Course title 工学倫理 <english> Engineering Ethics</english>	Affiliated department, Job title,Nam	Professor,TAK Graduate Schoo Professor,ATO Graduate Schoo	chool of Energy Science AKUDA HIROHIKO chool of Engineering TOMI HARUYUKI chool of Engineering urer,KANEKO KENTAROU		
Target year 4th year students or above Number		Course offered /ear/period	2019/First semester		
Day/period Thu.3 Class style	Lecture	Language	Japanese		
[Outline and Purpose of the Course]					
Addern ethics based on engineering aspect a nstructors from various faculties give lecture			s and scientists.		
[Course Goals]					
The goal of this class is to understand engine ou encounter ethical issues.	ering ethics, and to deve	elop the ability to	judge by yourself when		
[Course Schedule and Contents]					
ieotechnical engineering and engineering et iiscussing the underground public use, slope enerating. Introducing some examples of na ngineering and engineering ethics will be di ingineering ethics as an applied ethics. (4/22 ingineering Ethics by comparing with the ot e age of information technology. (M. Mizu thical theories for engineering ethics. (5/2) utilitarianism, deontology, virtue ethics, pro- articular ethical problems in engineering eth Art-view concept for engineering. (5/9) Itim ngineering. Some practical examples in met e QOL-evaluation will be discussed from b comita: Engineering Science) thics of biotechnology and stem cell resear echnology and stem cell engineering, editing ossible, at least technically. In this lecture, 1 roblems accompanying technological devel tesearch and engineering ethics. (5/23) Itim elongs thereto. The sense of ethics necessar	stability, geo-sequestra tural disasters and cons scussed. (K. Kishida: C) 1 time. In this lecture, her fields of Applied Et tani: Graduate School o 1 time. This lecture foct fessional ethics etc.) wh tics. (T. Iseda: Graduate e. Concept of "quality o lical-care and welfare fi oth function-optimizing ch. (5/16) 1time. With th g of the human genome will introduce these lat opment. (G. Eiraku: Ind e. It is said that He that	tion of byproduct truction accidents. Jobal Engineering I will show the b hics. And show its f Letters) us on various idea uich will be useful 2 School of Letters f life" is required felds will be introd g view point and a ne rapid developm that goes beyond	for the energy , geotechnical g) asic Idea of s unique character in s in ethics for thinking about s) for human related luced, and problem of rt view point. (N. enet of genome editing generations has become ind think about ethical		

工学倫理**(2)**

medicines and food productions. Associated with it, problems of their safety and ethics are arising, which should be addressed by our societies. In this class, the recent progress in biology-related techniques, and problems we have and will have in near future are described. (M. Shirakawa: Industrial Chemistry) Patents and ethics (Part 1). (6/6) Itime. This course will teach the students about 1) patent systems which protect inventions and research results and 2) ethical issues in patents. The first class, in preparation for the next subject of patent ethics, introduces Japan's patent system with comparisons to the patent systems in the world's major countries and international framework. (M. Nakagawa: Electrical and Electronics Engineering)

Patents and ethics (Part 2). (6/13) 1time. Students, equipped with the basic knowledge of patent systems by the previous lecture, will get familiar with actual case studies on ethical and legal issues in patents. (M. Nakagawa: Electrical and Electronics Engineering)

Ethics required for advanced science. (6/27) Itime. Engineers and researchers are at the forefront of preventing harm caused by advanced chemistry. Think about social roles and ethics required by engineers and researchers through relationships between chemical substances and environmental problems, efforts to avoid hazards of nanomaterials. (K. Miura: Industrial Chemistry)

Ethics in press release. (7/4) 1 time. Press Release is an essential process for introducing the research to our society through various medias. In this lecture, issues related to Press Release in University are addressed and discussed. (K. Umeno: Informatics and Mathematical Science)

Failure accidents and inspection/maintenance (7/11) 1time. On the occasions of failure accidents of vehicles and plants, the appropriateness of inspection/maintenance of their structures is often questioned. Some actual failure accidents are reviewed to discuss the importance of inspection/maintenance together with the relation to engineering ethics. (S. Biwa: Engineering Science)

Ethics in nuclear engineering. (7/18) 1 time. Discussion on engineering ethics in the TEPCO accident from view point of Tsunami evaluation by the Japanese government. (I. Takagi: Engineering Science) Ethical issues on sound design. (7/25) 1 time. Every working things consuming energy emits acoustic sound.

Ethical issues on sound design. (7/25) 1 time. Every working things consuming energy emits acoustic sound Even a small sound energy affect human as noise and may create annoyance and health problems. Sound problems of various things are introduced in the lecture. Ethical issues, which shall be considered during design and operation environment, will be discussed. (Y. Takano: Architecture)

[Class	requirement]
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None

[Method, Point of view, and Attainment levels of Evaluation]

Class participation and reports

[Textbook]

Lecture materials will be distributed

[Reference books, etc.]

(Reference books) [®]Omnibus Engineering Ethics a (Kyoritsu Shuppan Co., Ltd.) ISBN:978-4320071964 [®]Practical Engineering Ethics - A Short Course, New Edition a (Kagaku-Dojin Publishing Company,INC) SBN:9784759811551 [®]Engineering Ethics (Revised Edition) a (CORONA PUBLISHING CO.,LTD.) ISBN:978-4-339-07798-[®]World of Engineering Ethics (3rd Edition) a (Morikita Publishing Co., Ltd.) ISBN:978-4-627-97303-9

_____Continue to 工学倫理(3)

工学倫理**(3)**

[Regarding studies out of class (preparation and review)]
The assignment of the report will be given for each lesson.

(Others (office hour, etc.))

The class order is subject to change.

*Please visit KULASIS to find out about office hours.

* Numbering code Graduate School of Engineering Senior Lecturer,MAEDA MASAHIRO Graduate School of Engineering Senior Lecturer,MATSUMOTO RIYOUSUKE 工学序論 Graduate School of Engineering Senior Lecturer,YOROZU KAZUAKI Graduate School of Engineering Senior Lecturer,KANEKO KENTAROU urse title department, Job title.Nam <English> Introduction to Engineering Graduate School of Engineering Senior Lecturer, ASHIDA RIYUUICHI Course offered Target year 1st year students or above Number of credits 2019/Intensive, First semeste Day/period Intensive Class style Lecture Language Japanese [Outline and Purpose of the Course] [Course Goals] [Course Schedule and Contents] 1~2times 6times, [Class requirement] lone [Method, Point of view, and Attainment levels of Evaluation] [Textbook] [Reference books, etc.] (Reference books) [Regarding studies out of class (preparation and review)] (Others (office hour, etc.)) *Please visit KULASIS to find out about office hours

	ode		A.F	filiated	Graduate Scho	ol of Engineering			
	LセミナーI obal Leadershi	(企業調査研究 p Seminar I) de	epartment, bb title,Name	Senior Lecturer, YOROZU KAŻUAK Graduate School of Engineering Senior Lecturer, MAEDA MASAHIRO				
Target year	2nd year students	or above Number (of credits		ourse offered ar/period	2019/Intensive, year-round			
Day/period	Intensive	Class style	Seminar		Language	Japanese			
•	Purpose of t	-							
nd find solution	ons for expandi r laboratory, st	ng their own tech udents investigate	nologies to the metho	the internat dology of te	ional market. T am organizatio	e, etc. make proposals hroughout hands-on n, proposal, market e expected to improve			
heir comprehe	nsion and expla		. As extend			course, the Global			
I	,	ca in the second s	Seniester.						
[Course Goa	•			·	1				
						lity for processes of ompanies by group			
[Course Sch	edule and Co	ontents]							
Week 1, Guida									
Week 2-13, Ha Week 14, Pre-1	nds-on training								
Week 15, Fina									
[Class requi	rement]								
	r will be annou	nced later. Studen	its who war	nt to join thi	s course is requ	ested to attend the first			
class.	int of viow a	nd Attainmont	lovals of l	Evaluation	1				
class. [Method, Po		nd Attainment			-	ation			
elass. [Method, Po Students are pr		nd Attainment hands-on trainin			-	ation.			
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class. [Method, Po Students are pr [Textbook]					ased on present	ation. ミナーI (企業調査研究) (2) 一			

Reference be	ooks, etc.]
(Reference	books)
(Related UF	
ttp://www.glc.t	kyoto-u.ac.jp/ugrad
[Regarding s	udies out of class (preparation and review)]
nvestigating co	npanies in advance. Analyzing the result from hands-on training. Preparing presentation.
(Others (offi	e hour, etc.)
	will be announced later. Students who want to join this course is requested to attend the first re prohibited to skip hands-on training. Evaluation will be based on presentation.
Please visit KU	LASIS to find out about office hours.

	culty of Enginee	ソターンシップ1 ering International Inte	ernship 1 Job t	rtment, itle,Name	proved	
Target year	3rd year students	s or above Number	of credits 1		period	2019/Intensive, yes
Day/period	Intensive	Class style	Seminar		Language	Japanese and E
-		the Course]				
		skills with the train Faculty of Engine				
[Course Goa						-++
-	-	nal skills with the t	raining of for	eign languag	e through th	e to internship p
hosted by the U	Jniversity is th	ne major expectation	on to the stude	nts.	-	
[Course Sch		-				
Overseas Intern program.	nship,1time,Tl	he contents to be a	equired should	l be describe	d in the broc	hure of each in
	ion,1time,A p	resentation by the	student is requ	ired followe	d by discuss	ion among part
	-		-			
[Class requi	rement]					
		booklet for each in	ternship prog	ram. The reg	istrant is req	uested to have
language skills		*				
• ,		and Attainment		-		
credit is not inc the Global Lea	cluded in the u dership Educa	credit earned by th indergraduate scho ition Center as a op contents and the c	ol in which th tional credit.	e participant The number	belongs to, of credits, e	the credit is gra ther 1 or 2, wil
[Textbook]						
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-	books, etc.]					
[Textbook]						
[Textbook] [Reference b						_
[Textbook] [Reference b (Reference	e books)	of class (prepar	ation and re	view)]		
[Textbook] [Reference b (Reference	e books)	of class (prepar	ation and re	view)]		
[Textbook] [Reference b (Reference	e books)	of class (prepar	ation and re	view)]		
[Textbook] [Reference b (Reference	e books) studies out (ation and re	view)]		
[Textbook] [Reference b (Reference [Regarding s (Others (off It is required for mandatory crec school or educa	e books) studies out (fice hour, etc or students to c dits or not and ational program		hip program t any credits be rolled. If the o	o participate fore the part credit could i	icipation to t	he undergradua

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Numbering	j code				_						
								Graduate School of Engineering Senior Lecturer,MAEDA MASAHIRO Graduate School of Engineering Senior Lecturer,KANEKO KENTAROU			
Target ye								rse offered r/period		2019/Intensive, Second semester	
	riod Intensive Class style Seminar							Languag	е	Japanese	
[Outline and Purpose of the Course]											
by themselve trained throu	es aimi gh gro rough o	ng at creati up works ir oral present	ng new social va n residential train ations regarding of	lues. In ing and	con skil	crete, at ls of pre	oilitie esenta	s of planning ation and cor	g ai nm	or set up challenges nd problem-solving are nunication are the process from a	
[Course G	oals]										
			ction or setting u h group works.	ıp challe	enge	s to pro	posal	l of solutions	ai	ming at creating new	
[Course S	chedu	Ile and Co	ontents]								
organized. Lectures,2tir Group works are done. Residential t problems is p Preliminary Report meeti	nes,Leo s,3time raining planneo review ing,1tir	ctures by e: s,Setting up g,7times,Th d, a draft re meeting,1t ne,Final pro	view and a sched sperts are given. o challenges, extr rough intensive g port is made, and ime,A preliminan esentations are m	raction o group wo l a few p ry reviev	of pr orks orese v m	oblems, based o entations eeting is	colle on dis s are s helo	ecting inform scussion, a pr made. 1 and discuss	nati rop	ion, and group works osal for solving	
[Class req	uirem	ent]									
None											
[Method, F	Point o	of view, a	nd Attainment	levels	of E	valuat	ion]				
concerning a a goal is mac	bilities le throu	s in group d	ntial training. A r iscussion to extra ation of the prop	act or se	t up	challen	ges a	ind to propos		e evaluation olutions for achieving	
[Textbook]										
Will be indic	ated as	s necessary									

Reference bo	oks, etc.]
(Reference b	
Will be indicated	as necessary.
Regarding stu	idies out of class (preparation and review)]
	· · · · · · · · · · · · · · · · · · ·
(Others (office	
	od: October to January
	he course will be instructed.
*It depends on di	visions which students belong to whether the earned credits are admitted as credits required ease refer to the syllabus of your division.
or graduation. Pi	ease refer to the synabus of your division.
Please visit KUI	ASIS to find out about office hours.

Numberin	g co	de										
Course title <english></english>	nurse title 有機工業化学 Industrial Organic Chemistry							ated Irtment, Iitle,Nan	Pr Gr Pr Gr Pr Gr Pr Gr Gr Gr	Graduate School of Engineering Professor, MAE KAZUHIRO Graduate School of Engineering Professor, TANAKA TSUNEHIRO Graduate School of Engineering Professor, OOE KOUICHI Graduate School of Engineering Professor, ATOMI HARUYUKI Graduate School of Engineering Professor, KAWASE MOTOAKI Graduate School of Engineering		
Target ye	ar	3rd y	ear students	or above	Number	of crea	lits 2		Cours	se offered period	DOU TERUYUKI 2019/Second seme:	
Day/perio	d	Wed.	1	Cla	ss style	Lectur	e			Language	Japanese	
[Outline a	nd	Purr	ose of	the C	oursel	-						
	ioa	ls]										
[Course S , 2 times,		-	e and Co	onten	its]				_			
[Course S , 2 times, ,2times, ,3times, ,2times,		-	e and Co	onten	its]		_	_				
Course S		-	e and Co	onten	its]							
[Course S , 2 times, ,2times, ,3times, ,2times, ,1time, ,2times,		-	e and C	onten	its]							
[Course S , 2 times, ,2times, ,2times, ,2times, ,2times, ,2times, ,2times, ,1time, Itime,	iche	edule		onten	ts]							
[Course S , 2 times, ,2times, ,3times, ,2times, ,1time, ,2 times, ,2 times, ,1 time, [Class red None	iche	eduk	nt]									
[Course S , 2 times, ,2times, ,2times, ,2times, ,2times, ,2times, ,2times, ,1time, Itime,	iche	eduk	nt]			tlevels	of Ev	valuati				
[Course S , 2 times, ,2times, ,3times, ,2times, ,1time, ,2 times, ,2 times, ,1 time, [Class red None	iche	eduk	nt]			tievels	of Ev	valuati	on]			
[Course S , 2 times, ,2times, ,3times, ,2times, ,1time, ,2 times, ,2 times, ,1 time, [Class red None	iche	eduk	nt]			t levels	of Ev	Yaluati	on]			
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[Course S , 2 times, ,2times, ,3times, ,2times, ,1time, ,2 times, ,2 times, ,1 time, [Class red None	iche	eduk	nt]			t levels	of Ev	raluati				

