For students admitted in 2022 and before

The Graduate School of Medical Sciences

Kumamoto University

(Master's Course)

Syllabus

A1 Morphological Human Physiology
A2 Functional Human Physiology
A3 General Social Medicine
A4 General Clinical Medicine
A5 Bioethics
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

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	2023spring	Graduate School of Medical Sciences (10010)	1, 2	2	others

Course Title(Theme)(科目名(講義題目))	Instructor(s)(担当教員)
Morphological Human Physiology (For students admitted in 2022 and before)(Morphological Human Physiology A1)	WAKAYAMA Tomohiko, SHIMAMURA Kenji, ERA Takumi, FUKUDA Takaichi, OGAWA Minetaro, Ooba Takashi, KOMOHARA Yoshihiro, Fujihara Yukio

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, OHP and others.
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)】 Understanding normal structure of human body by anatomy, histology and embryology and mechanism of disease by pathology. 【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		Anatomy1 Fukuda Takaichi (e-learning only)	Anatomy 1 General Anatomy, Bone and Muscle
2		Histology1 Wakayama Tomohiko (e-learning only)	Histology1 General histology
3		Anatomy2 Fukuda Takaichi (e-learning only)	Anatomy 2 Caeduovasicular and Respiratory system
4		Histology4 Wakayama Tomohiko (e-learning only)	Histology2 Particular histology 1 Alimentary system
5		Histology2 Wakayama Tomohiko (e-learning only)	Histology3 Particular histology 2 Endocrine system
6		Anatomy3 Fukuda Takaichi (e-learning only)	Anatomy3 Kidney and Urinary system
7		Anatomy4 Fukuda Takaichi (e-learning only)	Anatomy4 Nervus system
8		Histology3 Wakayama Tomohiko (e-learning only)	Histology4 Particular histology 3 Reproductive system
9		Embryology1 Ooba Takashi (e-learning only)	Embryology1 Development and maturation of germ cells. Maturation of ovum. Fertilization
10		Pathology1 Fujihara Yukio (e-learning only)	Pathology1 Circulatory disturbance
11		Pathology3 Komohara Yoshihiro (e-learning only)	Pathology2 Inflammation
12		Pathology2 Fujihara Yukio (e-learning only)	Pathology3 Metabolic disorder
13		Embryology2 Era Takumi (e-learning only)	Embryology2 Early embryonic development. Formation of endoderm
14		Embryology3 Ogawa Minetaro (e-learning only)	Embryology3 Specification of mesoderm cell lines
15		Pathology4 Itou Takaaki (e-learning only)	Pathology4 Tumor
16		Embryology4 Shimamura Kenji (e-learning only)	Embryology4 ormation 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)	Nothing.
Assessment Methods and Criteria(評価方法・基準)	Assessment will be decided based on attendance including report on each lecture and class tests on each lecture. Assessing them comprehensively.
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	2023spring	Graduate School of Medical Sciences (10020)	1, 2	2	others

Course Title(Theme)(科目名(講義題目))	Instructor(s)(担当教員)
Functional Human Physiology (For students admitted in 2022 and before)(A2)	OSHIUMI Hiroyuki, TOMIZAWA Kazuhito, SASHIDA Goro, IWAMOTO Kazuya, YAMAGATA Kazuya, Sou Bunketsu, YAMANAKA Kunitoshi, IRIE Atsushi, NAKACHI Yutaka

