

**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－)	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	2022spring	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(Morphological Human Physiology A1)			WAKAYAMA Tomohiko, SHIMAMURA Kenji, ERA Takumi, FUKUDA Takaichi, OGAWA Minetaro, Ooba Takashi, KOMOHARA Yoshihiro, Fujihara Yukio, Ito Takaaki		
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	04/14	1st Anatomy1 Fukuda Takaichi		Anatomy 1 General Anatomy, Bone and Muscle	
2	04/14	3rd Histology1 Wakayama Tomohiko		Histology1 General histology	
3	04/15	1st Anatomy2 Fukuda Takaichi		Anatomy 2 Caeduovascular and Respiratory system	
4	04/15	3rd Histology4 Wakayama Tomohiko		Histology2 Particular histology 1 Alimentary system	
5	04/18	2nd Histology2 Wakayama Tomohiko		Histology3 Particular histology 2 Endocrine system	
6	04/18	3rd Anatomy3 Fukuda Takaichi		Anatomy3 Kidney and Urinary system	
7	04/19	1st Anatomy4 Fukuda Takaichi		Anatomy4 Nervus system	
8	04/19	3rd Histology3 Wakayama Tomohiko		Histology4 Particular histology 3 Reproductive system	
9	04/20	1st Embryology1 Ooba Takashi		Embryology1 Development and maturation of germ cells. Maturation of ovum. Fertilization	
10	04/21	1st Pathology1 Fujihara Yukio		Pathology1 Circulatory disturbance	
11	04/21	3rd Pathology3 Komohara Yoshihiro		Pathology2 Inflammation	
12	04/22	1st Pathology2 Fujihara Yukio		Pathology3 Metabolic disorder	
13	04/22	3rd Embryology2 Era Takumi		Embryology2 Early embryonic development. Formation of endoderm	
14	04/25	3rd Embryology3 Ogawa Minetaro		Embryology3 Specification of mesoderm cell lines	
15	04/26	1st Pathology4 Itou Takaaki		Pathology4 Tumor	
16	04/26	3rd Embryology4 Shimamura Kenji		Embryology4 ormination 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(科目番号)	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	2022spring	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(A2)			OSHIUMI Hiroyuki, TOMIZAWA Kazuhito, SASHIDA Goro, IWAMOTO Kazuya, YAMAGATA Kazuya, SONG Wen-Jle, 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	04/14	2nd period, OSHIUMI Hiroyuki	Immune response to viral infection		
2	04/14	4th period, IRIE Atsushi	Types of T cells and their functions		
3	04/15	2th period, IRIE Atsushi	Autoimmune disorders		
4	04/15	4th period, OSHIUMI Hiroyuki	Vaccines and immune responses		
5	04/18	4th period, SASHIDA Goro	Hematopoietic stem cell function		
6	04/19	2nd period, SASHIDA Goro	Epigenetic alteration in leukemia		
7	04/19	TOMIZAWA Kazuhito (e-lerning only)	Mechanism of homeostasis in living organism		
8	04/20	TOMIZAWA Kazuhito (e-lerning only)	Learning and emotional memory		
9	04/21	2nd period, NAKACHI Yutaka	Sexual differentiation of the brain		
10	04/21	4th period, IWAMOT Kazuya	Transposons in neurons		
11	04/22	2th period, SONG Wen-Jle	Visual information processing in the retina		
12	04/22	4th period, SONG Wen-Jle	Visual information processing in the cortex		
13	04/25	2nd period, YAMAGATA Kazuya	Glucose metabolism and disorders 1		
14	04/25	4th period, YAMAGATA Kazuya	Glucose metabolism and disorders 2		
15	04/26	2nd period, YAMANAKA Kunitoshi	Intracellular protein dynamics I		
16	04/26	4th period, YAMANAKA Kunitoshi	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-)	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	2022spring	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 Youko, Katou Takahiko, MATSUI Kunihiro, SASAO Aki, SOEJIMA Hirofumi, Chang-Nian Wei, Lu Xi, MASUDA Shota, TSUTSUMI Hiroshi, FURUKAWA Shota		
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	04/27	1st period Takahiko Katoh	Public Health: Studies General Theory and Concepts		
2	04/27	2nd period Takahiko Katoh	Public Health: Epidemiology		
3	04/28	1st period Takahiko Katoh	Public Health: Behavioral Medicine		
4	04/28	2nd period Yoko Nishitani	Forensic Medicine: Definition of Forensic Medicine		
5	05/02	1st period Shota Masuda	Public Health: Sets of statistics of a population in Japan		
6	05/02	2nd period Shota Masuda	Public Health: Infection control measures in Japan		
7	05/06	1st period Chang-Nian Wei	Environmental Medicine: Health, Lifestyles, and Improving Public Health		
8	05/06	2nd period Chang-Nian Wei	Environmental Medicine: Assessing Lifestyles		
9	05/09	1st period Yoko Nishitani	Forensic Medicine: Forensic Medicine and Alcohol		
10	05/09	2nd period Kunihiro Matsui	General Medicine: Clinical studies, design, and outcome settings		
11	05/10	1st period Hiroshi Tsutsumi	Forensic Medicine: Social Aspects of Death (1)		
12	05/10	2nd period Shota Furukawa	Forensic Medicine: Social Aspects of Death (2)		
13	05/11	1st period Xi Lu	Public Health: Medical Statistics		
14	05/11	2nd period Aki Sasao	Forensic Medicine: Analytical Methods for Drug Screening		
15	05/12	1st period Hirofumi Soejima	General Medicine: Coronary Risk Factor		
16	05/12	2nd period Hirofumi Soejima	General Medicine: Ischemic Heart Disease		
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)