有機工業化学**(2)**

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Numbering	g co	de										
Course title <english></english>					ンシップ2 ernational Inte	ernship 2	de	iliated partment p title,Na		Appro	ved	
Target ye	ar	3rd ye	ar students o	r above	Number	of cred	its	2		ourse o ar/peri	offered	2019/Intensive, year-round
Day/perio	d	Inten	sive	Cla	ss style	Semina	ır			La	anguage	Japanese and English
[Outline a	nd F	Purp	ose of t	he C	ourse]							•
Acqusition of international												e participation to the bodies.
[Course G	ioal	s]										
												o international
	-					e partici	pati	on shou	ld b	e ident	ified by e	each program.
[Course S												
Overseas Int program.	terns	hip, l	time,The	cont	ents to be a	equired :	shou	iid be de	escr	ubed in	the broc	hure of each internship
	itatic	n,1ti	me,A pre	senta	tion by the	student i	s re	quired f	ollo	owed by	y discuss	ion among participants
[Class red	quire	eme	nt]									
						ternship	pro	gram. T	The	registra	ant is req	uested to have enough
language ski	ills f	or th	e particip	ation.								
[Method, I	Poir	nt of	view, ar	nd At	tainment	levels	of E	Valuat	ion]		
responsible credit is not	to id inclu	entif uded	y if the cr in the un	edit e dergr	arned by th aduate scho	is subje ol in wh	et te ich	be inclute the part	ude icip	d as m ant bel	andatory ongs to,	Each Department ones or not. If the the credit is granted by
												ither 1 or 2, will be pant has participated in.
[Textbook								1.0			1 1	I I
-	-											
[Referenc	e bo	oks	, etc.]									
(Refere	nce	boo	ks)									
[Regardin	a st	udie	es out of	clas	s (prepar	ation a	nd	review)1			
					4 1							
(Others (offic	e h	our, etc.))							_	
It is required mandatory c	l for redi ucat	stud ts or ional	ents to ch not and c program	eck i ould the s	earn how m tudent in en	any crec rolled. I	lits f th	before tl e credit	he p cou	articip ld not l	ation to t	evaluated as part of he undergraduate d as mandatory ones,
*Please visit	t KU	LAS	IS to find	out	about office	hours.						

[Textbook] [Reference books, etc.] (Reference books) [Regarding studies out of class (preparation and review)] (Others (office hour, etc.)) *Please visit KULASIS to find out about office hours.

Numbering	g code											
Course title <english></english>	le 生物化学工学 ≥ Biochemical Engineering						Affiliated Senior Job title,Name Gradu Gepartment, Job title,Name Gradu Assoc Gradu Gradu Gradu Gradu Gradu Gradu Gradu Gradu Gradu Gradu Gradu Gradu			aduate School of Engineering ffessor, ATOMI HARUYUKI aduate School of Engineering ffessor, UMEDA MASATO aduate School of Engineering nior Lecturer, KANAI TAMOTSU aduate School of Engineering sociate Professor, HARA YUUJI aduate School of Engineering ffessor, HAMACHI ITARU aduate School of Engineering sociate Professor, MASAYUKI MORI		
Target ye	ear 3rd	year students	or above	Number	of cred	lits	2			e offered eriod	2019/Second semester	
Day/peric	d Fri.	2	Cla	ss style	Lectur	e				Language	Japanese	
[Outline a	nd Pu	pose of	he C	ourse]								
[Course G	Goals]											
[Course S	Schedu	le and Co	onten	nts]								
,4times, ,3times, ,3times, ,4times, ,1time,												
[Class red	quirem	ent]										
None												
[Method,	Point o	of view, a	nd At	ttainment	levels	of E	Evaluat	ion]	1			
[Textbook	(]						_					
									C	ontinue to		

生物化学工学 (2)	
[Reference books, etc.]	
(Reference books)	
(Reference books)	
[Regarding studies out of class (preparation and review)]
(Others (office hour, etc.))	
*Please visit KULASIS to find out about office hours.	

Numbering	g code	•			_					
Course title <english> Introduction to Environment Preservation</english>						Affiliated department, Job title,Name		Agency for Health, Safety and Environmen Professor, HASHIMOTO SATOSHI Agency for Health, Safety and Environmen Professor, SAKAI SHINICHI Graduate School of Engineering Associate Professor, NAKAGAW A HIROYUK		
Target year Brd year students or above Number of credits 2 Course offered year/period 2019/First semester										
Day/perio	d M	on.1	Class st	yle Lectu	ire			Language	Japanese	
[Outline a	nd Pu	irpose of t	the Course	e]						
Students will of preservation	l stud ion of ial-cy	y basic exan the environ	nples of env ment at the We will helj	university, t p develop st	issue: he air	s and the	nment, I	he aquatic er	from the perspective avironment, and a preservation	

[Course Goals]

*

The major course objectives:

(2) To learn the background and basic mechanisms of environmental problems, specifically as they relate to air and water, as well as how to establish a sound material-cycle society.
 (2) To understand relationships between various activities and their environmental impacts on campus.

[Course Schedule and Contents] 1. Environmental Issues of Our Time, 3 times

With a particular focus on chemicals, we will study the background and current status of environmental issues and discuss possible future problems. We will also examine how environmental issues are related to human activities and resource/energy consumption.

2. Environment Preservation at Kyoto University, 2 times

Students will learn about environmental protection systems at Kyoto University. We will explain systems for water quality control, liquid waste treatment, and specially controlled waste management. We will also detail systems and regulations for proper use and management of chemical substances.

3. Air Environment, 5 times

We will discuss the current status of global air pollution. We will learn about a variety of regulations and the relevant background of rules created based on the Air Pollution Control Law. We will discuss in detail air pollutants emitted by factories and automobiles in urban areas and look closely at their chemical reactions in the air, with a particular focus on radical reactions.

4. Aquatic Environment, 2 times

Students will study the conservation of water quality, specifically (1) water contamination by organic substances and related purification methods, (2) water contamination by heavy metals and related treatment methods, and (3) management of environmentally persistent substances. They will also learn about environmental criteria, effluent standards, and environmental protection technologies for water quality Continue to 環境保全概論(2)

環境保全概論**(2)**

L_____Control.

5. Waste Management and a Sound Material-Cycle Society, 2 times

Students will develop a better understanding of waste treatment/management and a sound material-cycle society by studying (1) mass balance and indexes on the macro level, (2) definitions of waste and the current status of waste treatment, (3) waste and dioxin problems, and (4) approaches toward establishing a sound material-cycle society.

6. Confirmation of students' levels of understanding, 1 time Students ' level of understanding of course topics will be checked.

[Class requirement]

None

[Method, Point of view, and Attainment levels of Evaluation] Evaluation: test scores + attendance rates.

[Textbook]

Not specified. Materials and references will be distributed in class when needed.

[Reference books, etc.]

(Reference books) To be announced in class.

[Regarding studies out of class (preparation and review)]

Review on the materials and references distributed. Specified points willbe announced in class.

(Others (office hour, etc.))

Numbering c	ode									
Course title <english> Ct</english>		全化学 ry and Environmental Safety				Affiliated department Job title,Na	ime	Profe Grad Associ Grad Profe	essor,HAS uate Schoo iate Professo uate Schoo essor,ABE	h, Safety and Environment HIMOTO SATOSHI ol of Engineering r,NAKAGAWA HIROYUKI ol of Engineering RYUU
Target year	3rd y	ear students of	or above	Number	of cred	lits 2		ourse ar/per	offered riod	2019/Second semester
Day/period										Japanese
[Outline and	Purp	pose of t	he C	ourse]						
[Course Goals]										
[Course Sch	edul	e and Co	onter	nts]						
,2-3times,										
,2-3times,										
,2-3times,										
,2-3times,										
,2-3times,										
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,1time,	,1time,									
[Class requi	reme	ent]								
None										
[Method, Po	int of	f view, a	nd At	ttainment	levels	of Evaluat	tion	ןו		
[Textbook]										
[Reference b	ook	s, etc.]								
(Reference	e boc	oks)								
[Regarding s	studi	es out o	f clas	ss (prepar	ation a	nd review)]			
(Others (off	ice h	our, etc.))			_			_	
*Please visit K	ULAS	SIS to find	louta	about office	e hours.					

													*
Numberin	g code												
Course title <english></english>			Phenor	nena			de	iliated partment b title,Na				ol of Enginee IAMOTO R	
Target ye	ear Bro	d yea	r students (or above	Number	of cred	lits	2			e offered eriod	2019/First s	emester
Day/peric					ss style	Lectur	e				Language	Japanese	
[Outline a	nd Pu	irpo	ose of t	the C	ourse]								
[Course G	Goals]												
[Course S	Schedu	ule	and Co	onten	its]								
,5times,		-			-		-		-	-			
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,1time,													
,1time,													
[Class red	quiren	nen	t]										
None													
[Method,	Point	of v	/iew, a	nd At	tainment	levels	of E	Evaluat	ion]			
• /			,							•			
[Textbool	4	_					_		_	_			
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ID - (-1-1										
[Reference (Refere													
(Refere	nce bo	JOK	S)										
[Regardin	ng stu	dies	s out o	f clas	s (prepar	ation a	nd	review)]				
(Others (office	ho	ur, etc	.))				_					
*Please visi	t KUL	ASI	S to find	d out a	about office	hours.							

Course title <english></english>		ス制御工学 s Control		de	filiated epartment, ob title,Nar	Profes Gradu Profes Gradu	ssor,OOS ate Scho ssor,SOT ate Scho	ol of Engineering HIMA MASAHIR ol of Engineering OWA KENICHIR(ol of Engineering ssor,KIM SANGH
Target ye	ear Brd	year students or abo	we Number	of credits	2	Course o year/peri		2019/First semest
Day/perio	d Wed	1.2 C	lass style	Lecture		La	anguage	Japanese
[Outline a	nd Pur	pose of the	Course]					
Simulink ar [Course C The goal of	e offered Soals] the class	d. 1. s is to educate	the students	to be able to	o develop	o the dynar	nic proce	es using Matlab an ess model, design th rocess control syste
[Course S	chedu	le and Conte	entsl					
Development understand 1 and heat ball appropriatel model is exp Laplace tran the transfer How to obta Exercise wi Simulink, th second-orde executing th PID Contro Derivative) basic featurn Dynamics of	nt of Dy the dyna ance equ y. Then. plained. isform a function in the li th Matla the dynam r lag sys- te simult, l,1time,7, controll- e of PID f contro ectured.	mic behaviors uations is lectr. , how to derive and Transfer fu from the linea near model fro b for learning nic behaviors of stem are simulation is execut The most popu er. The basic f controller, ho lled system, Iti Then, the basis	, I time, The fit of the procee- ured to consth e the linear tr arized dynam om the step r dynamic bel of some typic ated. Then, f ed. dar controller eatures of thi- we to adjust ti ime, The relat	irst step for ss to be con- construct the mor- ansfer model ,The Laplac the model and esponse is a haavior,1 time al dynamic for a given p r in process ree element: the control p tionship bet	developin trolled. T lel showi el using T ee transfo nong the lso taugh c,[Exercis systems trocess, th industrie s (P, I, D) arameter: ween the	ng better p The modeli ing the dyr. Taylor exp orm is revis: input and it. se] After le such as th he exercise is is PID (F) are expla s is taught pole of th terristics, an	ing metho aamic beh ansion of sited first the output earning the e first-ord e on deve Proportion ined. The e transfer nd the sta	ntrol systems is to od using the materi- navior of the proces 'the first principle . Then, how to deri at variables is lectu the basics of Matlab der lag system and loping the model a nal, Integral, and en, after explaining function and the bility of the feedba
						cont		н слиринт. т(с)

response), and how to detect the stability from the frequency response are lectured. The features of various

Filters are also explained. PID control system design , ltime, The adjusting method of PID parameters based on the IMC control procedure is explained. Then, several revised controllers of the basic PID controller for improving the performance are lectured.

Exercise of control system design ,1time,[Exercise] For a given process, the exercise of tuning the control parameters and verifying the performance under the developed system using Matlab/Simulink is executed. Cascade control and Multi-loop control, 1time, The concept of cascade control is explained. Then, as a control system dealing with the two-input and two-output process, the multi-loop control system is introduced, and

how to remove the interaction among the control loops is explained. Exercise of multi-loop control, Itime, [Exercise] For a given process, the exercise of developing a controller

for a two-input and two-output process is executed. Equipment for control, Itime, The equipment used for the real process control system are explained. The Concept of proportional band and the reason why non-dimensional system is used are explained. Overall exercise of process control design, Itime, [Exercise] Starting with the construction of the first principle model of a chemical/bio process, a two-input and two-output control system (multi-loop controller) is designed and the parameters are tuned by using Matlab and Simulink Feed-back time, 1 times, The question and answer to the final exercise, and the whole of the lectures are

conducted.

[Class requirement]

Basic understanding of linear algebra, ordinal differential equations and Laplace transform

[Method, Point of view, and Attainment levels of Evaluation]

The score is determined by considering the quality of homeworks, midterm exam, term-end exam and final project.

[Textbook]

Process Control Engineering, Hashimoto, Hasebe, Kano, Asakura book store, isbn{}{4254250312}

[Reference books, etc.]

(Reference books) Process Control System, Ohshima, CORONA Publishing isbn{}{4339033146}

[Regarding studies out of class (preparation and review)] The final term project will be given.

(Others (office hour, etc.))

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Numbering	g co	de										
Course title <english></english>			学概論 tion to Qu	у						ol of Engineering O HIROFUMI		
Target ye	ar	3rd ye	ar students o	or above	Number	of cred	its	2		ourse ar/pei	offered riod	2019/Second semester
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Course title <english></english>		光学 oscopy for Organic Compounds		unds	Affiliated department, Job title,Nar	, me	Graduate School of Engineering Professor, MURAKAMI MASAHIRO Graduate School of Engineering Associate Professor, KURAHASHI TAKUY, Graduate School of Engineering Professor, TANAKA KAZUO Graduate School of Engineering Assistant Professor, HIROSE TAKASH		
Target yea	ar 4th	year students o	r above	Number	of cred	lits 2	Соц	urse offered r/period	2019/First semester
Day/perio	d Tue	.3	Cla	ss style	Lecture	e		Language	Japanese
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	departmen			Professor, AB Graduate School Associate Profe	of Global Environmenta essor, MIYAZAKI K ool of Engineering	al Studies OUHEI 3					
Target ye	ar	4th year stu	idents or abov	Number	of cred	lits	2		urse offered ar/period	2019/First seme	ester
Day/perio				ass style	Lecture	e			Language	Japanese	_
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Course title <english></english>		某化学 alyst Che	mistry			dep	iliated partment p title,Na	t, ime	Pro Gra Pro Gra Asso Gra	fessor,EGU duate Schoo fessor,TAN duate Schoo ociate Professo	ol of Engineering CHI KOUICHI ol of Engineering AKA TSUNEHIRO ol of Engineering r, TERAMURA KENTARO ol of Engineering RYUU
Target ye	ar	4th year stu	dents or above	Number	of cred	its 2 Course year/pe				e offered eriod	2019/First semester
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独媒化学(2)	
Regarding studies out of class (preparation and review)]	
Others (office hour, etc.))	
Please visit KULASIS to find out about office hours.	