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		OSHIUMI Hiroyuki（e-lerning only）	Immune response to viral infection
2		IRIE Atsushi（e-lerning only）	Types of T cells and their functions
3		IRIE Atsushi（e-lerning only）	Autoimmune disorders
4		OSHIUMI Hiroyuki（e-lerning only）	Vaccines and immune responses
5		SASHIDA Goro（e-lerning only）	Hematopoietic stem cell function
6		SASHIDA Goro（e-lerning only）	Epigenetic alteration in leukemia
7		TOMIZAWA Kazuhito（e-lerning only）	Mechanism of homeostasis in living organism
8		TOMIZAWA Kazuhito（e-lerning only）	Learning and emotional memory
9		NAKACHI Yutaka（e-lerning only）	Sexual differentiation of the brain
10		IWAMOTO Kazuya（e-lerning only）	Transposons in neurons
11		SONG Wen-Jle（e-lerning only）	Visual information processing in the retina
12		SONG Wen-Jle（e-lerning only）	Visual information processing in the cortex
13		YAMAGATA Kazuya（e-lerning only）	Glucose metabolism and disorders 1
14		YAMAGATA Kazuya（e-lerning only）	Glucose metabolism and disorders 2
15		YAMANAKA Kunitoshi（e-lerning only）	Intracellular protein dynamics I
16		YAMANAKA Kunitoshi（e-lerning only）	Intracellular protein dynamics II

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	Japanese

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	2023spring	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)	Nishitani Yoko, Katoh Takahiko, FURUKAWA Shota, MATSUI Kunihiko, SASAO Ako, SOEJIMA Hirofumi, Chang-Nian Wei, 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)】
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	04/20	2nd period Takahiko Katoh	Public Health: Studies General Theory and Concepts
2	04/21	1st period Takahiko Katoh	Public Health: Epidemiology
3	04/21	2nd period Takahiko Katoh	Public Health: Behavioral Medicine
4	04/24	1st period Shota Masuda	Public Health: Sets of statistics of a population in Japan
5	04/24	2nd period Shota Masuda	Public Health: Infection control measures in Japan
6	04/25	1st period Yoko Nishitani	Forensic Medicine: Definition of Forensic Medicine
7	04/25	2nd period Yoko Nishitani	Forensic Medicine: Forensic Medicine and Alcohol
8	04/26	1st period Kunihiko Matsui	General Medicine: Clinical studies, design, and outcome settings
9	04/26	2nd period Ako Sasao	Forensic Medicine: Analytical Methods for Drug Screening
10	04/27	1st period Hiroshi Tsutsumi	Forensic Medicine: Social Aspects of Death (1)
11	04/27	2nd period Shota Furukawa	Forensic Medicine: Social Aspects of Death (2)
12	04/28	1st period Chang-Nian Wei	Environmental Medicine: Health, Lifestyles, and Improving Public Health
13	04/28	2nd period Chang-Nian Wei	Environmental Medicine: Assessing Lifestyles
14	05/08	1st period Hirofumi Soejima	General Medicine: Coronary Risk Factor
15	05/08	2nd period Hirofumi Soejima	General Medicine: Ischemic Heart Disease
16	05/09	2nd period Xi Lu	Public Health: Medical Statistics

Estimated out-of-class study time	
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
Course Based on Practical Work Experience(実務経験	Applicable (A teacher with practical work experience in Public Health, Regional Medicine, or Forensic Medicine will lecture)

を活かした授業)	Applicable (A teacher with practical work experience in Public Health, Regional Medicine, or Forensic Medicine 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	2023spring	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)	MUKOYAMA Masashi, SAKAGAMI Takuro, KONDO Eiji, NAKAMURA Kimitoshi, UEDA Mitsuharu, IWAI Masanori, INOUE Toshihiro, TSUJITA Kenichi, SHINRIKI Satoru, FUKUI Toshihiro, MIYAMOTO Takeshi, TANAKA Yasuhito, MIYAMOTO Yuji, YASUNAGA Junichiro, IZUMI Yuichiro, KONDO Tatsuya