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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	2022spring	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, MATSUI Hiroataka, YAMASHITA Yoichi, KONDOH Eiji, MATSUOKA Masao, NAKAMURA Kimitoshi, UEDA Mitsuharu, ADACHI Masataka, IWAI Masanori, INOUE Toshihiro, TSUJITA Kenichi, SHINRIKI Satoru, FUKUI Toshihiro, MIYAMOTO Takeshi, 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	04/27	3rd period by Yoichi Yamashita (surgery)	Surgical treatment for gastroenterological cancer		
2	04/27	4th period by Satoru Shinriki (diagnostic medicine)	Pathobiology and diagnostics of cancer		
3	04/28	3rd period by Masanori Iwai (pediatrics)	Recent neonatal intensive care: New therapeutic strategies for neonatal hypoxic ischemic brain injury		
4	04/28	4th period by Toshihiro Fukui (cardiovascular surgery)	Recent advancement in cardiovascular surgery		
5	05/02	3rd period by Takuro Sakagami (pulmonology)	Recent advance in respiratory medicine		
6	05/02	4th period by Masashi Mukoyama (nephrology)	Recent topics on nephrology: Chronic kidney disease and non-communicable diseases		
7	05/06	3rd period by Kenichi Tsujita (cardiology)	Pathophysiology and treatment of acute myocardial infarction: Involvement of coronary spasm viewed from genetic and environmental factors		
8	05/06	4th period by Toshihiro Inoue (ophthalmology)	The wonder of the visual system		
9	05/09	3rd period by Mitsuharu Ueda (neurology)	Recent advances in the diagnosis and treatment for systemic amyloidosis		
10	05/09	4th period by Eiji Kondoh (obstetrics/ gynecology)	Life-threatening complications in pregnancy		
11	05/10	3rd period by Kimitoshi Nakamura (pediatrics)	Children’ s health and screening test for diseases		
12	05/10	4th period by Masataka Adachi (nephrology)	Renal sodium handling		
13	05/12	3rd period by Hiroataka Matsui (diagnostic medicine)	Principles and applications of comprehensive genetic/epigenetic analysis		
14	05/12	4th period by Masao Matsuoka (hematology)	Virus and human		
15	05/13	3rd period by Yasuhito Tanaka (hepatology)	Recent advancement in hepatology and gastroenterology		
16	05/13	4th period by Takeshi Miyamoto (orthopedics)	Pathophysiology of locomotive organs		
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	2022spring	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 (CITI e-learning system) 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. The class is occasionally divided into small groups for discussion and students will be required to give presentations. 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		2nd period	Introduction of biomedical ethics	Lecture and discussion on the theme	
2		2nd period	Ethics of Advanced Medicine 1	Lecture and discussion on the theme	
3		2nd period	Ethics of Advanced Medicine 2, Clinical Ethics 1	Lecture and discussion on the theme	
4		2nd period	Clinical Ethics 2	Lecture 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-learning 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	2022spring	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, SAKAGAMI Takuro, ARAKI Eiichi, NAKAYAMA Hideki, TSUJITA Kenichi, FUKUSHIMA Satoshi, YAMASHITA 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)】				
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	05/30	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.		
2	05/31	4th period Yasuhito Tanaka	Latest information on liver diseases: Outline the pathological progression mechanism and latest treatment of liver cirrhosis and hepatocellular carcinoma		
3	06/02	4th period Satoshi Yamashita	Diagnosis and Treatment of Intractable Neurological Diseases.		
4	06/03	4th period Satoshi Fukushima	Clinical pathology of melanoma from the perspective of genomics.		
5	06/06	4th period Takuro Sakagami	Anti-cytokine antibody and respiratory disease.		
6	06/07	4th period Kimitoshi Nakamura	Liver diseases in inborn errors of metabolism.		
7	06/09	4th period Kenichi Tsujita	Pathology of acute coronary syndrome and antithrombotic therapy.		
8	06/10	4th period Eiichi Araki	Diabetes/Metabolic disorder caused by impaired insulin action and its complications.		
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(科目番号)	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	2022spring	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	05/16	2nd period Tomohiro Sawa	Introduction to bacterial infections/diseases.		
2	05/17	2nd period Tomohiro Sawa	Pathogenic mechanisms of bacterial infections.		
3	05/18	2nd period Yosuke Maeda	Basic and practical medical virology.		
4	05/19	2nd period Yorifumi Sato	Pathogenesis of virus infection and diseases.		
5	05/23	2nd period Chihiro Motozono	Cellular immune responses to viral infections.		
6	05/24	2nd period Terumasa Ikeda	Virus infection and restriction factors		
7	05/25	2nd period Hiroyuki Oshiumi	Viral infection and innate immunity.		
8	05/26	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	2022spring	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	05/16	3rd period Norie Araki	Academic Background of Genomics, Proteomics and Metabolomics		
2	05/17	3rd period Atsushi Irie	Basic Principle of Genomics, Proteomics and Metabolomics (1)		