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[Textbook]

[Reference books, etc.] (Reference books)

[Regarding studies out of class (preparation and review)]

(Others (office hour, etc.))

*Please visit KULASIS to find out about office hours.

Numbering	code									
	生化学II Basic Biochemistry II		Affiliated department, Job title,Name		, me	Graduate School of Engineering Professor, ATOMI HARUYUKI Graduate School of Engineering Professor, MORI YASUO Graduate School of Engineering Professor, UMEDA MASATO Graduate School of Engineering Senior Lecturer, KANAI TAMOTSU Graduate School of Engineering Associate Professor, HARA YUUJI Graduate School of Engineering Professor, HAMACHI ITARU Graduate Professor, MASAYUKI MORI				
Target yea	ır 3rd	year students	or above	Number of	of cred	its	2		urse offered ar/period	2019/Second semester
Day/period	I Moi	n.1	Cla	ss style	Lecture	•			Language	Japanese
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3times, 3times, 2times, 2times, 2times, 2times, 1time, 4times,										
[Class requ	uirem	ent]								
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Numbering	g co	de										
Course title <english></english>		微粒子工学 Fine Particle Technology					iliated partment p title,Na	' D.	Graduate School of Engineering Professor,MATSUSAKA SHIYUUJI			
Target ye	ar	Brd year students or above Number of cre				its	2		se offered period	2019/Second semester		
Day/perio	period Tue.3 Class style Lectu				Lecture	e			Language	Japanese		
[Outline and Purpose of the Course]												
From raw materials to finished products, powders#8212particle aggregates#8212are often used in chemical												

processes. In this course, students will learn about the fundamental properties of particles, characteristics of powders, properties of dispersed particles in a gas (vapor) or liquid phase, particle dynamic behavior analysis, and the generation, separation, and collection of particles.

[Course Goals]

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Students will acquire an understanding of the characteristics of particles and powders, and of methods of analyzing the dynamic behavior of fine particles. Students will also foster their abilities in applications and developments involving the manipulation of fine particles, including their generation, separation, and collection.

[Course Schedule and Contents]

Overview of fine-particle engineering (1 class) Explanation is made of the role of fine engineering in chemical processes, with examples from classical processes and natural phenomena

Particle properties and measurement (4 classes) In these lectures, explanation is made regarding the following: particle diameter expression method, particle size distribution and related statistical processing methods, dynamic properties, especially the basic properties of elastic deformation and plastic deformation, physicochemical properties including droplet formation and capillary condensation, etc., electrostatic properties related to electrical charge, optical properties from the relationship between light wavelength and particle diameter, etc., as well as the properties of individual particles, and the characteristics of particle interactions and particle aggregates (assemblies). Measurement nethods for these will also be discu sed.

Gas (vapor)-phase particle systems (5 classes)

Lectures focus on the basics of microparticle generation via pulverization and nucleation, as well as motion of gas-phase dispersed particles. Explanation is made of analysis methods for basic phenomena such as wall-surface deposition, fine particle aggregation, etc. Using this as a foundation, discussion is then made of various operations, including dispersion, classification, solid-gas separation, materials processing, etc.

Liquid-phase particle systems (4 classes)

Explanation is made of interactions of liquid-phase dispersion particles, and this base is used to discuss unit operations including dispersion, aggregation, filtration, etc. Examples of ordered structure formation based on particle group interactions are explained next. Finally, confirmation is made of the extent that students have nderstood the contents of this course.

General summary of course (1 class)

Continue to 微粒子工学(2)

微粒子工学(2)

	L
l	A summary, chiefly focused on dry powder operations.
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[Class requirement]

None

[Method, Point of view, and Attainment levels of Evaluation]

Evaluation is made on the basis of scores (results) in periodically given tests. Consideration will also be given to reports that may be assigned at any time during the course.

[Textbook]

K. Okuyama, H. Masuda and S. Morooka [#]Biryuushi Kougaku ndash Fine particle technology_a (Ohmsha ISBN:4-274-12900-4

[Reference books, etc.]

(Reference books) K. Hashimoto, F. Ogino ^PGendai Kagaku Kogaku a (Sangyo Tosho) ISBN:4-7828-2609-5

[Regarding studies out of class (preparation and review)]

Students must prepare for classes, and review after classes

(Others (office hour, etc.))

*Please visit KULASIS to find out about office hours.

プロセスシステム工学**(2)**

[Method, Point of view, and Attainment levels of Evaluation]

Homework assigned in the lectures is treated as 30 points, and the final examination is treated as 70 points of the total score.

[Textbook]

Lecture materials are distributed in the class.

[Reference books, etc.]

(Reference books)

[Regarding studies out of class (preparation and review)]

(Others (office hour, etc.))

*Please visit KULASIS to find out about office hours.

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Numbering co	ode									
	ロセスシスラ ocess Systems				de	iliated partment p title,Na		Profess Gradua	or,SOTO	ol of Engineering OWA KENICHIRO of Engineering or,TONOMURA OSAMU
Target year	3rd year students	or above	Number	of cred	its	2		ourse of ar/perio		2019/Second semester
Day/period	Thu.2	Clas	ss style	Lecture	•			Lar	nguage	Japanese
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[Course Goa	ls]									
	ocesses. In ad	dition, i	t is request	ted to un	der	stand th	e op	otimizati	ion meth	operational problems ods for solving the g problem.
[Course Sch	edule and C	onten	ts]							
and operation p Modelling of th statistical mode Procedure of pr output model an Process design process simulat Process synthes used in the cond Heat exchanger the heat exchan Production mar supply chain pr Solution procec programming p Scheduling prol processes as a t explained.	ee processes - r roblems is exy ee processes - el is explained occess design, re explained. using simulati ors is explain. is, ltime, The e ceptual design network synt ger network synt ger network synt ure using LP, roblem, and it blem and Ban raveling sales ling problems heir solution r earning achiev	bhysical plained statistic statistic lime,T ion,1tin ed. combin are exy hesis,2t ynthesi hemical ained. 2times, s soluti apB me man pro- of batc nethods	model, 1 tii al model, 1 he procedu he, The sequ atorial prog plained. imes, A sys s problem. on method thod, 2 tim oblem and i h processes are explain 1 times, Th	me, The stime, The stime, The stematic and stematic stematic stematic stematic stematic stematic solutions of the solution of	feat e lea nodu ag m syn he c i the ie si i orm	ure of p ast squa as design ular app aethod a thesis n concept produc mplex r ulation procedu ious sch	hysi re m n an oroac and r neth of p etion neth of t ure u nedu	cal mod nethod u d the sol ch which multi-ste od using production plannin nod are e he sched ising the lling pro	lels used ased in co lution m n is comm ep heuris g T-Q dia on manag ng proble explained fuling pr branch is blems w	ethod using input and monly used in the titic method which are agram is explained for gement including em as a linear d. coblem of batch and bound method are thich arise in batch
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erence books, etc.] [R (Reference books)

プロセス設計**(2)**

(Related URLs) (http://www.cheme.kyoto-u.ac.jp/processdesign/)

[Regarding studies out of class (preparation and review)]

(Others (office hour, etc.))

Numbering code

Since the exercise is supervised by faculty members in each laboratory, the registration is restricted to senior students belonging to Chemical Process Engineering Course.

*Please visit KULASIS to find out about office hours.

計算化学工学(2) data by non-linear least square method. 15. Term-end examination 16. Feedback [Class requirement] Excel is to be used. The basic operation of computer and excel is prerequisite. [Method, Point of view, and Attainment levels of Evaluation] The submission of all homework assignments will be worth 40% of the final grade. The term end exam will be evaluated for the rest of the 60 % of the final grade. [Textbook] Text will be prepared by the tutors [Reference books, etc.] (Reference books) Introduced during class

[Regarding studies out of class (preparation and review)] Writing program for the chemical engineering problem is assigned as homework every week.

(Others (office hour, etc.))

The first 30 minutes of the class will be devoted for explaining theory and basic computational scheme needed to solve the assignment of the day. Then, solve the assignment by using the computer.

*Please visit KULASIS to find out about office hours.

Course title <english></english>		算化学工学 mputers in Che	emica	nical Engineering			iliated partment b title,Na		Pro Gra Ass Gra	fessor,OOS aduate Scho ociate Profess aduate Scho	ol of Engineering HIMA MASAHIRO ol of Engineering or,NAGAMINE SHINS ol of Engineering essor,HIKIMA YUU	UKE
Target ye	ear	3rd year students of	or above	Number	of cred	lits	2			e offered eriod	2019/First semeste	er
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Gaussian el	gran imir ssion	mming codes f ation to solve n model from t	the si	multaneous							the students learn r program to derive	a

The students learn the steepest descent method, Newton method and Marquardt method to seek local extremum of multivariable function, and write the program to determine the parameters to fit the model with Continue to 計算化学工学(2)

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化学実験の安全指針(2)	
Regarding studies out of class (preparation and review)]	
(Others (office hour, etc.))	
Please visit KULASIS to find out about office hours.	

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Target year	3rd year students	or above Nu	mber of cre	dits	2		se offered	2019/Second semester				
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Target year	2nd year stud	ents or above	Number	of cred	its	2		urse off ar/period		2019/First semester
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 Course title
 有機化学基礎及び演習[工化4]

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 Exercises in Basic Organic Chemistre
 Affiliated department, Job title,Name Exercises in Basic Organic Chemistry Cou year Target year 2nd year students or above Number of credits 2 Day/period Mon.1 Class style Lecture [Outline and Purpose of the Course] [Course Goals] [Course Schedule and Contents] , 2 times, ,3times, , 1 times, , 2 times, ,2times, ,2times, , 2 times, ,1time, [Class requirement] None [Method, Point of view, and Attainment levels of Evaluation] [Textbook] [Reference books, etc.] (Reference books) [Regarding studies out of class (preparation and review)] (Others (office hour, etc.)) *Please visit KULASIS to find out about office hours.

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Course title <english></english>		機化学 [⁻ lorganic C				dep	liated partment p title,Na	me	Professor,FU Institute for I Professor,TA	nool of Engineering JITA KOUJI Liberal Arts and Science NAKA KATSUHISA
Target ye	ear 2nd y	ear students o	or above	Number	of cred	lits	2		ourse offered ar/period	2019/First semester
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Target ye	ar 21	nd year students of	or above	Number	of cred	lits	2		ourse	e offered eriod	2019/First semester
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化学プロセス工学基礎 [**T17** , **T18] (2)**

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[Regarding studies out of class (preparation and review)]

(Others (office hour, etc.))

*Please visit KULASIS to find out about office hours.

Numberin	g cod	le									
Course title <pre>KV学プロセス工学基礎[T19,T20] Fundamental Chemical Process Engineering Target year</pre> Index School of Engineering Professor, KAWASE MOTOAKI Graduate School of Engineering Professor, SANO NORIAKI Graduate School of Engineering School of E											
Target ye	ar	2nd year students o	or above	Number	of cred	lits	2		urse offered ar/period	2019/First semester	
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transport in friction facto Weeks 3 and	fluids or, an d 4: H r at fl	s as well as N ad macroscopi Heat transfer (uidsolid inte	ewtor ic flov energ	n's law of vi v and applic y transport)	scosity, ation o	lan f ba es o	iinar flo lance eq f heat tra	w of uation	Newtonian flu on to actual pro er, heat conduct	whenomena, momentum id, turbulent flow and cesses are lectured. tion and Fourier's law, sfer, and principles of	
transport, er	nergy		d mate	erial transpo	ort, equi					tween momentum e-directional diffusion,	
		of transport p vere taught pi				nsiv	e lecture	e of i	fluid dynamics,	heat transfer, and	
Week 8: Co phenomena			rstand	ling of trans	sport ph	eno	mena	Inte	ermediate exam	ination on transport	
										f chemical reaction riewpoint is explained.	

Weeks 9 and 10: Reaction rate equation--- Definition of reaction rate and its dependency on temperature are explained. Steady-state approximation and partial equilibrium approximation fro formulation of overall Continue to 化学力セス工学基礎 [T19, T20](2)

化学プロセス工学基礎[T19,T20](2) reaction are lectured. Weeks 10 and 11: Fundamental equations of designing and operating reactors Stoichiometry during reaction and kinetic balance equations of batch reactor, continuous tank reactor, and tubular reactor are explained. Week 12: Kinetic analysis of simple reaction Measuring data in experiments using batch reactor, tubular reactor, or continuous tank reactor, analyzing those data, and formulating reaction rate as a function of concentrations and temperature are explained. Weeks 13 and 14: Design and operation of reactors Design and operation of reactors are taught and exercised. Week 15: Comprehensive lecture on chemical reaction engineering which were lectured in previous weeks is given. IClass requirement] None IMethod, Point of view, and Attainment levels of Evaluation] Absolute evaluation of intermediate and final examinations. Take-home assignments and in-class quizzes are imposed and evaluated if necessary.	Numb Course : <englis Targe Day/p [Outlin [Cours ,2times, ,2times, ,2times,</englis
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[Reference books, etc.]	[Class
(Reference books) F. Ogino [®] Ido Gensho _a (Sangyo Tosho) ISBN:478282520X R. Bird, W. Stewart and E. Lightfoot [®] Transport Phenomena (2nd Ed.) _a (Wiley) ISBN:9780470115398 K. Hashimoto [®] Han'no Kogaku (revised) _a (Baifukan) ISBN:4563045187	[Class None [Metho
[Regarding studies out of class (preparation and review)]	
Read through a corresponding part of the textbooks before the lecture. Assignments are usually taken from the textbooks.	[Text
(Others (office hour, etc.))	
All registered students are divide into 3 classes. The 3 classes run separately though the contents are shared. Fundamental knowledge on ordinary differential equations is needed. Be sure to take two examinations on the former part (transport phenomena) and the latter part (chemical reaction engineering).	
*Please visit KULASIS to find out about office hours. Continue to 化字力也无工字基键 [119, 120] (3)	

化学プロセス工学基礎 [**T19** , **T20**] (3)

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化学プロセス工学基礎 [**T21** , **T22**] (2)

[Reference books, etc.]