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	04/21	3rd period by Yuji Miyamoto (surgery)	Surgical treatment for gastroenterological cancer
2	04/21	4th period by Satoru Shinriki (diagnostic medicine)	Pathobiology and diagnostics of cancer
3	04/24	3rd period by Takuro Sakagami (pulmonology)	Recent advance in respiratory medicine
4	04/24	4th period by Toshihiro Fukui (cardiovascular surgery)	Recent advancement in cardiovascular surgery
5	04/25	3rd period by Masanori Iwai (pediatrics)	Recent Neonatal Intensive Care ～ New Therapeutic Strategies for Neonatal Hypoxic Ischemic Brain Injury
6	04/25	4th period by Kimitoshi Nakamura (pediatrics)	Children’s health and screening test for diseases
7	04/27	3rd period by Mitsuharu Ueda (neurology)	Recent advances in the diagnosis and treatment for systemic amyloidosis
8	04/27	4th period by Masashi Mukoyama (nephrology)	Recent topics on nephrology: Chronic kidney disease and life style-related diseases
9	04/28	3rd period by Eiji Kondoh (obstetrics/ gynecology)	Life-threatening complications in pregnancy
10	04/28	4th period by Yuichiro Izumi (nephrology)	Renal sodium handling
11	05/02	3rd period by Toshihiro Inoue (ophthalmology)	The wonder of the visual system
12	05/02	4th period by Kenichi Tsujita (cardiology)	Pathophysiology and treatment of acute myocardial infarction: Involvement of coronary spasm viewed from genetic and environmental factors
13	05/08	3rd period by Tatsuya Kondo (metabolic medicine)	Disbetes Mellitus:Causes,Pathogenesis,andCurrent Treatment
14	05/08	4th period by Takeshi Miyamoto (orthopedics)	Pathophysiology of locomotive organs
15	05/09	3rd period by Yasuhito Tanaka (hepatology)	Recent advancement in hepatology and gastroenterology
16	05/09	4th 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	Japanese and English

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)
RMM5-004-81-2	2023spring	Graduate School of Medical Sciences (10050)	1, 2	1	others

Course Title(Theme)(科目名(講義題目))	Instructor(s)(担当教員)
Bioethics(A5)	KADOOKA Yasuhiro

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 ‥‥50% 3.Global perspective and ability to take initiative action ‥‥20%

Type of Class(授業の形態)	Lecture
Teaching Method(授業の方法)	PowerPoint presentation will be used in the lectures on ethics of advanced medicine and clinical ethics, and active participation in the discussion is encouraged. E-learning concerning research ethics (eAPRIN learning program) will also be used.
Course Goals(授業の目的)	To introduce students to a wide range of ethical issues associated with medical treatment and biomedical science To provide students with opportunities that will help them understand the basic issues inherent in the practice of medicine as well as the conduct of biomedical research and enable them to make logical arguments in exploring these problems To give students an in-depth knowledge of relevant ethical guidelines and help them to understand their basis To help students to forge a solid intellectual foundation in biomedical ethic
Course Learning goals(学修目標)	【A level (A水準)】 To understand relevant rules and concepts in biomedical ethics, and make diversified and consistent discussions basing on them To practice research integrity and participants protection in order to conduct a sound graduate research 【C level (C水準)】 To be aware of socio-ethical issues caused by medical science and care To understand research ethics and integrity
Course Outline(授業の概要)	This course explores the history, case examples, problems, principles, concepts, and relevant ideas regarding biomedical ethics, so students will gain the ethical footing they will need as medical researchers and healthcare professionals. Critically reading relevant articles from major journals, students examine problems associated with medical treatment and science. The topics this course covers are subject to change.

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		Introduction of biomedical ethics	Lcture and discussion on the theme
2		Ethics of Advanced Medicine 1	Lcture and discussion on the theme
3		Ethics of Advanced Medicine 2, Clinical Ethics 1	Lcture and discussion on the theme
4		Clinical Ethics 2	Lcture and discussion on the theme