3	05/19	3rd period Atsushi Irie	Basic Principle of Genomics, Proteomics and Metabolomics (2)		
4	05/20	3rd period Norie Araki	Genomics, Proteomics and Metabolomics and frontier of disease research		
5	05/23	3rd period Yutaka Nakachi	Introduction to bioinformatics		
6	05/24	3rd period Kazuya Iwamoto	General remarks of DNA epigenetics (1)		
7	05/26	3rd period Kazuya Iwamoto	General remarks of DNA epigenetics (2)		
8	05/27	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	2022spring	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, SHIMAMURA Kenji, IWAMOTO Kazuya, MUKASA Akitake, BOKU Shuken, 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)	<p>【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.</p> <p>【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.</p>				
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	05/16	4th period Shuken Boku; Psychiatry	Neuroscience from a mental disorder perspective		
2	05/17	4th period Kenji Shimamura; Neural development	Induction and regionalization of the central nervous system		
3	05/19	4th period Akitake Mukasa; Neurosurgery	Clinical neuroscience in Neurosurgery		
4	05/20	4th period Hidenobu Mizuno; Somatic sensation	Somatosensory neuroscience		
5	05/23	4th period Kazuya Iwamoto; Molecular Brain Sciences	Molecular genetics of psychiatric disorders		
6	05/24	4th period Wen-Jie Song; Hearing	Auditory neuroscience		
7	05/26	4th period Shigeyuki Esumi; Neural development and neural anatomy	Structure and development of the cerebral cortex		
8	05/27	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－)	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	2022spring	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)	<ul style="list-style-type: none">Embryonic development and embryonic stem cells and tissue stem cellsKidney development and regenerative medicineTumor suppression via regulation of mitosis and DNA repairHereditary mitochondrial diseaseDiagnosis and gene therapyEpigenetic medicineTissue and organ graftsCardiac 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	05/17	1st period Ryuichi Nishinakamura	Developmental and regenerative medicine		
2	05/18	1st period Hitoshi Niwa	Embryonic development and stem cells		
3	05/19	1st period Satoshi Tateishi	Tumor suppression via regulation of cell cycle and DNA repair		
4	05/20	1st period Mitsuyoshi Nakao, Tomoaki Koga	Epigenetics in health and diseases		
5	05/24	1st period Kimitoshi Nakamura	DNA diagnosis and therapy for genetic diseases		
6	05/25	1st period Yasuhiko Sugawara	Organ transplantation		
7	05/26	1st period Kazutoyo Terada	Mitochondrial disease		
8	05/27	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	2022spring	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(Learn how to handle and manage information when providing medical care from the perspectives of medical information, clinical pathways, community medicine, clinical research practice, and EBM.)			NAKAMURA Taishi, Nishikawa Takeshi, HARADA Masahiro, USUKU Koichiro		
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)	Lectures using Power point and OHP etc.				
Course Goals(授業の目的)	Though medical care is a work to apply a medical advance to the medical practice, appropriate handling of informations occurring in the healthcare setting is essential to accomplish its purpose. The aim of this lecture is to acquire ability to handle information appropriately in the field of the healthcare setting through learning types of information in this field, way to handle information including personal information protection, and method to take useful information from patients and literature.				
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. 【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 following this course.				
Course Outline(授業の概要)	In medical informatics, 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 electronic exchange. Lectures will be given on problems in exchanging medical information, including points to keep in mind when using Information and Commuication 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, 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	05/30	3rd period Taishi Nakamura	Clinical Pass : its design		
2	05/31	3rd period Masahiro Harada	Handling of clinical data and statistical analysis in clinical research ①		
3	06/02	3rd period Takeshi Nishikawa	Hypothesis and Design of Clinical Researches		
4	06/03	3rd period Koichiro Usuku	Handling of electronic information and Electronic Medical Records		
5	06/06	3rd period Taishi Nakamura	Regional Medical Cooperation		
6	06/07	3rd period Masahiro Harada	Handling of clinical data and statistical analysis in clinical research ②		
7	06/09	3rd period Takashi Nishikawa	Hypothesis and design from the perspective of diabetic complications researches		
8	06/10	3rd period Koichiro Usuku	Handling medical records from the privacy protection view		
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 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, clinical pathways, and regional medical cooperation.)				