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Target year	2nd year students	or above Number	of cred	its 2		rse offered /period	2019/Second semester
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Numberin	g code				_	C.	duota Cal-	ol of Engineering
Course title	分析化	/ 学 (創成	化学)		filiated	Pro	fessor,OOT	OI OF Engineering SUKA KOUJI ol of Engineering
<english></english>			stry (Frontier Ch		lepartment ob title,Na	Ass	ociate Profes	sor,OYAMA MUNETAK ol of Engineering
			_			As	sociate Prof	essor,KUBO TAKUY
Target ye	ar 2nd	l year students o	or above Number	of credits	s 2	Cours year/p	e offered eriod	2019/Second semester
Day/peric	d Fri.	2	Class style	Lecture			Language	Japanese
[Outline a	nd Pu	rpose of t	he Course]					
[Course 0	ioals]							
[Course S	chedu	le and Co	ontents]					
Principle of Acid-Base I			rium,2times,					
	ormatio	n Equilibri	um,4times,					
			,					
Complex-Fe Oxidation-F ,1time,								
Oxidation-F ,1time,	luirem	ent]						
Oxidation-F	luirem	ent]						
Oxidation-F ,1time, [Class red None			nd Attainment	levels of	Evaluat	ion]		
Oxidation-F ,1time, [Class red None			nd Attainment	levels of	Evaluat	ion]		
Oxidation-F ,1time, [Class red None			nd Attainment	levels of	Evaluat	ion]		
Oxidation-F ,1time, [Class red None [Method, [Textbool	Point o	of view, a					2016) :-1	(1)(079)4641252051
Oxidation-F ,1time, [Class red None [Method, [Textbool	Point o	of view, a					, 2016) isbn	·{}{9781464135385}
Oxidation-F, 1time, [Class ree None [Method, [Textbool Daniel C. H [Reference	Point of [] arris: Q e bool	of view, an quantitative (s, etc.]					, 2016) isbn	{}{9781464135385}
Oxidation-F, 1time, [Class red None [Method, [Textbool Daniel C. H	Point of [] arris: Q e bool	of view, an quantitative (s, etc.]					, 2016) isbn	{}{9781464135385}
Oxidation-F, Itime, [Class red None [Method, [Textbool Daniel C. H [Referenc (Refere	Point d arris: Q e bool nce bo	uuntitative (s, etc.] ooks)	Chemical Analy	ysis (W.H. 1	Freeman,	9th Ed.	, 2016) isbn	.{}{9781464135385}
Oxidation-F, Itime, [Class red None [Method, [Textbool Daniel C. H [Referenc (Refere	Point d arris: Q e bool nce bo	uuntitative (s, etc.] ooks)		ysis (W.H. 1	Freeman,	9th Ed.	, 2016) isbn	\{}{9781464135385}
Oxidation-F. Itime, [Class red None [Method, [Textbool Daniel C. H [Referenc (Refere [Regardir	Point (arris: Q e bool nce bo g stud	uantitative (s, etc.] (oks)	Chemical Analy	ysis (W.H. 1	Freeman,	9th Ed.	, 2016) isbn	;{}{9781464135385}
Oxidation-F, Itime, [Class red None [Method, [Textbool Daniel C. H [Reference (Refere [Regardin (Others (Point of arris: Q e bool nce bo g stud	uantitative (s, etc.] (oks) lies out of hour, etc.	Chemical Analy	rsis (W.H. 1	Freeman,	9th Ed.	, 2016) isbn	{}{9781464135385}

Numbering	g code										
Course title <english></english>				≱) rontier Che	emistry)	de	filiated partment b title,Na		Ass Gra	ociate Prof duate Scho	ol of Engineering essor,NISHIDA KOUJI ol of Engineering GA TSUYOSHI
Target ye	ar 2nd	year students	or above	Number	of cred	its	2			e offered eriod	2019/Second semester
Day/perio				ss style	Lecture	•				Language	Japanese
[Outline a	nd Pur	pose of t	the C	ourse]							
[Course G	ioals]										
[Course S	chedu	e and Co	onten	ts]							
2times, 3times, 3times, 3times, 3times, 1time,											
[Class rec	luireme	ent]									
None											
[Method, I	Point o	f view, a	nd At	tainment	levels	of I	Evaluat	ion]		
[Textbook	(]										
[Referenc	e book	s, etc.]									
(Referei	nce bo	oks)									
[Regardin	g studi	es out o	f clas	s (prepar	ation a	nd	review)]			
(Others (office h	our, etc	.))								
*Please visit	KULA	SIS to find	d out a	bout office	e hours.						

	無機化学(創成 Inorganic Chemi	论化学) stry (Frontier Che	. d	ffiliated epartment ob title,Na	, me	Profess Gradua Associate	sor,MIU ate Scho e Professor	ol of Engineering RA KIYOTAKA ol of Engineering ;SHIMOTSUMA YASUHIK
Target yea	ar 2nd year students	or above Number	of credits	s 2		urse of ar/peric		2019/Second semester
Day/period	d Mon.2	Class style	Lecture			Lai	nguage	Japanese
[Outline an	d Purpose of	the Course]						
[Course Go	oals]							
-	hedule and C	ontentsj						
,3times, .3times,								
.4times.								
,4times,								
, 1 times,								
[Class requ	uirementj							
None								
[Method, P	oint of view, a	and Attainment	levels of	Evaluat	ion	1		
•	, .							
[Textbook]								
	books, etc.]							
(Referen	ce books)							
Regarding	ı studies out o	of class (prepar	ation and	review)1			
(Others (o	ffice hour, etc	:.))						
*Please visit	KULASIS to fin	d out about office	e hours.					

Numbering code

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Numberin	g co	de											
Course title <english></english>		分子化学基礎 ents of Polymer (dep	iliated partment p title,Na		Ass Gra	duate Scho ociate Prof duate Scho ociate Profes	essor, ol of l	NISHII Enginee	DA KOUJ ering
Target ye	ear	2nd year students	or above	Number	of cred	its	2		ourse ar/pe	offered eriod	201	9/Secon	nd semeste
Day/perio	d T	Thu.2	Cla	ss style	Lecture	,				Language	Japa	nese	
[Outline a	Ind F	Purpose of t	he C	ourse]									
[Course 0	Goal	sl				_		_					
		-				_		_			_		
•	Sche	dule and Co	onten	its]									
,2times,													
,1time, .2times.													
,2times, .1time.													
,1time, .1time.													
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[Class red None	quire	ementj											
									-				
[Method,	Poin	nt of view, a	nd At	tainment	levels o	of E	valuat	ion]				
[Textbool	k]												
[Referenc	e bo	ooks, etc.]											
(Refere	nce	books)											
[Regardin	ng st	udies out o	f clas	s (prepar	ation a	nd I	review)]					
(Others (offic	e hour, etc))										
*Please visi	t KU	LASIS to fine	l out a	about office	hours.								

											*
Numbering	g code										
Course title <english></english>		連物質化 ted Materi		創成化学) emistry		de	filiated partment b title,Na		Prof Instit Prof Grac Seni Instit	Tessor, KIM ute for Fronti Tessor, TAB duate Scho ior Lecture ute for Fronti	ol of Engineering URA SHIYUNSAKU ier Life and Medical Science ATA YASUHIKO ol of Engineering r,OOMAE MASASHI ier Life and Medical Science sssor,JO JUNICHIRO
Target ye	ar Brd y	year students (or above	Number	of cred	lits	2		ourse ar/pe	offered riod	2019/First semester
Day/perio	d Tue.	1	Cla	ss style	Lectur	e				Language	Japanese
[Outline a	nd Pur	pose of t	he C	ourse]							
[Course G	ioals]										
[Course S	chedul	le and Co	onten	ts]							
, 4 times,											
,4times, .4times.											
,3times,											
[Class req	luireme	ent]									
None											
[Method, I	Point of	f view, a	nd At	tainment	levels	of E	Evaluat	ion]		
[Textbook	4]										
[Referenc	e book	s, etc.]									
(Referei											
[Regardin	g studi	ies out o	f clas	s (prepar	ation a	nd	review)]			
(Others (office h	our. etc.))								

Numbering	code								*
Course title	有機化的	学II (創历 Chemistry	戊化学) y II (Frontier Che	emistry)	de	iliated partment b title,Na	' D		ol of Engineering ISUBARA SEIJIROU
Target yea	ar 3rd y	ear students o	r above Number o	of cred	its	2		se offered period	2019/First semester
Day/perio	d Wed.	2	Class style	Lecture				Language	Japanese
[Outline ar	nd Purp	oose of t	he Course]						•
[Course G	oals]								
[Course So	chedul	e and Co	ontents]	_					
,3times,									
,3times,									
,3times, .3times.									
,3times, ,2times,									
,1time,									
[Class req	uireme	nt]							
None									
[Method, P	oint of	view, ar	nd Attainment	levels	of E	zvaluat	ion]		
[Textbook]				_					
[Reference	books	s, etc.]			_				
(Referen	ce boo	oks)							
[Regarding	g studi	es out of	class (prepara	ation a	nd	review)]		
							_		
(Others (c	office h	our, etc.)						
*Please visit	KULAS	SIS to find	out about office	hours.					

										*
Numbering	g cod	le								
Course title <english></english>		化学II(創 iical Chemis				dep	iliated partment p title,Na	, As In	sociate Prof	nemical Research essor,OONO KOUJI nemical Research JII YOSHINOBU
Target ye	ar	3rd year students	or above	Number	of credi	ts	2		se offered period	2019/First semester
Day/perio	d W	/ed.1	Cla	ss style	Lecture				Language	Japanese
[Outline a	nd P	urpose of	the C	ourse]						
[Course G	ioals	51	_		_		_	_		
		•								
[Course S	che	dule and C	onten	ts]						
3times,										
2times, 2times,										
4times,										
3times,										
1time.										
,										
[Class red	luire	ment]								
None										
[Method,	Poin	t of view, a	and At	tainment	levels o	of E	valuat	ion]		
[Textbook	4]									
[Referenc	e bo	oks, etc.]								
(Refere	nce l	books)								
[Regardin	g sti	udies out o	of clas	s (prepar	ation ar	nd I	review)]		
(Others (offic	e hour, etc	:.))							
Please visi	t KU	LASIS to fir	nd out a	bout office	hours.					

Numberin	g code							
Course title <english></english>			II(創成化: hemistry II (Fro		Affiliated departmen Job title,N	nt,	Associate Profess Graduate Scho	ol of Engineering or,HORINAKA JIYUNICH ol of Engineering or,TERASHIMA TAKAYA
Target ye	ear 3rd y	ear students o	or above Num	ber of cre	dits 2		urse offered ar/period	2019/First semester
Day/perio			Class sty		re		Language	Japanese
[Outline a	nd Pur	pose of t	he Course]				
[Course C	Soalel							
10001000	Jouioj							
ICourse 6	اربله مرامد	e and Ci	mientel					
[Course S .2times.	schedui	e and Co	ontentsj					
,2times,								
,3times,								
,3times, ,4times,								
,1time,								
[Class red	quireme	ent]						
None								
[Method,	Point of	f view, a	nd Attainm	nent levels	of Evalua	tion]		
- /		,				-		
[Textbool	k]							
[Reference	e book	s, etc.]						
(Refere	nce boo	oks)						
[Regardir	ng studi	es out o	f class (pro	eparation	and reviev	v)]		
(Others (office h	our, etc.	.))					
*Please visi	t KULA	SIS to find	d out about o	office hours.				

Numberin														
	g co	de					_		_					
Course title <english></english>			所化学(al Analytical		公学) try (Frontier C	Chemistry)	depa	liated artment title,Na	t, ime	Prof Grac Asso Grac	duate Scho fessor,OO duate Scho ociate Profes duate Scho ociate Profes	TSUK ool of ssor,OY ool of	A KOUJI Engineeri YAMA MU Engineeri	ing JNET ing
Target ye	ar	3rd ye	ear students (or above	Number	of cred	lits	2	Cou	irse	offered eriod		9/First se	
Day/peric	d	Fri.1		Clas	s style	Lecture	e				Language	Japa	inese	
[Outline a	nd	Purp	ose of t	he Co	ourse]									
[Course G	Goal	ls]												
[Course S	che	edule	e and Co	ontent	s]									
Spectroscop Electrochen ,1time,				ies,										
[Class red	luir	eme	nt]		_	_								
None														
[Method,	Poi	nt of	view, a	nd Att	ainment	levels	of Ev	valuat	tion]					
[Method,	Poii	nt of	view, a	nd Att	ainment	levels	of Ev	valuat	ion]					
[Method,		nt of	view, a	nd Att	ainment	levels	of Ev	valuat	tion]					
	۲]										2016) isbr	n{}{9'	78146413	35385
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[Textbook Daniel C. H	k] arris e b nce Sko	s: Qua ooks boo og, F	antitative 5, etc.] ks) . James H	Chem Ioller,	ical Analy Stanley R.	sis (W.F	H. Fre	eeman,	9th E	Ed.,				
[Textbool Daniel C. H [Referenc (Referenc Douglas A.	(] arris nce Sko th Ed	s: Qua ooks boo og, F d., 20	antitative s, etc.] ks) . James F 17) isbn{	Chem Ioller, 1 }{978	ical Analy Stanley R. 13055772	rsis (W.F Crouch 13}	H. Fre	eeman, nciples	9th E of Ins	Ed.,				
[Textbool Daniel C. H [Referenc (Referenc Douglas A. Learning, 70	(] arris nce Sko th Ed	s: Qua ooks boo og, F d., 20	antitative s, etc.] ks) . James F 17) isbn{	Chem Ioller, 1 }{978	ical Analy Stanley R. 13055772	rsis (W.F Crouch 13}	H. Fre	eeman, nciples	9th E of Ins	Ed.,				
[Textbool Daniel C. H [Referenc (Referenc Douglas A. Learning, 70	k] arris nce Sko h Ed	s: Qua ooks boo og, F d., 20 tudie	antitative s, etc.] ks) . James F 17) isbn{ es out o	Chem Ioller, 1 }{978 f class	ical Analy Stanley R. 13055772	rsis (W.F Crouch 13}	H. Fre	eeman, nciples	9th E of Ins	Ed.,				
[Textbool Daniel C. H [Reference (Reference Douglas A. Learning, 71 [Regardin	(] arris nce Sko th Ed g s offi	s: Qua ooks boo og, F d., 20 tudie ce h	antitative s, etc.] ks) . James F 17) isbn{ es out o our, etc.	Chemi Ioller, 3 }{978 f class	ical Analy Stanley R. 13055772 s (prepar	sis (W.F Crouch 13} ration a	H. Fre	eeman, nciples	9th E of Ins	Ed.,				
[Textbool Daniel C. H (Reference Ouglas A. Learning, 7/ [Regardin (Others ((] arris nce Sko th Ed g s offi	s: Qua ooks boo og, F d., 20 tudie ce h	antitative s, etc.] ks) . James F 17) isbn{ es out o our, etc.	Chemi Ioller, 3 }{978 f class	ical Analy Stanley R. 13055772 s (prepar	sis (W.F Crouch 13} ration a	H. Fre	eeman, nciples	9th E of Ins	Ed.,				
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Numbering	g code	9								
Course title <english></english>		熱力学入門 tion to Statistical			r Chemistry)	de	iliated partment b title,Na			ol of Engineering essor,IDA DAICHI
Target ye	ear 31	rd year students	or above	Number	of crec	lits	2		ourse offered ar/period	2019/First semester
Day/perio	od Mo	on.2	Cla	ss style	Lectur	е		-	Language	Japanese
[Outline a	nd Pu	urpose of	the C	ourse]						
[Course G	Goals]									
[Course S	Sched	ule and Co	onten	its]						
,2times,										
,3times, .3times.										
.3times.										
,3times,										
,1time,										
[Class red	quiren	nent]								
None										
[Method,	Point	of view, a	nd At	tainment	levels	of E	Evaluat	ion]	
[Textbook	<]									
[Referenc	e boo	oks, etc.]								
(Refere	nce b	ooks)								
[Regardin	ig stu	dies out o	f clas	ss (prepar	ation a	nd	review)]		
(Others (office	hour, etc	.))							
*Please visi	t KUL	ASIS to fin	d out a	about office	e hours.					
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Numbering	g code									
Course title <english></english>		学III(創 Chemistr		≱) Frontier Che	emistry)	dep	iliated partment p title,Na	, me A A	ssociate Profess Graduate Scho Associate Profes	ol of Engineering or,KURAHASHI TAKUYA ol of Engineering sor,YOSHIHIRO SASAKI
Target ye	ar Brd y	ear students of	or above	Number	of cred	its	2		rse offered /period	2019/Second semester
Day/perio	d Tue.	2	Cla	ss style	Lecture	e			Language	Japanese
[Outline a	nd Pur	oose of t	he Co	ourse]						
[Course G	ioals]									
[Course S	chedul	e and Co	onten	ts]						
2times, 2times, 2times, 2times, 2times, 4times,										
[Class rec	luireme	nt]								
None										
[Method,	Point of	i view, a	nd At	tainment	levels	of E	valuat	ion]		
[Textbook	(]									
[Referenc	e book	s, etc.]								
(Refere	nce boo	oks)								
[Regardin	g studi	es out o	f clas	s (prepara	ation a	nd	review)]		
(Others (office h	our, etc.))							
Please visi	t KULAS	SIS to find	d out a	bout office	hours.					