Estimated out-of-class study time	
Required Textbook(テキスト)	Handouts will be provided at every class period.
Reading List(参考文献)	V. Ravitsky V, Fiester A, Caplan AL (eds). The Penn Center Guide to Bioethics. NY, Springer Publishing Company, 2009. Singer PA, Viens AM (eds). The Cambridge Textbook of Bioethics. UK, Cambridge University Press, 2008. The Hastings Center. Bioethics Briefing Book. (http://www.thehastingscenter.org/Publications/BriefingBook/Default.aspx) Bonnie Steinbock (Editor) The Oxford Handbook of Bioethics, Oxford University Press, Oxford, 2007. Kuhse H, Singer P　(eds). A Companion to Bioethics 2nd edition. London, Oxford University Press,2009. Beauchamp TL, Childress JF. Principles of Biomedical Ethics 4th edition. NY, Oxford University Press, 1994. Lo B. Resolving ethical dilemmas A Guide for Clinician. Lippincott Williams and Wilkins, Baltimore, 2000. British Medical Association. Medical Ethics Today 3rd edition. London, BMJ, 2011. Rachels J: The Element of Moral Philosophy 2nd ed., McGraw-Hill, 1993. Stephan G. Post (Ed). Encyclopedia of Bioethics, 3rd edition, Volume 1, Macmillan Reference USA, Thomson/Gale, 2004. Mitchan　C (Editor in Chief). Encyclopedia of Science, Technology, and Ethics. Volume 1, Macmillan Reference USA, Thomson/Gale, 2005.
Enrollment Conditions(履修条件)	
Assessment Methods and Criteria(評価方法・基準)	Student evaluations will be weighted on attendance, understanding and presentation at discussion and classes, completion of appointed CITI e-leaning classes, comment sheet, and so on.
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 (Teacher"s academic degrees in bioethics and medicine, and practical experiences of research review and clinical ethics support.)

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	2023spring	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, FUKUSHIMA Satoshi, TANAKA Yasuhito, UEDA Mitsuharu, SAKAGAMI Takuro, TSUJITA Kenichi, KONDO Tatsuya, NAKAYAMA Hideki

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)】
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	05/23	4th period Satoshi Fukushima	Clinical pathology of melanoma from the perspective of genomics.
2	05/25	2th period Kimitoshi Nakamura	Liver diseases in inborn errors of metabolism.
3	05/25	4th period Yasuhito Tanaka	Latest information on liver diseases: Outline the pathological progression mechanism and latest treatment of liver cirrhosis and hepatocellular carcinoma
4	05/26	4th period Mitsuharu Ueda	Diagnosis and Treatment of Intractable Neurological Diseases.
5	05/30	4th period Takuro Sakagami	Anti-cytokine antibody and respiratory disease.
6	05/31	4th period Kenichi Tsujita	Pathology of acute coronary syndrome and antithrombotic therapy.
7	06/01	4th period Tatsuya Kondo	Diabetes/Metabolic disorder caused by impaired insulin action and its complications.
8	06/02	4th period Hideki Nakayama	The mechanism of periodontal disease will be explained pathologically, and students will learn the associations between periodontal disease and various systemic diseases.

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)	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)	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)
RMM5-006-79-2	2023spring	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, OKADA Seiji, SATO Yorifumi, OSHIUMI Hiroyuki, MOTOZONO Chihiro, Maeda Yousuke, IKEDA Terumasa

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	05/10	2nd period Tomohiro Sawa	Introduction to bacterial infections/diseases.
2	05/11	2nd period Tomohiro Sawa	Pathogenic mechanisms of bacterial infections.
3	05/12	2nd period Yosuke Maeda	Basic and practical medical virology.
4	05/15	2nd period Yorifumi Sato	Pathogenesis of virus infection and diseases.
5	05/16	2nd period Chihiro Motozono	Cellular immune responses to viral infections.
6	05/17	2nd period Terumasa Ikeda	Virus infection and restriction factors
7	05/18	2nd period Hiroyuki Oshiumi	Viral infection and innate immunity.
8	05/19	2nd period Seiji Okada	Differentiation of hematopoietic stem cells to immunocompetent cell.