Course Coding(科目番号)	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	2022spring	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 (Class by zoom & on-demand Class)	Lecture and discussion about reproductive engineering technology in mice I		
2		2nd period, Reproductive engineering technology in mice II by TAKEO Tooru (on-demand Class)	Lecture and discussion about reproductive engineering technology in mice II		
3		3rd period, Infectious diseases of laboratory animals by TORIGOE Daisuke (Class by zoom & on-demand Class)	Lecture and discussion about infectious diseases of laboratory animals		
4		4th period, Small animal experiment using molecular imaging by KOJIMA Akihiro (on-demand Class)	Lecture and discussion about small animal experiment using molecular imaging		
5		1st period, Production of transgenic mice by ARAKI Kimi (on-demand Class)	Lecture and discussion about production of transgenic mice		
6		2nd period, Knock-out mice and genome editing by ARAKI Kimi (on-demand Class)	Lecture and discussion about knock-out mice and genome editing		
7		3rd period, Production of gene trap mice by ARAKI Masatake (on-demand Class)	Lecture and discussion about production of gene trap mice		
8		4th period, Principle of the RNA silencing technology by NAKAMURA Akira (Class by zoom & on-demand Class)	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 (4th ed.). Cold Spring Harbor Laboratory Press, 2013. ・ Virginia E. Papaianou 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)		Not applicable			