	理化学III(創 ysical Chemistr	成化学) y III (Frontier Ch	emistry)	Affiliated department Job title,Na	D.		ol of Engineering XITA HIDEO
Target year	3rd year students of	or above Number	of credi	its 2		se offered period	2019/Second semester
Day/period	Tue.1	Japanese					
Outline and	Purpose of t	he Course]					
hemistry desc nermodynamic nermodynamic n how quantu	ribe the dynami cs provides syst cs makes links t m theory serves	cs and properies ematic description between microsc	of micro on of mac opic and nderstand	scopic syste croscopic pr macroscopi ing electror	ems su opertie c prop	ch as electro es and charac erties. The l	ynamics: quantum ns and molecules, teristics, and statistical ectures will also focus toms, chemical bonds,
nolecular worl	nderstand quan d. Students wi	tum theory syste Il also become al cal bonds, molec	ble to exp	lain, on the	basis	of quantum t	heory, electron
	edule and Co		ular struc	tures, and s	anous	specification	le properties.
 Origins of q Quantum-m 	echanical princ al motion, vibra	nics and microse iples	opic syste	em dynamio	es		
Structure an	d spectra of the	ic spectra (2 clas hydrogen atom nic spectra of mu	,	on atoms			
 Valence bor 	structure (2 clas nd method, mole molecular syste	ecular orbital me	ethod				
(4) Molecular sRotational sVibrational		(2 classes)					
(5) Molecular sElectron tra	spectroscopy 2 (nsition	(1 class)					
(6) Molecular sMagnetic re	spectroscopy 3 (sonance	(1 class)					
							化学Ⅲ(創成化学)(2)

 (7) Intermolecular interactions (1 class) Electrical properties Intermolecular interactions 	
Final examination/ Confirmation of extent of student learning (1 class)	
Feedback (1 class)	
[Class requirement]	
Prerequisites for this course are completion of the following courses: Fundamentals of Physical and Practical Exercises, Physical Chemistry I (Frontier Chemistry), and Physical Chemistry II (Chemistry).	
[Method, Point of view, and Attainment levels of Evaluation]	
Grading method Final examination scores (80%) and class attendance and participation (20%) The "class attendance and participation" evaluation will include attendance records of stud evaluations of short reports.	dents and
Grading standard The following grades are given in accordance with the goal-achievement levels of each indiv A+: Course goals have been accomplished at an extremely high level, from all perspectives. B: Course goals have been accomplished at a high level, from all perspectives. B: Course goals have been accomplished, from all perspectives. C: Confirmation can be made, from a majority of perspectives, of effects of student learning goals have been accomplished to a certain extent. D: While course goals have been accomplished to a certain extent, further effort by the studesirable. F: No confirmation can be made of effects of student learning, and it is difficult to say that accomplished the goals of this class.	es. ng, and course ident is
[Textbook]	
Peter Atkins, Julio de Paula 著, 中野元裕・上田貴洋・奥村光隆・北河康隆 訳 『アトキン 学」第10版(上) a (東京化学同人) ISBN:978-4-8079-0908-7 (アトキンス「物理作 (上) でも構いません) Peter Atkins, Julio de Paula 著, 中野元裕・上田貴洋・奥村光隆・北河康隆 訳 『アトキン 学」第10版(下)a (東京化学同人) ISBN:978-4-8079-0909-4 (アトキンス「物理化 (下) でも構いません)	と学」第8版 ノス「物理化
[Reference books, etc.]	
(Reference books) To be introduced during the course	
Continue to 物理化学III(創	

物理化学Ⅲ(創成化学)(2)

物理化学Ⅲ(創成化学)**(3)**

[Regarding studies out of class (preparation and review)]

Lectures will proceed on the assumption that students have read carefully and thoroughly assigned textbook pages before each class period. Therefore, students should be sure to perform such study before and after each class.

(Others (office hour, etc.))

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*Please visit KULASIS to find out about office hours

* Numbering code Graduate School of Engineering Professor,OOTSUKA KOUJI Graduate School of Engineering Associate Professor,OYAMA MUNETAKA Affiliated 最先端機器分析 (創成化学) ourse title department, Job title,Name <English> Advanced Instrumental Analysis (Frontier Chemistry) Graduate School of Engineering Associate Professor, KUBO TAKUYA Course offered year/period 2019/Second semester Target year Brd year students or above Number of credits 2 Day/period Fri.1 Language Japanese Class style Lecture [Outline and Purpose of the Course] [Course Goals] [Course Schedule and Contents] ligh-performance Separation Analysis,4times, Electrochemical Analysis, Advanced,4times, Spectroscopic Analysis 1,1time, Spectroscopic Analysis 2,4times, opics,1time, 1time, [Class requirement] Jone [Method, Point of view, and Attainment levels of Evaluation] [Textbook] aniel C. Harris: Quantitative Chemical Analysis (W.H. Freeman, 9th Ed., 2016) isbn{}{9781464135385} [Reference books, etc.] (Reference books) Orderence books Journal Analysis (Cengage Journal Analysis) (Cengage Journal, 7th Ed., 2017) ison { } {9781305577213 } [Regarding studies out of class (preparation and review)] (Others (office hour, etc.)) Please visit KULASIS to find out about office hours

		学のフロンテ ontier Chemist				de	iliated partmen b title,Na		Graduate School of Engineering Professor,MIURA KIYOTAKA Faculty of Engineering			
Target ye	ar	4th year students	or above	Number	of cred	lits	2			e offered eriod	2019/First semester	
Day/perio								Language	Japanese			
[Outline a	٦d	Purpose of	the Course]									
[Course G	oa	-										
areas, as wel	l as		re tren	ds. Studen							ve chemistry research mistry plays in society.	
As macromo these lecture self-organiza	lec s, a tio	n overview ex	riety o planat ro-pha	of molecular ion is provi se separate	ided on i d structu	how ires	block on nand	copc	olym	ers and graf	erior properties. In 't copolymers form, via e nano-patterns are	
An overview	ex		ovide	d of basic c							s of precise synthesis of cisely synthesized.	
Chemistry for proactively g of living rad graft polyme	or th gran ical riza	nt new function polymerization	ign an 1s to p on, wh view o	d synthesis olymers. S ich has und f applicatio	of macr tudents ergone ns and r	will rem elat	gain a arkable ed item	deep dev s wi	per u elop ll als	nderstandin ments in rec	activities that aim to g of the fundamentals ent times, and surface- ted from the viewpoint	
		lymer characte				, in 1	olvme	r sol	utio	ns and of m	ethods for determining	

molecular parameters from intrinsic viscosity measurement. Also discussed are application examples for each type of macromolecule (polymer).

Frontlines of organic chemistry and analytical chemistry (2 classes)

Fine organic synthesis using organometalic compounds has become the most powerful tool of molecular architecture. An overview is made of the theories of fine organic synthesis, and concrete advanced research cases are introduced. Micro- and nanoscale high-performance separation and analysis techniques are introduced to showcase the frontlines of novel topics.

化学のフロンティア(創成化学)(2)

Frontlines of inorganic materials chemistry (2 classes) Discussion will be made of the synthesis and function of novel inorganic materials synthesis for applications involving spin electronics and photonics materials.

Frontlines of polymer materials chemistry (2 classes)

Explanation will be made of recent issues associated with the characteristics and properties of such things as elastomers and polymer gels. Lectures discuss the flow of development from supramolecular assembly to supramolecular organization, trends in molecular architecture such as catenane and rotaxane, and the development of nanomaterials.

Feedback (1 class)

Evaluation is made of the extent of learning achieved in the course overall, and in regards to the degree that students have achieved course goals.

[Class requirement]

Students are recommended to have finished fundamental courses in organic chemistry, physical chemistry, inorganic chemistry, analytical chemistry, and polymer chemistry.

[Method, Point of view, and Attainment levels of Evaluation]

Grades will be determined based on an overall evaluation of attendance and scores (results) on reports

[Textbook]

No textbook will be used. Materials and PowerPoint presentations will be distributed and/or used during classes

[Reference books, etc.]

(Reference books)

[Regarding studies out of class (preparation and review)]

Assignments and individual reports will be appropriately instructed during classes.

(Others (office hour, etc.))

Course contents may be changed as necessary

*Please visit KULASIS to find out about office hours.

										*		
Numbering	g coc	le										
Course title <english></english>		生物学 mical Biology	Ý			de	filiated partment b title,Na	Pro Ins	Institute for Frontier Life and Medical Sciences Professor, EIRAKU GENJI Institute for Frontier Life and Medical Sciences Associate Professor, OHGUSHI MASATOSHI			
Target ye	ar	3rd year students (d year students or above Number of credits 2 Course offered year/period 2019/Second semester									
Day/perio	d T	'hu.2	2 Class style Lecture Language Japanese						Japanese			
[Outline a	nd P	Purpose of t	he C	ourse]								
organic mate level can ma engineering- lipids of bio explained in interdisciplin	[Outline and Purpose of the Course] It is important in the field of life science to understand biochemistry and biological medicine in terms of organic material chemistry. The way to think and view the biological system and bioprocess at the molecular level can make clear the academic knowledge of life science and contribute to the development of engineering-medicine-pharmacy interdisciplinary research area. In this lecture, proteins, polysaccharides, and lipids of bio-related substances as well as cells, cell membrane, extracellular matrix of biological system are explained in terms of chemical biology. As a representative of engineering-medicine-pharmacy interdisciplinary research area, drug delivery system (DDS) and regenerative medicine are introduced. In addition, some topics in the field of life science, including stem cells, body defense and immunology, and											

[Course Goals]

The objective of the lecture is to obtain the fundamental knowledge of proteins, polysaccharides, lipids, cells, and extracellular matrix and understand stem cells, body defense, DDS, regenerative medicine, and endocrine lisruptor of life science application.

[Course Schedule and Contents]

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Proteins and enzymes,2times,Structure and function of proteins and enzymes
Polysaccharides and lipids,1time,Structure and function of polysaccharides and lipids
Cell and cell membrane,1time,Structure and function of cells and membrane transportation
Signal transduction,1time,Signal transduction at cell membrane
Energy conversion, 1 time, Oxidative phosphorylation to generate ATP
Cytoskeleton,1time,Cellular biomechanics and biochemistry of cytoskeleton
Body defense and immunology, 1 time, System and function of body defense and immunology
Stem cells,1time,System, function, and medical application of stem cells
Cell and extracellular matrix,1time,Structure and function of extracellular matrix
Regenerative medicine and material science,2times,Overview of regenerative medicine based on material
science
Drug delivery system (DDS),1time,Overview of DDS based on material science
Endocrine disruptor, 1 time, Overview of endocrine disruptor based on material science
Achievement evaluation, 1 time, Credit evaluation based on the understanding level of lecture contents
[Class requirement]
None

Continue to 化学生物学(2)

化学生物学**(2)**

[Method, Point of view, and Attainment levels of Evaluation]

The credit is judged by the scheduled examination and the attendant rate.

[Textbook]

[Reference books, etc.] $(\ {\rm Reference\ books\ })$

Fundamentals of Biochemistry: Life at the Molecular Level; Wiley isbn{}{9780470547847}、 Molecular biology of the Cell; Garland Science isbn{}{9780815344322}、 ますます重要になる細胞周辺環境(細胞ニッチ)の最新科学技術;株式会社メディカルドゥ isbn{} {9784944157846}、 |7/107473/103747], |Immunology; Saunders isbn{}{9780323080583}, 生物薬剤学;株式会社南江堂 isbn{}{9784524403059}, 絵で見てわかるナノDDS;株式会社メディカルドゥ isbn{}{9784944157884}

[Regarding studies out of class (preparation and review)]

(Others (office hour, etc.))

Numbering	g cod	le										
Course title <english></english>			七学 I Chemist	ry I			de	iliated partment b title,Na				ool of Engineering JCHI MAKOTO
Target ye	ar	3rd ye	ear students o	or above	Number	of cred	its	2			e offered eriod	2019/Second semester
Day/perio	d W	/ed.	1	Cla	ss style	Lecture	e				Language	Japanese
[Outline a	nd P	urp	oose of t	he C	ourse]							
polymerizati	ion), ic and	this 1 ca	course is tionic), ri	to dis ng-op	cuss the co ening, and l	ncepts a living po	nd t olyn	he char nerizatio	acter ons.	risti Exa	cs of coord mples are p	ondensation and radical ination, stereospecific, provided for initiators, rs.
[Course G	ioals	5]										
						mistry, j	part	icularly	the	func	lamental na	ature of polymers and
their synthes	515 (p	olyr	nerizatior	1 react	tions).							
[Course S	che	dule	e and Co	onten	ts]							
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Target year	 2nd year studer 	nts or above	Number	of credit	ts 2	Cours year/p	e offered eriod	2019/Secon
Day/period	Tue.2	Cla	iss style	Lecture			Language	Japanese
[Outline and	d Purpose o	of the C	ourse]					
[Course Go	als]							
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[Method, Po	bint of view,	and A	ttainment	levels o		lionj		
[Textbook]								

Continue to 化学数学(創成化学)(2)

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Fundamental Polymer Science I (2nd year, 2nd term) and Fundamental Polymer Science II (3rd year, 1st term)

[Method, Point of view, and Attainment levels of Evaluation]

Written Examination

[Textbook]

None in particular. PDF files of slides that are to be shown at the course lectures will be uploaded into the course website, and it is strongly recommended for students to download these materials for review and selflearning.