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	2023spring	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, ARAKI Norie, IRIE Atsushi, Oike Yuuichi, NAKACHI Yutaka

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	05/11	3rd period Norie Araki	Academic Background of Genomics, Proteomics and Metabolomics
2	05/12	3rd period Atsushi Irie	Basic Principle of Genomics, Proteomics and Metabolomics (1)
3	05/15	3rd period Atsushi Irie	Basic Principle of Genomics, Proteomics and Metabolomics (2)
4	05/16	3rd period Norie Araki	Genomics, Proteomics and Metabolomics and frontier of disease research
5	05/17	3rd period Yutaka Nakachi	Introduction to bioinformatics
6	05/18	3rd period Kazuya Iwamoto	General remarks of DNA epigenetics（1）
7	05/19	3rd period Kazuya Iwamoto	General remarks of DNA epigenetics（2）
8	05/22	3rd period Yuichi Oike	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)	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 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	2023spring	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, Boku Syuken, SHIMAMURA Kenji, IWAMOTO Kazuya, MUKASA Akitake, ESUMI Shigeyuki, 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	05/11	4th period Kazuya Iwamoto; Molecular Brain Sciences	Molecular genetics of psychiatric disorders
2	05/12	4th period Kenji Shimamura; Neural development	Induction and regionalization of the central nervous system
3	05/15	4th period Akitake Mukasa; Neurosurgery	Clinical neuroscience in Neurosurgery
4	05/16	4th period Shigeyuki Esumi; Neural development and neural anatomy	Structure and development of the cerebral cortex
5	05/17	4th period Hidenobu Mizuno; Somatic sensation	Somatosensory neuroscience
6	05/18	4th period Shuken Boku; Psychiatry	Neuroscience from a mental disorder perspective
7	05/19	4th period Wen-Jie Song; Hearing	Auditory neuroscience
8	05/22	4th period Yohei Misumi; Neurodegenerative diseases	Neuroscience in neurodegenerative diseases

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	2023spring	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, NAKAO Mitsuyoshi, NAKAMURA Kimitoshi, 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	05/10	1st period Ryuichi Nishinakamura	Developmental and regenerative medicine
2	05/11	1st period Hitoshi Niwa	Embryonic development and stem cells
3	05/12	1st period Satoshi Tateishi	Tumor suppression via regulation of cell cycle and DNA repair
4	05/15	1st period Mitsuyoshi Nakao, Tomoaki Koga	Epigenetics in health and diseases
5	05/16	1st period Kimitoshi Nakamura	DNA diagnosis and therapy for genetic diseases
6	05/17	1st period Yasuhiko Sugawara	Organ transplantation
7	05/18	1st period Kazutoyo Terada	Mitochondrial disease
8	05/19	1st period Yuichiro Arima	Cardiac disease and regenerative medicine

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	2023spring	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(B6 Learn 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, USUKU Koichiro, NISHIKAWA Takeshi, 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	05/23	3rd period Koichiro Usuku	Handling of electronic information and Electronic Medical Records
2	05/24	3rd period Takeshi Nishikawa	Hypothesis and Design of Clinical Researches
3	05/25	3rd period Masanobu Ishii	Handling of clinical data and statistical analysis in clinical research ①
4	05/26	3rd period Taishi Nakamura	Critical Path : its design and the utilization
5	05/30	3rd period Koichiro Usuku	Handling medical records from the privacy protection view
6	05/31	3rd period Takashi Nishikawa	Hypothesis and design of clinical researches from the perspective of diabetic complications
7	06/01	3rd period Masanobu Ishii	Handling of clinical data and statistical analysis in clinical research ②
8	06/02	3rd period Taishi Nakamura	Regional Medical Cooperation

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, and with 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	2023spring	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, KOJIMA Akihiro, ARAKI Kimi, ARAKI Masatake

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) Small animal experiment using molecular imaging 4) Production of knock-out mice, transgenic mice and genome editing 5) Production of gene trap mice 6) Principle of the RNA silencing technology

