Course 目ナ	Coding(科 ンバー)	Year/Se m(年)	emester/Ter 度・学期)	Faculty Offering Course(時間割所属・時間 割コード)	Ye	Eligible Student 'ear(開講年次)	Credits(単位 数)	Weekday and Period(曜 日・時限)	
RDM7-007-79-2 2025v		whole year	Graduate School of Medical Sciences (20080)		1, 2, 3, 4	2	others		
		Co	ourse Title(Th	neme)(科目名(講義題目))			Instructor(s)(担当教員)	
		Develo	pmental and Regenerative Medicine(B7)			NISHINAKAMURA Ryuichi, OKAE Hiroyuki, ISHIGURO Keiichiro, NAKAMURA Akira, ERA Takumi, YABUKI Yasushi, ONO Yusuke, NIWA Hitoshi, OKI Shinya, ESUMI Shigeyuki, TAKEO Toru, NODA Taichi, ARIMA Yuichiro, KOBAYASHI Akio			
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)									
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)			Developmental and regenerative medicine aims at curing diseases by revealing molecular mechanisms of organ development. In this course, you learn basic concepts and techniques used in this filed, including knockout mice, which have now become essential for any area of research. This course serves as introductory for those in the Developmental and Regenerative Researcher Program, and will also be useful for those in other programs, as you obtain essential knowledge on genetic engineering techniques.						
Course Learning goals(学修 目標)			[A level (A水準)] Master basic concepts and techniques used in this filed, and is able to explain the disease mechanisms and treatments based on the knowledge. [C level (C水準)] Master basic concepts and techniques used in this filed, and is able to understand the disease mechanisms and treatments.						
Course Outline(授業の概要)			(1) Establishment and application of stem cells including ES and iPS cells; (2) Reproductive engineering including in vitro fertilization, freezing of embryos and sperms, embryo transfer, intracytoplasmic sperm injection, and nuclear transfer; (3) Genome editing technology and knockout mice; (4) Maintenance and differentiation of stem cells; (5) Placental development; (6) Organ development and disease including the kidney, liver, pancreas, muscle, neuron, gonad, heart and vasculature; (7) Regenerating organs from stem cells						
				Details for Individual Classes(各回の	D授業	業内容)			
No.(回)	Date(月日)		Class Theme(授業テーマ)			Brief Outline of Class(内容概略)			
1			Ryuichi NIS	HINAKAMURA [eE-0]	٥v	verview & Kidn	ey developmer	nt	
2			Toru TAKEC	D [eE-0]	Re	eproductive en	gineering		
3			Taichi NOD	A [eE-0]	Ge ap	eneration of ge pplication	netically modi	fied mice and their	
4			Hitoshi NIW	/A [eE-0]	Mo	lolecular basis	of embryonic s	tem cells I	
5			Hitoshi NIW	/A [eE-0]	Mo	lolecular basis	of embryonic s	tem cells II	
6			Takumi ERA	A [eE-0]	iPS	PS cells, their ap	oplications for	the medicine	
7			Hiroaki OKA	AE [eE-0]	Pro	regnancy in ma	mmals		
8			Shinya OKI	[eE-0]	Bio	ioinformatics in	developmenta	al biology	
9			Yasushi YAI	BUKI [eE-0]	iPS	S cells and neu	irodegeneratio	n	
10			Shigeyuki E	sumi [eE-0]	An	natomy of dige	stive tracts and	l lung	
11			Akio KOBA	YASHI [eE-0]	De	evelopment of	the urogenital	system	
12			Yusuke ON	O [eE-0]	Mu	luscle developr	nent and reger	neration	
13			Akira NAKA	MURA [eE-0]	ge	erm cell format	ion: preformati	on and epigenesis	
14			Keiichiro IS	HIGURO [eE-0]	ge	erm cell develo	pment in mam	mals	
15			Yuichiro AR	RIMA [eE-0]	Di He	ifferentiation, N eart and Blood	laturation, and Vessels	Regeneration of the	
Estimated out-of-class study time			60 hrs						
Required Textbook(テキスト)									
Reading List(参考文献)			 "Developmental Biology, 12th edition" by Barresi MJF& Gilbert S 2019. "Essential Developmental Biology, 4th edition" by Slack JMW &Dale L.,Blackwell Publishing 2021 "Manipulating the Mouse Embryo: A Laboratory Manual, 4th edition" by Nagy A., Gertsenstein M., Vintersten K., Behringer R., Cold Spring Harbor Laboratory Press, 2014. "Larsen' s Human Embryology, 5th edition" by Shoenwolf GC, Bleyl SB, Brauer PR, Francis-West PH. Churchill Livingstone, 2014. 						
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)			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