[Reference books, etc.]

(Reference books)

quotFundamentals in Polymer Sciencequot, Tokyo Kagaku Dojin: isbn{}{9784807906352}

[Regarding studies out of class (preparation and review)]

(Others (office hour, etc.))

*Please visit KULASIS to find out about office hours.

化学数学(創成化学)**(2)**

(Reference books)

[Regarding studies out of class (preparation and review)]

(Others (office hour, etc.)) *Please visit KULASIS to find out about office hours.

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Numbering of	code						
	皆体化学(創成 oordination Cher	化学) nistry (Frontier Che		Affiliated department Job title,Na	, Pr In	ofessor,FUJI stitute for Lil	ol of Engineering TA KOUJI peral Arts and Sciences AKA KATSUHISA
Target year	r 3rd year students	or above Number	of credit	s 2		se offered period	2019/Second semester
Day/period	Mon.1	Class style	Lecture			Language	Japanese
[Outline and	d Purpose of	the Course]					
[Course Go	als]						
-	-						
[Course Scl	hedule and Co	ontents]					
,3times,							
,3times,							
,3times, .2times.							
.3times.							
,1time,							
[Class requ	irement]						
None							
[Method, Po	oint of view, a	nd Attainment	levels of	f Evaluat	ion]		
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-	books, etc.]						
(Referenc	e books)						
[Regarding	studies out o	f class (prepara	ation and	d review))]		
(Others (of	fice hour, etc	.))					
*Please visit K	ULASIS to fin	d out about office	hours.				

Course title 創成化学実験 <english> Frontier Chemistry I</english>	(創成化学) .aboratory I(Frontier C	dep	liated artment, title,Nar	Pr Fa 創	ofessor,MA culty of Eng 成化学実験	ol of Engineering ISUBARA SEIJIRO ineering 関連教員
Target year 3rd year students	or above Number	of credits			se offered period	2019/First semester
Day/period Tue3,4,5,Wed3,4,5,Thu3,4		Experimen	t		Language	Japanese
[Outline and Purpose of	the Course]					
[Course Goals]						
[Course Schedule and C	ontents]			_		
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6times,						
12times,						
9times, 3times,						
9times,						
15times.						
,6times,						
[Class requirement]						
[Class requirement] None [Method, Point of view, a	and Attainment	levels of E	valuati	ion]		
None	and Attainment	levels of E	valuati	ion]		
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None [Method, Point of view, a [Textbook]	and Attainment	levels of E	valuati	on]		
None [Method, Point of view, a [Textbook] [Reference books, etc.]	and Attainment	levels of E	valuati	ion]		
None [Method, Point of view, a [Textbook] [Reference books, etc.]	and Attainment	levels of E	valuati	ion]		
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Target ye	ar	3rd year students of	r above Number	of cred	lits	2			e offered eriod	2019/Second semester
Day/perio	d	Fri.2	Class style	Lecture	e				Language	Japanese
[Outline a	nd	Purpose of t	he Course]							
-	[Course Goals] Mastering at least the minimum knowledge of polymer physics necessary for starting research in polymer									
field				polymer	phy	sics neo	cess	ary i	for starting i	research in polymer
[Course S	che	edule and Co	ontents]							
	4times, 3times,									
[Class red	quir	ement]								
None										
[Method, I	Poiı	nt of view, a	nd Attainment	levels	of E	valua	tion]		
Grading										
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(Others (offi	ce hour, etc.))	_						
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			学実験		t 化学)			artment			TSUBARA SEIJĪROU
<english></english>	Front	tier Cl	hemistry Lal	ooratory	/ II(Frontier C	hemistry)		title,Na	me	Faculty of En	
		_								割成化学実験	(関連教員
Target ye	ar	βrd ye	ear students o	r above	Number	of cred	its	7		rse offered	2019/Second semester
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None											
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Numbering co	ode									
Course title 科 <english> Sc</english>	学英語(創点 ientific Engli)		dep	iliated partment p title,Na		Pro	ofessor,MA7	ol of Engineering ISUBARA SEIJIROU er,BOLSTAD , Francesco
Target year	3rd year student	s or above	Number o	of cred	lits	2			e offered eriod	2019/First semester
Day/period	Mon.3	Cla	ss style	Lecture	e		_		Language	English
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[Course Goa	ıls]									
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, 4 times,										
, 4 times,										
, 5 times,										
[Class require	rement]									
None										
[Method, Poi	int of view,	and A	ttainment l	levels	of E	valuat	ion]		
[Textbook]										
None										
[Reference b	ooks, etc.]									
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[Regarding s	studies out	of clas	ss (prepara	ation a	nd ı	review)]			
(Others (off	ice hour, et	c.))		_						
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Target year	2nd year students	or above Number	of credits		Course year/pe	e offered eriod	2019/Second s
Day/period	Wed.2	Class style	Lecture			Language	Japanese
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[Course Go	alsi						
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		エンタルピー,	非理想系0)平衡 .	フガシ	ティー	
(4)化学反	応速度論【5	回】					
	応速度 , 反応	速度式,速度定	数と平衡定	【数,衝	突理論	,活性複合	合体理論,連鎖
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(J) 手目到 (6) フィー							
	「「ハック」」						
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IClass requi							
[Class requi 前期配当の物	irement]	回】 び演習の知識を	必要とする				
前期配当の物	irement] I理化学基礎及	び演習の知識を		•	_		
前期配当の物 [Method, Po	irement] I理化学基礎及 vint of view, a	び演習の知識を nd Attainment		•	on]		
前期配当の物 [Method, Po	irement] I理化学基礎及	び演習の知識を nd Attainment		•	on]		
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前期配当の物 [Method, Po 平常点と定期 [Textbook]	irement] I理化学基礎及 vint of view, a	び演習の知識を nd Attainment		•	on]		
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Target ye	ar	3rd year students o	r above Number	of cred	its	2			e offered eriod	2019/First semester
Day/perio	d N	Aon.4	Class style	Lecture	e		-		Language	English
[Outline a	nd F	Purpose of t	he Course]							
[Course G	Soal	s]								
[Course S	che	dule and Co	ntents]							
Basic knowl detection. Intrusion De	ledge etecti	e on the role of	f IDS in network re-Based IDS,5t	security	an arn t	d how n	hach	ine l	earning car of intrusion	cility for this class.\\ help the intrusion detection by signature-
based IDS by studying open source signature-based IDS and attacks, such as correspondence between alarms issued from IDS and communications, and adding signatures to detect attacks. Intrusion Detection by Machine Learning, 7times, Learn the method of classifying normal and malicious traffic by machine learning algorithms and public dataset for benchmarking intrusion detection performance. Presentation, Itime, Based on the exercise, students presents their methods of intrusion detection using machine learning, and discuss it with other students and instructors.										
[Class rec								_		
None	1						_	_		
[Method, I	Poin	nt of view, ar	nd Attainment	levels	of E	Evaluat	ion]		
[Textbook	(]									
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(Referei	nce	books)								
[Regardin	g st	udies out of	class (prepar	ation a	nd	review)]			
(Others (offic	e hour, etc.))							
*Please visit	t KU	LASIS to find	out about office	e hours.						

物理化学⊥a(工業基礎化	学)(2)
学(上)」第10版』(引 Peter Atkins・Julio de Paula	8,9章) 著,中野元裕・上田貴洋・奥村光隆・北河康隆訳 『アトキンス「物理化 東京化学同人)ISBN:ISBN978-4-8079-0908-7(第4,5,6章) 著,中野元裕・上田貴洋・奥村光隆・北河康隆訳『アトキンス「物理化 東京化学同人)ISBN:ISBN978-4-8079-0909-4(第20,21章)

[Regarding studies out of class (preparation and review)] 講義した内容を復習して,期末試験に臨むこと。

(**Others (office hour, etc.)**) *Please visit KULASIS to find out about office hours.

Numbering	code														
Course title 物理化学 I b (工業基礎化学) <english> Physical Chemistry Ib (Fundamental Chemi</english>							depar	Affiliated department, Job title,Name			Graduate School of Engineering Professor,SEKI SYUHEI				
Target yea	arget year 2nd year students or above Number of c								Cou year		offered iod	I	2019/S	econd	semeste
Day/period	1 Th	u.2		Clas	ss style	Lecture	e		-	L	anguag	je .	Japanes	se	
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物理化学Ib(工業基礎化学)(2)

[Course Schedule and Contents] . Principles of Statistical Mechanics and Entropy; mathematical backgrounds 2. Definition of Entropy: Approaches from statistical mechanics and conventional thermodynamics Boltzmann Principles: Historical reviews starting from the discussions by Clausius Translational Motion of Atoms/Molecules Phase Transitions revisited by Statistical Mechanical Approaches: Heat Capacity of Matters
 Distribution of Molecular Motions in Gases: Partition Functions Canonical Ensembles: Partition Functions A Varieties of Intensive Variables: in relation to macroscopic thermodynamic systems

9. Mid-Term Exam

10. Entropy Elasticity

11. Brownian Motions and the Collision Theory of Particles

12. Arrhenius Equation and Law

13. Eyring Equations and the Transition State Theory

14. Limitations of Classical Statistical Mechanics towards Quantum Statistical Mechanics

[Class requirement]

[Method, Point of view, and Attainment levels of Evaluation] Scores will be made by the following dual ways (finalized by the better one)

1) Active participation + midterm examination + final examination in total 2) Final examination only

No makeup exam after the final examination

[Textbook]

Walter J. Moore Physical Chemistry (Longman Publishing Group) ISBN:978-0582442344

[Reference books, etc.]

(Reference books) Richard P. Feynman [®]Feynman Lectures on Physics Vol1 a ISBN:978-0465024933 Richard P. Feynman

[Regarding studies out of class (preparation and review)] Think quantitatively and calculate anything

(Others (office hour, etc.))

Welcome not only the questions during/at the end of classes, but also the question papers.

*Please visit KULASIS to find out about office hours.

Numbering	g co	de									
Course title <english></english>		化学 I (工業基 ganic Chemistry				de	filiated partment b title,Na	me	Pro Ins Pro Gra Ass Gra Progr Gra Asso Gra	ofessor, SAKJ titute of Adv ofessor, NOH duate School of ofessor, ABE aduate Schoo autore Schoo am-Specific Associa duate School of pociate Professor.	ol of Engineering sor,MATSUI TOSHIAKI ol of Engineering te Professor,HOSOKAWA SABUROU Global Environmental Studies FUKUTSUKA TOMOKAZU ol of Engineering
Target ye	ar	2nd year students o	or above	Number of	of cred	lits	2			e offered eriod	2019/Second semester
Day/perio	d	Mon.2	Cla	ss style	Lecture	e				Language	Japanese
[Outline a	nd I	Purpose of t	he Co	oursel							

In quotInorganic Chemistry Iquot, following four topics will be explained: 1) Acids and bases of inorganic compounds 2) Oxidation and reduction 3) Concept of group theory, which is necessary for the understanding of molecular structures 4) Fundamentals of d-block coordination compounds

[Course Goals]

Acids and bases, oxidation and reduction, a group theory, and coordination compounds will be understood for Inorganic chemistry II at 3rd grade and Electrochemistry at 4th grade.

[Course Schedule and Contents]

Asids and Bases,4times,Bronstead acids and bases and the Lewis acids and bases will be described. Hard and Soft Acids and Bases (HSAB) theory by Peason will be explained. Finally, solvent parameters which can valuate the degree of intensities of acids and bases will be described.

Oxidation and Reduction, 4times, Oxidation and Reduction will be explained mainly by using electrochemistry. In particular, stand ard potentials will be explained in detail. By using the potentials, oxidation and reduction reactions will be explained.

Molecular Symmetry,4times,Based on the molecular shapes, point groups can be determined. By using point groups, various physical phenomena of molecules will be described.

Coordination compounds,2times,Coordination compounds based on metal ions of Lewis acids and ligands of Lewis bases will be described and their geometrical structures will be explained. Evaluation, 1 time, Evaluaion

______Continue to 無機化学 I(工業基礎化学) [I 化1・I 化3] (2)

[Class requirement]

Based on the understanding of quotFundamental Inorganic Chemistryquot, lectures will be done.

無機化学I(工業基礎化学)[工化1・工化3](2)

[Method, Point of view, and Attainment levels of Evaluation]

Grading is based on the examination held at the end of the semester. The attendance rate and the reports submitted during the course may be counted in evaluation.

[Textbook]

Inorganic Chemistry (6th edition) M.Weller, T.Overton, J.Rourke, F.Armstrong(2014) ISBN 9780199641826 isbn{}{9780199641826}

[Reference books, etc.]

(Reference books) Supplemental explanation will be delivered at the first class.

[Regarding studies out of class (preparation and review)]

(Others (office hour, etc.))

Before the class, each topic should be prepared. At every class, quizes will be given and the answers for them should be submitted at the next class

Numbering code

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分析化学I(工業基礎化学)[工化1・工化3]

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Target year	ar 2nd year students or abov		Number	lits	2		ourse offered ear/period 2019		2019/Second semester		
Day/period	y/period Mon.2 Class		ss style	Lecture				Language Japanese			
[Outline and	Purpose of t	he C	ourse]								
In quotInorgan	ic Chemistry Io	not fe	ollowing for	ur topic	s wi	ll be ext	olaine	ed·	1) Acids an	d bases of inorganic	

compounds 2) Oxidation and reduction 3) Concept of group theory, which is necessary for the understanding of molecular structures 4) Fundamentals of d-block coordination compounds

[Course Goals]

Acids and bases, oxidation and reduction, a group theory, and coordination compounds will be understood for Inorganic chemistry II at 3rd grade and Electrochemistry at 4th grade.

[Course Schedule and Contents]

Guidance,2times,Guidance on how this class is operated, and how to use computing facility for this class. Basic knowledge on the role of IDS in network security and how machine learning can help the intrusion letectior

Intrusion Detection by Signature-Based IDS.5times.Learn the mechanism of intrusion detection by signaturebased IDS by studying open source signature-based IDS and attacks, such as correspondence between alarms issued from IDS and communications, and adding signatures to detect attacks.

Intrusion Detection by Machine Learning,7times,Learn the method of classifying normal and malicious traffic by machine learning algorithms and public dataset for benchmarking intrusion detection performance Presentation, Itime, Based on the exercise, students presents their methods of intrusion detection using machine learning, and discuss it with other students and instructors.

[Class requirement]

Based on the understanding of quotFundamental Inorganic Chemistryquot, lectures will be done.

_____Continue to 票機化学Ⅰ【工業基礎化学)】[工代2・工化4](2)

無機化学I(工業基礎化学)[工化2・工化4](2) [Method, Point of view, and Attainment levels of Evaluation] Grading is based on the examination held at the end of the semester. The attendance rate and the reports submitted during the course may be counted in evaluation. [Textbook] Inorganic Chemistry (6th edition) M.Weller, T.Overton, J.Rourke, F.Armstrong(2014) ISBN 9780199641826 isbn{}{9780199641826} [Reference books, etc.] (Reference books) applemental explanation will be delivered at the first class. [Regarding studies out of class (preparation and review)] (Others (office hour, etc.)) Before the class, each topic should be prepared. At every class, quizes will be given and the answers for them should be submitted at the next class *Please visit KULASIS to find out about office hours.