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		1st period, Reproductive engineering technology in mice I by TAKEO Tooru	Lecture and discussion about reproductive engineering technology in mice I
2		2nd period, Reproductive engineering technology in mice II by TAKEO Tooru	Lecture and discussion about reproductive engineering technology in mice II
3		3rd period, Infectious diseases of laboratory animals by TORIGOE Daisuke	Lecture and discussion about infectious diseases of laboratory animals
4		4th period, Small animal experiment using molecular imaging by KOJIMA Akihiro	Lecture and discussion about small animal experiment using molecular imaging
5		1st period, Production of transgenic mice by ARAKI Kimi	Lecture and discussion about production of transgenic mice
6		2nd period, Knock-out mice and genome editing by ARAKI Kimi	Lecture and discussion about knock-out mice and genome editing
7		3rd period, Production of gene trap mice by ARAKI Masatake	Lecture and discussion about production of gene trap mice
8		4th period, Principle of the RNA silencing technology by NAKAMURA Akira	Lecture and discussion about principle of the RNA silencing technology

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)	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)
RMM5-012-79-2	2023spring	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)	OKADA Seiji, SHIMASAKI Tatsuya, KOJIMA Akihiro

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)	Other
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	04/19	3rd period Akihiro Kojima	Basics of Radioisotope (1)
2	04/19	4th period Akihiro Kojima	Basics of Radioisotope (2)
3	05/10	3rd period Akihiro Kojima	Basics of Radioisotope (3)
4	05/11	4th period Akihiro Kojima	Basics of Radioisotope (4)
5	05/22	1st period Seiji Okada	Application of RI for Biomedical Research
6	05/23	1st period Akihiro Kojima	Measurement of radioisotope
7	05/24	1st period Tatsuya Shimasaki	Biological effects of irradiation
8	05/25	1st period Tatsuya Shimasaki	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.)

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

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

Academic Year 2023 Graduate School's Medical Experiment Course

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

Date	AM		PM	
April 5 (Wed.)	1 8:45 ～ 10:15	Introduction to recombinant DNA technique (Molecular Genetics : TERADA Kazutoyo)	3 13:15 ～ 14:45	Principle and application of polymerase chain reaction (Medical Biochemistry : SATO Yoshifumi)
	2 10:30 ～ 12:00	Gene Trasfer Technique (Molecular Physiology : CHUJO Takeshi)	15:00 ～ 16:30	
April 6 (Thu.)	4 8:45 ～ 10:15	Cell imaging and quantitative analysis (Chromosome Biology: ISHIGURO Keiichiro)	6 13:15 ～ 14:45	Analysis of Transcriptional Regulation (Cell Signaling and Metabolic Medicine : KANAMORI Yohei)
	5 10:30 ～ 12:00	Protein Purification (General Methods) (Molecular Cell Biology : YAMANAKA Kunitoshi)	7 15:00 ～ 16:30	Pharmacokinetics (Pharmacology and Therapeutics : SARUWATARI Jyunji)
April 10 (Mon.)	8 8:45 ～ 10:15	Production of polyclonal and monoclonal antibodies (Immunology : IRIE Atsushi)	9 13:15 ～ 14:45	Analytical methods for intracellular signaling (Infection and Hematopoiesis : SUZU Shinya)
	10:30 ～ 12:00		10 15:00 ～ 16:30	Immunohistochemistry (Cell Pathology : YANO Hiromu)
April 11 (Tue.)				
	11 10:30 ～ 12:00	Basic Methods in Immunology (Immunology : IRIE Atsushi)	12 15:00 ～ 16:30	Proteomics (Tumor Genetics and Biology : ARAKI Norie)
April 12 (Wed.)	13 8:45 ～ 10:15	Experimental animals and animal Experimentations I (Division of Microbiology and Genetics: TORIGOE Daisuke)	15	Reproductive Engineering Techniques (Reproductive Engineering: TAKEO Toru)
	14 10:30 ～ 12:00	Experimental animals and animal Experimentations II (Division of Microbiology and Genetics: TORIGOE Daisuke)	16 15:00 ～ 16:30	In situ hybridization (Molecular Pharmacology : KIKUCHI Koji)
April 13 (Thu.)	17 8:45 ～ 10:15	Practice and Guidance for Biological Laboratory Safety (Medical Virology: MAEDA Yosuke)		
	18 10:30 ～ 12:00	Introduction to flowcytometry (Immunology : IRIE Atsushi))		
e-learning only	19	Experiment study and safety control 【e-learning only】 (Environmental Safety Center: YAMAGUCHI Yoshihiro)	20	Guidance for Living Modified Organism (LMO) 【e-learning only】 (Division of Genomics : ARAKI Masatake)
			21	Methods for Literature Search 【e-learning only】 (Anatomy : FUKUDA Takaichi)