を活かした授業)	Not applicable
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Course Coding(科目番号)	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	2022spring	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	04/20	3rd period Akihiro Kojima	Basics of Radioisotope (1)		
2	04/20	4th period Akihiro Kojima	Basics of Radioisotope (2)		
3	05/11	3rd period Akihiro Kojima	Basics of Radioisotope (3)		
4	05/11	4th period Akihiro Kojima	Basics of Radioisotope (4)		
5		1st period Seiji Okada	Application of RI for Biomedical Research		
6		1st period Akihiro Kojima	Measurement of radioisotope		
7		1st period Tatsuya Shimasaki	Biological effects of irradiation		
8		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「R I 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.)				

Academic Year 2022 Graduate School's Medical Experiment Course

How to take the course: Moodle

e-learning only	1	Introduction to recombinant DNA technique (Molecular Genetics : KAZUTOYO Terada)	3	Principle and application of polymerase chain reaction (Medical Biochemistry : SATO Yoshifumi)
	2	Gene Transfer Technique (Molecular Physiology : CHUJO Takeshi)	4	Research Integrity (Bioethics : KADOOKA Yasuhiro)
	5	Cell imaging and quantitative analysis (Chromosome Biology: ISHIGURO Keiichiro)	7	Analysis of Transcriptional Regulation (Cell Signaling and Metabolic Medicine : KANAMORI Yohei)
	6	Protein Purification (General Methods) (Molecular Cell Biology : YAMANAKA Kunitoshi)	8	Pharmacokinetics (Pharmacology and Therapeutics : SARUWATARI Junji)
	9	Production of polyclonal and monoclonal antibodies (Immunology : IRIE Atsushi)	11	Analytical methods for intracellular signaling (Infection and Hematopoiesis : SUZU Shinya)
	10	Reproductive Engineering Techniques (Reproductive Engineering: TAKEO Toru)	12	Immunohistochemistry (Cell Pathology : KOMOHARA Yoshihiro)
	13	Basic Methods in Immunology (Immunology : IRIE Atsushi)	14	Proteomics (Tumor Genetics and Biology : ARAKI Norie)
	15	Experimental animals and animal Experimentations I (Division of Microbiology and Genetics: TORIGOE Daisuke)	16	Experimental animals and animal Experimentations II (Division of Microbiology and Genetics: TORIGOE Daisuke)
	17	In situ hybridization (Molecular Pharmacology : KIKUCHI Koji)	18	Practice and Guidance for Biological Laboratory Safety (Medical Virology: MAEDA Yosuke)
	19	Introduction to flowcytometry (Immunology : IRIE Atsushi)	20	Experiment study and safety control (Environmental Safety Center: YAMAGUCHI Yoshihiro)
	21	Guidance for Living Modified Organism (LMO) (Division of Genomics : ARAKI Masatake)	22	Methods for Literature Search (Anatomy : FUKUDA Takaichi)

Note 1: Attendance at "Experimental animals and animal Experimentations I and II" is considered as having attended the "Education and Training for Animal Experiment Conductors and Caretakers" conducted by the Animal Experiment Committee. If you have attended "Experimental animals and animal Experimentations I and II" in this lecture, you do not need to attend the "Education and Training for Animal Experiment Conductors and Caretakers" conducted by the Animal Experiment Committee.

※Some of these lectures will be given in Japanese only.

Academic Year 2022, D1 Medicine & Life Science Seminar

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

No	Schedule	Talker	Title	Affiliation	Inviter
1	Apr 20 (WED)	HARA Hiromitsu	CBM signaling in immunity	Professor, Kagoshima University Graduate School of Medical and Dental Sciences, Department of Immunology	Immunology
2	Jun 8 (WED)	TSUNEYAMA Koichi	Development of novel animal models of non-alcoholic steatohepatitis (NASH) and its application to the pathophysiological analysis	Professor, Department of Pathology and Laboratory Medicine, Institute of Biomedical Sciences, Tokushima University Graduate School	Histology
3	Jun 15 (WED)	YOKOYAMA Akihiko	Mechanisms of leukemogenesis by epigenetic/transcriptional regulators	Team leader, Tsuruoka Metabolomics Laboratory, National Cancer Center	Diagnostic Medicine
4	Jun 29 (WED)	ITO Takahiro	Metabolic regulation of stem cell fate in cancer	Professor, Institute for Frontier Life and Medical Sciences, Kyoto University	Transcriptional Regulation in Leukemogenesis
5	Jul 20 (WED)	OKUNO Hiroyuki	Activity-dependent gene expression and cognitive function	Professor, Lab of Biochemistry and Molecular biology, Graduate School of Medical and Dental Sciences, Kagoshima University	Neuropsychiatry
6	Oct 12 (WED)	KAGEYAMA Ryoichiro	Dynamic transcriptional control of neural stem cells	Director, RIKEN Center for Brain Science	Hematology, Rheuma- tology and Infectious Disease
7	Oct 19 (WED)	KIDOYA Hiroyasu	Dynamics of tumor vasculature	Professor, Department of Integrative Vascular Biology, Faculty of Medical Sciences, University of Fukui	Cardiovascular Medicine
8	Nov 2 (WED)	NAKAGAMI Hironori	Vaccine development for chronic diseases with the COVID-19 era	Professor, Department of Health Development and Medicine, Osaka University Graduate School of Medicine	Molecular Genetics
9	Nov 16 (WED)	SHICHITA Takashi	Brain infarction: mechanisms and therapeutic challenges	Project Leader, Stroke Renaissance Project, Tokyo Metropolitan Institute of Medical Science	Microbiology
10	Dec 14 (WED)	KIKUCHI Akira	「Development of new anti- cancer drugs based on Wnt signal study」	Professor, Department of Molecular Biology and Biochemistry, Graduate School of Medicine, Osaka University	Tumor Genetics and Biology

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/>)

Academic Year 2022, D2 Learning from Experienced Doctors Seminar

Place: Lecture room 2, Medical Education & Library Building 3F.