Institute for Integrated Radiation and Nuclear Scier Associate Professor, OKI YUUICHI departm Graduate School of Global Environmental Studie <English> Analytical Chemistry I (Fundamental Chemistry Job title.Name Professor, ABE TAKESHI Graduate School of Engineering Associate Professor, NISHI NAOYA Graduate School of Engineering Associate Professor, KOBAYASHI YOUJI Course offered year/period Target year 2nd year students or above Number of credits 2 2019/Second semester Language Japanese Day/period Tue.2 Class style Lecture [Outline and Purpose of the Course] The solution equilibria that are important not only for introductory analytical chemistry but also for the fundamentals of chemistry, in general, such as acid-base equilibrium, complex formation, precipitation, and oxidation-reduction equilibrium, are the subjects of this course. [Course Goals] Not only the understanding of the basics of solution equilibria and the capability of solving related problems, but the appreciation of the relationship of the solution equilibria with other disciplines of chemistry and science, in general, will be targeted. [Course Schedule and Contents] Intriduction to chemical equilibrium,2tin Acid-base equilibrium,5times, Precipitation equilibrium, 1 time Complexation equilibrium,2times Oxidation-recduction equilibrium,4times Evaluation, 1 time, [Class requirement] None [Method, Point of view, and Attainment levels of Evaluation] Grading is based on the examination held at the end of the semester. The attendance rate and the reports submitted during the course may be counted in evaluation.

分析化学 I(工業基礎化学)[工化1・工化3](2)

[Textbook]

_____Continue to 分析化学 I(工業基礎化学) [工化1 · 工化3] (2)

Daniel C. Harris, Quantitative Chemical Analysis, 9th ed., Freeman (2016) isbn{}{9781464135385}

[Reference books, etc.]

(Reference books)

[Regarding studies out of class (preparation and review)]

(Others (office hour, etc.))

*Please visit KULASIS to find out about office hours

Graduate School of Engineering Professor,SAKKA TETSUO Institute of Advanced Energy Professor.NOHIRA TOSHIYUKI

Numbering	g co	ode										
Course title <english></english>	分析化学 I (工業基礎化学) [工化2・工化4 Analytical Chemistry I (Fundamental Chemistry an End year students or above Number of cre						iliated partment b title,Na		Graduate School of Engineering Professor, SAKKA TETSUO Institute of Advanced Energy Professor, NOHIRA TOSHIYUKI Institute for Integratel Radiation and Nucleus 8 Associate Professor, ABL TAKESHI Professor, ABE TAKESHI Graduate School of Engineering Associate Professor, NISHI NAOY Graduate School of Engineering			
Target ye	ar	2nd year students	or above	Number	of cred	lits	2		urs	e offered eriod	2019/Second semester	
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Intrusion Detection by Signature-Based IDS,5times,Learn the mechanism of intrusion detection by signature-Intrusion Detection by Signature-Based IDS, Stimes, Learn the mechanism of intrusion detection by signature-based IDS by studying open source signature-based IDS and attacks, such as correspondence between alarms issued from IDS and communications, and adding signatures to detect attacks. Intrusion Detection by Machine Learning, Times, Learn the method of classifying normal and malicious traffic by machine learning algorithms and public dataset for benchmarking intrusion detection performance. Presentation, Itime, Based on the exercise, students presents their methods of intrusion detection using machine learning, and discuss it with other students and instructors.

[Class requirement] None

Continue to 分析化学 I (工業基礎化学) [工化2 · 工化4] (2)

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Target ye	ar	2nd year students	or above	Number	of cred	lits	2			e offered eriod	2019/Second semester			
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[Textbook]	
[Reference books, etc.]	
(Reference books)	
[Regarding studies out of class (preparation and review)]	
(Others (office hour, etc.))	
Please visit KULASIS to find out about office hours.	

物理化学II(工業基礎化学)[工化1・工化3](2) -----[Regarding studies out of class (preparation and review)] (Others (office hour, etc.)) *Please visit KULASIS to find out about office hours.

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化学Ⅱ(工業基礎化学)[工化2・工化4](2)	
Regarding studies out of class (preparation and re	eview)]
Others (office hour, etc.)) Please visit KULASIS to find out about office hours.	
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Target year	3rd year students	or above Number	of credits	2	Cours year/p	e offered eriod	2019/First sen
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elimination are	involved in th	is part. The third ns such as alkene:	part gives th	ne details	s of the	reactivities	of unsaturated of
[Course Goa	als]						
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Optical resolut	ion (Chapter 14	4)		-			
Nucleophilic S	ubstitution 3tir	nee Mechaniem					
			SNI and SN	2 reaction	ons; Le	aving group	; Nucleophiles;
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有機化学II	(工業基礎化学)	[工化1・	工化3] (2)

[Textbook]

Organic Chemistry (Second Edition; Clayden, Greeves, Warren; Oxford University Press: 2012) isbn{}{ 9780199270293}

[Reference books, etc.]

(Reference books)

[Regarding studies out of class (preparation and review)]

(Others (office hour, etc.)) *Please visit KULASIS to find out about office hours.

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f標化学1(工業基礎化学)[工化2・工化4](2) [Regarding studies out of class (preparation and review)] (Others (office hour, etc.)) ^aPlease visit KULASIS to find out about office hours.

* Numbering code Graduate School of Global Environmental Studie Professor, ABE TAKESHI Graduate School of Engineering Affiliated 無機化学II(工業基礎化学) Associate Professor MATSUI TOSHIAKI Course title departmen Job title.Na Graduate School of Engineering Associate Professor,MIKI KOUJI Inorganic Chemistry II (Fundamental Chemistry) <English> Graduate School of Engineering ogram-Specific Senior Lecturer, TAKATSU HIROSHI Course offered Target year Brd year students or above Number of credits 2019/First semester riod /ear/n Day/period Mon.2 Class style Lecture Language Japanese [Outline and Purpose of the Course] Inorganic Chemistry II is an advanced course after learning Basic Inorganic Chemistry and Inorganic Chemistry I. Structures, electronic spectra and reaction mechanism in coordination chemistry of metal complexes and organometallic compounds are lectured. [Course Goals] Understanding of the basis of steric structure, electronic structure, electronic spectra and reaction mechanism in metal complexes and organometallic compounds [Course Schedule and Contents] 19. d-Metal complexes: electronic structure and spectra,7times, Coordination chemistry: reactions of complexes,4times,
 d-Metal organometallic chemistry,3times, Lecture review, 1 time, [Class requirement] None [Method, Point of view, and Attainment levels of Evaluation] Grades based on attendance and a final exam [Textbook] Shriver and Atkins Inorganic Chemistry [4th edition, Tokyo Kagakudojin] P.W.Atkins T.L.Overton J.P. Rourke M.T.Weller F.A.Armstrong, (translators) K.Tanaka, K.Hirao, S.Kitagawa ibid{}BD02556341} [Reference books, etc.] (Reference books) [Regarding studies out of class (preparation and review)] (Others (office hour, etc.)) d-Metal complexes, Electronic spectra, Steric structure and reaction mechanism of coordination compounds, Organometallic compounds

*Please visit KULASIS to find out about office hours

* Numbering code Graduate School of Global Environmental Studies Professor, ABE TAKESHI Institute for Chemical Research Professor,KAJI HIRONORI Graduate School of Engineering Affiliated Course title 分析化学II(工業基礎化学) Associate Professor, NISHI NAOYA Institute for Integrated Radiation and Nuclear Science <English> Analytical Chemistry II (Fundamental Chemistry Job title,Name Associate Professor, TAKAMIYA KOUICHI Associate Professor, MAXAMITA KOPCHI Graduate School of Engineering Associate Professor, MASAYUKI MORI Institute for Integrated Radiation and Nuclear Science Professor, OTSUKI TSUTOMU Course offered year/period Target year Brd year students or abo Number of credits 2019/First semester Day/period Tue.2 Class style Lecture Language Japanese [Outline and Purpose of the Course] As an introductory course of instrumental analysis, the lectures on chromatography, spectroscopy, electroanalytical chemistry, and mass spectrometry, will be given, [Course Goals] [Course Schedule and Contents] Chromatography, 3times. Spectroscopy,4times, Electroanalytical Chemistry, 3times, Mass spectroemtry,2times, ,1time, 2times [Class requirement] Jone [Method, Point of view, and Attainment levels of Evaluation] Grading will be mainly based on the score of the examination at the end of the semester. Attendance rate and he reports submitted may also be considered in evaluation. [Textbook] Daniel C. Harris, Quantitative Chemical Analysis (W. H. Freeman, 8th-ed., 2010) isbn{}{9781429239899} [Reference books, etc.] (Reference books) _ _ _ _ _ _ _ _ _ Continue to 分析化学II(工業基礎化学)(2)

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分析化学Ⅱ(工業基礎化学)(2)	Numbering code
Regarding studies out of class (preparation and review)]	Course title 生化学I(I業基礎化学) Affiliated department, Job title,Name Graduate School of Engineering Professor,MORI YASUO Graduate School of Engineering Professor,MORI YASUO Graduate School of Engineering School of Engineerin
(Others (office hour, etc.))	Associate Professor,HARA YUUJ
Please visit KULASIS to find out about office hours.	Graduate School of Engineering Professor,HAMACHI ITARU Graduate School of Engineering Associate Professor,MASAYUKI M
	Target year Brd year students or above Number of credits 2 Course offered year/period 2019/First semester
	Day/period Tue.1 Class style Lecture Language Japanese
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	[Course Schedule and Contents]
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Course title <english> ガリーンケミス Introduction to Gr</english>		d	Affiliated lepartment lob title,Nat	me Pro	Agency for Health, Safety and Environment Professor, HASHIMOTO SATOSHI Graduate School of Engineering Professor, EGUCHI KOUICHI Graduate School of Engineering Professor, OGOSHI TOMOKI			
Target year 3rd year students of	r above Number (of credit:	s 2		ourse offered ear/period 2019/First semester			
Day/period Thu.1	Class style	Lecture			Language	Japanese		
[Outline and Purpose of t	he Course]							
[Course Goals]								
[Course Schedule and Co	ontents]	_	_					
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,5times, .5times.								
.4times.								
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, runne,								
[Class requirement]								
None								
[Method, Point of view, an	nd Attainment	levels of	Evaluat	ion]				
[Textbook]								
[Reference books, etc.]								
(Reference books)								
[Regarding studies out of	class (prepara	ation and	d review)]				
(Others (office hour, etc.								
*Please visit KULASIS to find	l out about office	hours.						

生化学I(工業基礎化学)(2) [Method, Point of view, and Attainment levels of Evaluation] [Textbook] [Reference books, etc.] (Reference books) [Regarding studies out of class (preparation and review)] (Others (office hour, etc.)) *Please visit KULASIS to find out about office hours.

	code			filiated			
		↓I(工業基礎化 Chemistry I (Fundamental	(字) de	partment	' D C		ol of Engineering SHI TOMOKI
Target yea	r 3rd year students	or above Number	of credits	2	Course off year/period		2019/First semester
Day/period	Thu.2	Class style	Lecture		Lan	guage	Japanese
Outline an	d Purpose of	the Course]					
[Course Go	als]						
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Numbering code											
Course title <english></english>							filiated partment b title,Na	, me	Graduate School of Engineering Professor, KONDOU TERUYUKI Graduate School of Engineering Associate Professor, OOMURA TOSHIMIC Graduate School of Engineering Associate Professor, KIMURA YUU		
Target ye	ar	3rd year students of	or above	Number	of cred	lits	2		urse offered ar/period	2019/Second semester	
Day/perio	od 7	Tue.2	Cla	iss style	Lectur	e			Language	Japanese	
[Outline a	nd	Purpose of t	he C	ourse]							

The lecture is given on Organic Chemistry which is indispensable to a researcher and an engineer. After the Organic Chemistry I (2nd year, 2nd term) and the Organic Chemistry II (3rd year, 1st term), the lecture is given on the chapters 22 - 26 of the same textbook, which covers characteristic reactions of electron-deficient alkenes and aromatic compounds, protection and deprotection of functional groups, and chemistry of carbonyl compounds including various reactivity of enolates.

[Course Goals]

Comprehensive understanding of reactions of aromatic compounds, reactivities of functional groups, and chemistry of carbonyl compounds including alkylation of enolates, the aldol reaction, and other condensation reactions is a goal of this course. By combining ideas learned in the Organic Chemistry I and the Organic Chemistry II, high-level knowledge of organic chemistry must be acquired which is indispensable for a accomplished researcher and engineer.

[Course Schedule and Contents]

Conjugate addition and nucleophilic aromatic substitution, 3times, Conjugate addition reactions, conjugate substitution reactions, nucleophilic epoxidation, electrophilic aromatic substitution, addition-elimination mechanism, diazonium compounds, reactions via benzyne intermediate (Chapter 22)

Chemoselectivity and protecting groups,3times,Reducing agents, reduction of carbonyl groups, catalytic hydrogenation, removal of functional groups, dissolving metal reductions, selectivity in oxidation reactions, reactivities of functional groups, protecting groups (Chapter 23) Regioselectivity,2times,Regioselectivity in electrophilic aromatic substitution reactions, electrophilic attack

Regioselectivity, Zitmes, Regioselectivity in electrophilic aromatic substitution reactions, electrophilic attack on alkenes, regioselectivity in radical reactions, nucleophilic attack on allylic compounds, electrophilic attack on conjugated dienes, direct addition vs. conjugate addition (Chapter 24)

Alkylation of enolates, 3times, Alkylation of nitriles and nitroalkanes, electrophiles for alkylation, alkylation of lithium enolates, alkylation using enolate equivalents, alkylation of beta-dicarbonyl compounds, regioselectivity in alkylation of ketones (Chapter 25) Reactions of enolates with carbonyl compounds: the aldol and Claisen reactions, 3times, The aldol reaction,

Reactions of enolates with carbonyl compounds: the aldol and Claisen reactions,3times,The aldol reaction, cross aldol condensation, aldol reactions using enolates and their equivalents, intramolecular aldol reaction, acylation of enolates, Claisen condensation, cross Claisen condensation, intramolecular cross Claisen condensation (Chapter 26)

,1time, .1time.

有機化学Ⅲ(工業基礎化学)[工化1・工化3](2)

[Class requirement]

Basic Organic Chemistry A, Basic Organic Chemistry B, Organic Chemistry I(Fundamental Chemistry), Organic Chemistry II(Fundamental Chemistry)

[Method, Point of view, and Attainment levels of Evaluation]

The grade is given based on the final examination. Attendance and reports during the class could be considered.

[Textbook]

Organic Chemistry Second Edition (J. Clayden, N. Greeves, S. Warren, Oxford University Press, 2012) isbn{}{9780199270293}

[Reference books, etc.]

