic meeting, followed by a summary of some presentations that interested you and a description of the results obtained from your participation (please delete this part described in blue when submitting the report).

【Subject code：10230（Master’s Elective Subject）】
【Subject code：26052（Doctoral Elective Subject）】
*Note that the codes are different for master's and doctoral students.

English (GSMS)

1. To improve English language skills, English language proficiency will be assessed and two credits will be awarded according to the CEFR (The Common European Framework of Reference for Languages) standards, which are widely recognized as international standards for language communication skills.

2. The University has established English subjects as elective subjects in the Master's and Doctoral Programs of the Graduate School of Medical Sciences, and requires students to take the STEP (Eiken), GTEC/CBT, GTEC for STUDENTs, IELTS, TEAP, TOEFL iBT, TOEFL Junior Comprehensive, or TOEIC/ TOEIC S&W. Credit will be granted by submitting test scores of those tests.

3. Level A is defined as C1 level and Level C as B1 level according to the CEFR standards. Evaluation will be based on the following criteria.
   AA: CEFR C2 level
   A: CEFR C1 level
   B: CEFR B2 level
   C: CEFR B1 level (See Note below)
   Fail: CEFR A2 level or below

(Note) The CEFR B1 level score will be regarded as ‘Fail’ if it has not improved from the English score at the time of admission.

4. Conversion of each English test’s scores to the CEFR standards will be based on the table approved by the faculty meeting.

5. Evaluation will be made on English scores taken after the second year of the graduate school after a minimum of 90 hours of English study overall, including English conversation in the laboratory and English papers study after entering the graduate school.

Reference

2015/09/29版

各試験団体のデータによるCEFRとの対照表

CEFR	Cambridge English	英検	GTEC CBT	GTEC for STUDENTS	IELTS	TEAP	TOEFL iBT	TOEFL Junior Comprehensive	TOEIC / TOEIC S&W
C2	CPE (200+)				8.5-9.0				
C1	CAE (180-199)	1級 (2810-3400)	1400		7.0-8.0	400	95-120		1305-1390 L&R 945~ S&W 360~
B2	FCE (160-179)	準1級 (2596-3200)	1250-1399	980 L&R&W 810	5.5-6.5	334-399	72-94	341-352	1095-1300 L&R 785~ S&W 310~
B1	PET (140-159)	2級 (1780-2250)	1000-1249	815-979 L&R&W 675-809	4.0-5.0	226-333	42-71	322-340	790-1090 L&R 550~ S&W 240~
A2	KET (120-139)	準2級 (1635-2100)	700-999	565-814 L&R&W 485-674	3.0	186-225		300-321	385-785 L&R 225~ S&W 160~
A1		3級-5級 (790-1875)	-699	-564 L&R&W -484	2.0				200-380 L&R 120~ S&W 80~

英検： 日本英語検定協会 http://www.eiken.or.jp/forteachers/data/cefr/
http://www.eiken.or.jp/association/info/2014/pdf/0901/20140901_pressrelease_01.pdf
TOEFL：米国ETS http://www.ets.org/Media/Research/pdf/RM-15-06.pdf?WT.ac=dkb
IELTS：ブリティッシュ・カウンシル（および日本英語検定協会）資料より
TEAP： 第1回 英語力の評価及び入試における外部試験活用に関する検討会 吉田研作教授資料より
Cambridge English（ケンブリッジ英検）：ケンブリッジ大学英語検定機構 http://www.cambridgeenglish.org/exams-and-qualifications/cefr/cefr-exams/
http://www.cambridgeenglish.org/exams/cambridge-english-scale/
※各試験団体の公表資料より文部科学省において作成

GTEC ：ベネッセコーポレーションによる資料より
「L&R&W」の記載が無い数値が４技能の合計点
TOEIC ： IIBC http://www.toeic.or.jp/toeic/about/result.html
「L&R」または「S&W」の記載が無い数値が４技能の合計点

Source: Ministry of Education, Culture, Sports, Science and Technology Website (https://www.mext.go.jp/b_menu/shingi/chousa/shotou/117/shiryo/__icsFiles/afieldfile/2015/11/04/1363335_2.pdf)