Time & Date: From 17:30 (Usually on Wednesday)

No	Schedule	Talker	Title	Affiliation	Inviter
1	Apr 27 (WED)	TAKATA Atsushi	Genomic Analysis of Psychiatric Disorders: Toward Elucidation of their Molecular Pathology	Team Leader, Laboratory for Molecular Pathology of Psychiatric Disorders, RIKEN Center for Brain Science,	Molecular Brain Science
2	May 11 (WED)	IWAMI Shingo	Mathematical model-based quantitative data analysis	Professor, iBLab, Division of Biological Science, Graduate School of Science, Nagoya University	Hematology, Rheumatology and Infectious Disease
3	May 18 (WED)	OKADA Yukinori	Statistical genetics, disease biology, drug discovery, and personalized medicine	Professor, Department of Statistical Genetics, Osaka University Graduate School of Medicine Team leader, Laboratory for Systems Genetics, RIKEN Center for Integrative Medical Sciences	Medical Biochemistry
4	May 25 (WED)	KATAOKA Keisuke	Genetic dissection of lymphoma pathogenesis by cutting-edge techniques.	Professor, Division of Hematology Department of Medicine Keio University School of Medicine	Transcriptional Regulation in Leukemogenesis
5	Jun 1 (WED)	OGAWA Hisao	Lessons from 40 years of clinical research	President, Kumamoto University	Tumor Genetics and Biology
6	Aug 3 (WED)	MORIOKA Norimitsu	Disorders of emotional and cognitive function in chronic pain: involvement of microglia	Professor, Department of Pharmacology, Hiroshima University Graduate School of Biomedical & Health Sciences	Neuropsychiatry
7	Sep 7 (WED)	MIURA Katsuyuki	Strategy for cardiovascular disease prevention from the viewpoint of epidemiology	Director/Professor, NCD Epidemiology Research Center (NERC)/ Department of Public Health Shiga University of Medical Science (SUMS)	Histology
8	Sep 21 (WED)	KUBO Tatsuhiko	Clinical Information Management of Emergency Medical Team	Professor, Department of Public Health and Health Policy, Graduate School of Biomedical and Health Sciences, Hiroshima University	Disaster and Critical Care Medicine
9	Nov 9 (WED)	YASAKA Koichiro	Application of artificial intelligence to radiological diagnostic imaging	Assistant Professor, Department of Radiology, The University of Tokyo Hospital	Diagnostic Radiology
10	Dec 7 (WED)	KAMATANI Yoichiro	Does complex disease genomics lead to the application of genomic data in general practice?	Professor, Department of Computational Biology and Medical Sciences, Graduate School of Frontier Sciences, The University of Tokyo	Molecular Genetics
11	Feb 1 (WED)	TODA Tatsushi	From "not correct" to "correct" Elucidation of neurological diseases and molecular therapy using genomic science	Professor, Department of Neurology Graduate School of Medicine The University of Tokyo	Molecular Brain Science

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

Academic Year 2022, 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 pathophysiological 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.	May 18	Miki Ebisuya	TBA	Group Leader, EMBL, Barcelona, Spain
2.	June 22	Tomohisa Toda	TBA	Group Leader, DZNE, Dresden, Germany
3.	July	Keiko Nonomura	TBA	Associate Professor, School of Life Science and Technology, Tokyo Institute of Technology, Japan
4.	August	Shannon Elisabeth Elf	TBA	Assistant Professor, Ben May Department for Cancer Research, The University of Chicago, USA
5.	September	Josephine Galipon	TBA	Project Research Associate, Institute for Advanced Biosciences, Keio University, Japan
6.	October	Hiroki Kurihara	TBA	Professor, Graduate School of Medicine, The University of Tokyo, Japan
7.	November	Takaomi Sanda	TBA	PI, CSI, National University of Singapore, Singapore
8.	December	Nami Sugiyama-Matsuda	TBA	Assistant / Postdoc (FG Christofori), Department of Biomedicine, University of Basel, Switzerland
9.	January	Mako Kamiya	TBA	Associate Professor, Graduate School of Medicine, The University of Tokyo, Japan
10.	January	Masayuki Yazawa	TBA	Assistant Professor, Columbia Stem Cell Initiative (CSCI), Columbia University, USA
11.	February	Kanae Ando	TBA	Associate Professor, School of Science, Tokyo Metropolitan University, Japan
12.	March	Keisuke Ito	TBA	Associate Professor, Department of Cell Biology, Albert Einstein 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 the other seminar than the above.

<http://www.medphas.kumamoto-u.ac.jp/medgrad/gakunai/seminar/seminar3/>

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.

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:			
Place:			
A body of essay: Fill this A4 sheet with 250-500 words			