Elective subject : C2 Medical & Life Science Seminar (1 credit) Subject code 10180
(Medical and Life Science Seminar, Learning from Experience Doctors Seminar)

Academic Year 2023, D1 Medicine & Life Science Seminar

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

№	Schedule	Talker	Title	Affiliation	Inviter
1	Apr 19 (WED)	KANKI Tomotake	Mitophagy～mitochondrial morphology and quality control～	Professor, Department of Cellular Physiology, Niigata University Graduate School of Medical and Dental Sciences	Molecular Genetics
2	May 31 (WED)	YOSHIMATSU Yasuhiro	Lymphatic vessels in health and disease	Associate Professor, Division of Pharmacology, Graduate School of Medical and Dental Sciences, Niigata University	Cell Pathology
3	Jun 7 (WED)	NAKAE Susumu	Role of epithelial cell-derived cytokines in allergy	Professor, Graduate School of Integrated Sciences for Life, Hiroshima University	Microbiology
4	Jun 14 (WED)	Ohyama Kaname	Development of pathological research by comprehensive analysis of immune complexes	Professor, Department of Hospital Pharmacy, Nagasaki University	Neuropsychiatry
5	Jun 21 (WED)	GOYAMA Susumu	CRISPR-Cas: biology and its application to blood research	Professor, Division of Molecular Oncology, Graduate School of Frontier Sciences, The University of Tokyo	Transcriptional Regulation in Leukemogenesis
6	Jul 12 (WED)	HIBINO Hiroshi	Interdisciplinary Approaches to Inner Ear Research	Professor, Division of Global Pharmacy Department of Pharmacology Graduate School of Medicine, Osaka University	Sensory and Cognitive Physiology
7	Jul 19 (WED)	OKAMOTO Toru	Virus infection and pathogenesis	Professor, Department of Microbiology, Faculty of Medicine, Juntendo University	Infection and Immunity
8	Aug 9 (WED)	ISHIZU Ayako	Hematopoietic stem cell regulation by extrinsic and metabolic factors	Professor, Dept. Microanatomy and Developmental Biology, Tokyo Women's Medical University	Stem Cell Stress
9	Nov 1 (WED)	FURUSE Mikio	Roles of cell-cell junctions in epithelial barrier function	Professor, Division of Cell Structure, National Institute for Physiological Sciences	Histology
10	Dec 13 (WED)	SUZUKI Motoshi	Therapeutic strategies to target cancer-specific pathways and vulnerability	Professor, Fujita Health Univ, Dep Mol Oncol	Hematopoiesis
11	Jun 31 (WED)	IWAI Kazuhiro	Ubiquitin in signaling: a tale of atypical linear ubiquitin chains	Professor, Department of Molecular and Cellular Physiology, Graduate School of Medicine, Kyoto University	Molecular and Medical Pharmacology

Note: The date, time or place of these lectures may change due to the inviter's and lecturer's schedules. 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 the seminar other than the above. (http://www.medphas.kumamoto-u.ac.jp/en/medgrad/gakunai/seminar/)

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

C2(continue)

Academic Year 2023, D2 Learning from Experienced Doctors Seminar

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

№	Schedule	Talker	Title	Affiliation	Inviter
1	Apr 12 (WED)	MOCHIZUKI Naoki	Understanding Cardiovascular Development by in vivo Imaging using Zebrafish	Director General, Department Head of Cell Biology, National Cerebral and Cardiovascular Center Research Institute (NCVC RI)	Molecular Genetics
2	Apr 26 (WED)	MATSUDA Koichi	Disease biobank and genome research	Professor, Laboratory of Clinical Genome Sequencing Department of Computational biology and Medical Sciences, Graduate school of Frontier Science, The University of Tokyo	Hematopoiesis
3	May 10 (WED)	KOIKE Shinsuke	What we know about psychiatric disorders from human brain MRI studies.	Associate Professor Center for Evolutionary Cognitive Sciences (ECS) at the University of Tokyo	Molecular Brain Science
4	May 17 (WED)	YOSHIMI Akihide	Targeting Aberrant RNA Splicing in Cancer	Chief, Division of Cancer RNA Research, National Cancer Center Research Institute	Transcriptional Regulation in Leukemogenesis
5	Jul 5 (WED)	Kawato Mitsuo	Diagnostic and therapeutic systems based on brain science and AI	Director, ATR Brain Information Communication Research Laboratory Group	Neuropsychiatry
6	Sep 6 (WED)	ITO Toshihiro	Immune mechanism of COVID-19 and its elucidation	Professor, Department of Immunology, Nara Medical University	Infection and Immunity
7	Sep 8 (FRI)	MATSUMOTO Toshihiko	Why do people become addicted?	**Director, Department of Drug Dependence Research, National Institute of Mental Health, National Center of Neurology and Psychiatry**	Histology
8	Oct 4 (WED)	NAKAYAMA Keiichi	Next Generation Proteomics x AI Revolutionizing Cancer Therapy	Distinguished Professor, Division of Cell Biology, Department of Molecular and Cellular Biology, Medical Institute of Bioregulation, Kyushu University	Molecular and Medical Pharmacology
9	Oct 18 (WED)	SASAKI Hiroyuki	Efforts related to formulating a business continuity plan (BCP) of Tohoku University Hospital	Associate Professor, Division of International Cooperation for Disaster Medicine, International Research Institute of Disaster Science (IRIDeS)	Disaster and Critical Care Medicine

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

C2(continue)

Academic Year 2023, D5: International Biomedical Research Seminars

●Place: Meeting Lounge, IRCMS 1F (virtual seminars due to the pandemic)
●Time & Date: From 16:30 (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 2022 to March 2023, 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	The title for the lecture	Title / Affiliation
~~1.~~	~~April~~	~~Ruby Huang~~	~~TBA~~	~~Professor, School of Medicine, National Taiwan University, Taiwan~~
2.	May	Takahiro Masuda	TBA	Professor, Medical Institute of Bioregulation, Kyushu University, Japan
3.	June	Mari Sato	TBA	Associate Professor, Faculty of Dental Medicine, Division of Dental Medicine, Department of Health Science, Hokkaido University, Japan
4.	July	Luis Tiago	TBA	Sir Henry Dale Fellow, Faculty of Medicine, Department of Immunology and Inflammation, Imperial College London, UK
5.	August	Jing Huang	TBA	Senior Investigator, Head, Cancer and Stem Cell Epigenetics Section, Center for Cancer Research, The National Institutes of Health (NIH), USA
6.	September	Akihiko Yoshimura	TBA	Professor, Department of Microbiology and Immunology, Graduate School of Medicine, Keio University, Japan
7.	October	Fanyan Wei	TBA	Professor, Department of Modomics Biology and Medicine, IDAC, Tohoku University, Japan
8.	November	Paul Liu	TBA	Deputy Scientific Director, Head of Oncogenesis and Development Section, The National Institutes of Health (NIH), USA
9.	December	TBA	TBA	
10.	January	Takaaki Akaike	TBA	Professor, Department of Environmental Medicine and Molecular Toxicology, Tohoku University, Japan
11.	February	TBA	TBA	
12.	March	Xin Sun	TBA	Professor, Department of Cell and Developmental Biology, University of California San Diego (UCSD), 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 the other seminar 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			