(Reference books) マクマリー 有機化学 - 生体反応へのアプローチ(マクマリー著;柴崎正勝,岩澤伸治,大和田智 彦,増野匡彦 監訳;東京化学同人, 2009) isbn{} {9784807906918}

[Regarding studies out of class (preparation and review)]

(Others (office hour, etc.))

Two classes are lectured at the same time.

*Please visit KULASIS to find out about office hours

 Numbering code
 Affiliated department, so of the course stille
 Graduate School of Engineering Professor,KONDOU TERUYUKI Graduate School of Engineering Associate Professor,OOMURA TOSHIMICHI

 Course title
 Add year students or above
 Number of credits
 2
 Course offered year/period
 2019/Second semester

 Day/period
 Tue.2
 Class style
 Lecture
 Language
 Japanese

 [Outline and Purpose of the Course]
 Course of the Course]
 Course offered year/period
 Japanese

The lecture is given on Organic Chemistry which is indispensable to a researcher and an engineer. After the Organic Chemistry I (2nd year, 2nd term) and the Organic Chemistry II (3rd year, 1st term), the lecture is given on the chapters 22 - 26 of the same textbook, which covers characteristic reactions of electron-deficient alkenes and aromatic compounds, protection and deprotection of functional groups, and chemistry of carbonyl compounds including various reactivity of enolates.

[Course Goals]

Comprehensive understanding of reactions of aromatic compounds, reactivities of functional groups, and chemistry of carbonyl compounds including alkylation of enolates, the aldol reaction, and other condensation reactions is a goal of this course. By combining ideas learned in the Organic Chemistry I and the Organic Chemistry II, high-level knowledge of organic chemistry must be acquired which is indispensable for a accomplished researcher and engineer.

[Course Schedule and Contents]

Guidance,2times,Guidance on how this class is operated, and how to use computing facility for this class.\\ Basic knowledge on the role of IDS in network security and how machine learning can help the intrusion detection.

Intrusion Detection by Signature-Based IDS,5times,Learn the mechanism of intrusion detection by signaturebased IDS by studying open source signature-based IDS and attacks, such as correspondence between alarms issued from IDS and communications, and adding signatures to detect attacks.

Intrusion Detection by Machine Learning, 7times, Learn the method of classifying normal and malicious traffic by machine learning algorithms and public dataset for benchmarking intrusion detection performance. Presentation, Itime, Based on the exercise, students presents their methods of intrusion detection using machine learning, and discuss it with other students and instructors.

[Class requirement]

Basic Organic Chemistry A, Basic Organic Chemistry B, Organic Chemistry I(Fundamental Chemistry), Organic Chemistry II(Fundamental Chemistry)

[Method, Point of view, and Attainment levels of Evaluation]

The grade is given based on the final examination. Attendance and reports during the class could be considered.

Continue to 有機化学III (工業基礎化学) [工化1・工化3](2)

Continue to 有機化学III (工業基礎化学) [工化2 · 工化4] (2)

有機化学Ⅲ(工業基礎化学) [工化2・工化4] (2)	
[Textbook]	
Organic Chemistry Second Edition (J. Clayden, N. Greeves, S. Warren, Oxford University F }{9780199270293}	ress, 2012) isbn{
[Reference books, etc.]	
(Reference books) マクマリー 有機化学 - 生体反応へのアブローチ(マクマリー著;柴崎正勝,岩澤作 彦,増野匡彦 監訳;東京化学同人, 2009) isbn{}{9784807906918}	申治 , 大和田智
[Regarding studies out of class (preparation and review)]	
(Others (office hour, etc.))	
Two classes are lectured at the same time.	
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*Please visit KULASIS to find out about office hours.	

Numbering	code										, , , , , , , , , , , , , , , , , , , ,
		III (工業基 Chemistry I			· _1[23]	Affiliated departmer Job title,N	ame	Ass Gra Asso Gra Sen	sociate Profe aduate Schoo ociate Professo aduate Schoo ior Lecturer,	ol of Engineering essor,SUGASE KENJI ol of Engineering r,UMEYAMA TOMOKAZI ol of Engineering HIGASHIGUCHI KENJ	
Target yea	ar 3rd y	ear students o	r above	Numbe	of credit	s 2	yea	urse ar/pe	e offered eriod	2019/Second semester	
Day/perio	d Tue.	l	Clas	s style	Lecture				Language	Japanese	1
[Outline ar	nd Pur	oose of t	he Co	ourse]				_			1
										tra, Electronic ecular Interactions	1
[Course G	oals]										1 ľ
The goal of t	his cour	se is to un	dersta	nd basic	concept of	spectrosc	opy a	and	statistical th	ermodynamics.	7
[Course So	chedul	e and Co	nten	s]							1 h
Electronic tra Magnetic res Statistical the Lecture revie	onance, ermodyr	3times namics, 4t		iistry, 2tii	nes						1
[Class req	uireme	nt]									
The followin Physical Che Physical Che Physical Che	misry: l mistry l	Fundamen			ses						
[Method, P	oint of	i view, ar	nd Att	ainmen	t levels of	f Evalua	tion	1			1 1
Grades will b									ss attendanc	e.	1
[Textbook]			_	_					_		
P. W. Atkins	Phys	ical Chen	nistry,	10th editi	on』(Ox	ford Univ	versit	y Pr	ess)		
[Reference											
(Referen W. J. Moore			istry, 4	4th editio	n』(Pren	tice-Hall)				
[Regarding	g studi	es out of	clas	s (prepa	ration an	d reviev	v)]				1
The basic kn before the cla		e of quanti	ım me	chanics i	s prerequis	ite for thi	s clas	ss, so	o we recom	mend to review it	
(Others (c		-									
Two parallel	classes	will be he	ld bas	ed on the	class assig	nment.	_				

*Please visit KULASIS to find out about office hours.

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Numbering	g c	ode									
Course title <english></english>	()						iliated partment b title,Na		Pro Gra Pro Gra Ass Ins	ofessor,EGU aduate Scho ofessor,KAC aduate Scho sociate Profe titute for Ch	ol of Engineering ICHI KOUICHI ol of Engineering BYAMA HIROSHI ol of Energy Science sssor, TAKAI SHIGEOM temical Research UOCHI NORIKAZU
Target ye	ar	3rd year students of	or above	Number	of cred	lits	2			e offered eriod	2019/Second semester
Day/perio	bd	Fri.1	Cla	ss style	Lectur	e				Language	Japanese
[Outline a	nd	Purpose of t	he C	ourse]							
This class de properties	eal	s with the topic	s relat	ed to inorga	anic soli	ds,	such as	synt	hesi	is methods,	structures, and
[Course G	905	ls]									
structure, cr	yst		diffra	ction techni							ic solids, crystals non-stoichiometry,

[Course Schedule and Contents]

Synthesis method, 2 times, Solid state reaction, gas phase methods, liquid phase methods, intercalation, electrochemical methods, single crystal growth, and hydrothermal methods will be lectured. Characterization of solids, 2times, The characterization of solids will be lectured, such as optical microscope, electron microscope, IR spectroscopy, Raman spectroscopy, NMR, XAFS, and thermal analysis. Crystal Structure, 2times, Symmetry in crystals will be lectured from the point view of the crystal structures. Crystallography and diffraction techniques,2times,Crystallography and x-ray diffraction methods will be lectured.

Phase diagrams,2times,Phase diagrams including actual chemical compounds and their interpretations will be ectured.

Crystal defects, non-stoichiometry, solid solutions, 2times, Solid solution, several types of the defects in solids will be lectured.

Electrical properties, 2times, Metallic conductivity, superconductivity, semiconductivity, and ionic conductivity will be lectured. Term-end examination, 1time, Understanding of this class will be examined.

[Class requirement]

None

[Method, Point of view, and Attainment levels of Evaluation] Grading will be determined by a term-end examination

[Textbook] Solid State Chemistry and its Applications (2nd Edition, Wiley), A. R. West isbn{}{9781119942948} The following textbooks are also allowed. ollowing textbooks are also anowed. Continue to 無機化学Ⅲ(工業基礎化学)(2)

無機化学Ⅲ	(工業基礎化学)	(2)

Solid State Chemistry (Second Edition), A.R.West, John Wiley ampSons (1999) isbn{}{ 719875673 スト固体化学入門(講談社) isbn{}{4061533711}

erence books, etc.]

ference books

arding studies out of class (preparation and review)]

ers (office hour, etc.))

work is to read the textbook before the class and to solve the problem.

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Numbering	g co	de										
Course title <english></english>					業基礎化的 II (Fundamental)	de	Affiliated department, Job title,Name			ofessor, WAT titute for Ch ofessor, KAJ titute for Ch ociate Profes titute for Ch sistant Profes titute for Ch	emical Research TANABE HIROSHI emical Research I HIRONORI emical Research sor,MATSUMIYA YUMI emical Research sor,SUZUKI KATSUAKI sor,SUZUKI KATSUAKI	
Target ye	ear	3rd ye	ear students o	or above	Number	of cred	lits	2			e offered eriod	2019/Second semester
Day/perio	bd	Wed.	2	Cla	ss style	Lectur	e				Language	Japanese
[Outline a	nd	Purp	ose of t	he C	ourse]							
viscoelastici	ity)	of pol	lymers re	sult fr	om the thre	ad-like	prin	nary stru	ictur	e o	f polymer m	stic properties (such as tolecules. Focusing on in melts, and in solids.

[Course Goals] To understand molecular origin(s) of the characteristic structures, dynamics, and properties of polymers.

[Course Schedule and Contents]

Conformation of Polymer Chain, 2times, The conformation distribution of flexible polymers and the

relationship between their average size and molecular weight are explained. Solution Properties, 3times, The thermodynamic behavior of polymer solutions, such as the osmotic pressure and phase separation, is explained on the basis of the Flory-Huggins theory. For this purpose, molecular expressions are derived for the mixing entropy, mixing enthalpy, and chemical potential. In addition, a brief introduction is given for methods of molecular weight determination on the basis of the solution properties. Structure in Solid State, Zimes, Various morphology of crystalline polymers, i.e., single crystal, spherulite, lamellar crystalline, and extended chain crystal, are introduced and basic crystallization processes giving this variety of morphology are explained. In addition, methods of analysis of these crystalline structures are intriduced and the results of the analysis are explained.

intriduced and the results of the analysis are explained. Glass Transition, Itime, The glass transition phenomenon is explained in relation to the thermal motion of polymer chains. Changes of the thermal and mechanical properties on this transition are explained are related to the motion of the polymer chains.

Rubber Elasticity,2times,From a molecular point of view, the conformation distribution of flexible polymer chains above the glass transition point is related to the rubber elasticity. The molecular expression is derived for the stress and modulus of rubbers.

Polymer Dynamics,4times,The viscoelastic behavior of flexible polymer melts is related to the large scale motion of the polymer chains. In particular, the entanglement effect due to the uncrossability of the chains is explained from a molecular point of view, and some basic models are introduced. In addition, for polymers having type-A dipoles parallel along the chain backbone, a relationship between viscoelastic and dielectric properties is explained. Summary,1time,Essence of the whole lecture and a relationship among all items in the lecture are

summarized, thereby improving the understanding of the attending students in particular for the items not well addressed in the the exams.

Continue to 高分子化学預論II(工業基礎化学)(2)

Class requireme	nt]
	his class are desired to learn the basic part of polymer science at the class Polymer Chemistry I (Fundamental Chemistry)quot.
	f view, and Attainment levels of Evaluation]
udged on the basis of	of home-work reports and the final exam.
[Textbook]	
rinted documents a	re distributed in the class.
Reference books	s, etc.]
	bks) ku Joron (a book published from Kagaku Dojin) isbn{}{4759802584} u to Bussei (a book published from Koudansha) ISBN978-4-06-154380-5 isbn{}{
Regarding studi	es out of class (preparation and review)]
(Others (office h Please visit KULAS	our, etc.)) SIS to find out about office hours.

		工業基礎化学) or Chemistry (Fundamenta	dep	liated artment, title,Name	Graduate Scho Professor,SEK	ol of Engineering I SYUHEI
_		s or above Number		Co	urse offered	
Target year				2 yea	ar/period	2019/First seme
Day/period		Class style	Lecture		Language	Japanese
[Outline and	I Purpose of	the Course]				
[Course Goa	als]					
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None [Method, Po [Textbook] [Reference	books, etc.]	and Attainment	t levels of E	valuation]	
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None [Method, Po [Textbook] [Reference	books, etc.]	and Attainmen	t levels of E	valuation	1	
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None [Method, Po [Textbook] [Reference (Reference	books, etc.] e books)	and Attainment]	
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[Method, Po [Textbook] [Reference (Reference [Regarding (Others (off	books, etc.] e books) studies out	of class (prepa c.))	ration and r]	

Numbering	g co	de						
Course title <english></english>			学(工業基礎化 Ilytical Science (Fundament		Affiliated departmen Job title,Na	", T	Graduate Scho Professor,SAK	ol of Engineering KA TETSUO
Target ye	ar	4th year students	or above Number	of crec	lits 2		rse offered /period	2019/First semester
Day/perio	d	Wed.2	Class style	Lectur	e		Language	Japanese
-		Purpose of t mental metho	ds in analytical c	hemistry	y will be de	livered	d.	
[Course G	ioal	s]						
[Course S	che	edule and Co	ontents]					
[Class req	Juir	ement]	s of pH meters,66					
			nd Attainment				uation.	
[Textbook]							
None								
[Referenc	e b	ooks, etc.]						
(Referent None	nce	books)						
[Regardin	g si	tudies out o	f class (prepar	ation a	nd review)]		
(Others (offi	ce hour, etc	.))					
*Please visit	KU	JLASIS to fin	d out about office	e hours.				

Numbering	g code												
Course title <english></english>		ematical Method in Chemistry II					Affiliated department, Job title,Name			Fukui Institute for Pundamental Chemistry Professor, SATOU TOORU Graduate School of Engineering Assistant Professor, NAKANO HIROSHI Institute for Chemical Research Professor, MIZUOCHI NORIKAZU			
Target ye	ear Brd	year students o	or above	Number	of cred	credits 2 Course offered year/period 2019/First semes							
Day/perio				ss style	Lecture	•				Language	Japanese		
[Outline a	nd Pu	rpose of t	he C	ourse]									
[Course G	ioals]												
[Course S	chedu	le and Co	onten	ts]									
,2times,													
,1time,													
,3times,													
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,4times, .3times.													
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, runic,													
[Class rec	quirem	ent]											
None													
[Method,]	Point o	of view. a	nd At	tainment	levels	of E	valua	tion	1				
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[Textbook	(]												
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(Others (office	hour, etc.))										
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Numbering o	ode										
Course title 有機化学 (工業基礎化学) Affiliated department, Job title,Name Graduate School of Engineering Associate Professor,MIKI KOUJI Graduate School of Engineering Associate Professor,MIKI KOUJI											
Target year	4th y	ear students of	or above	Number	of cred	lits	2		rse offe r/period		2019/First semester
Day/period	yay/period Fri.2 Class style Lecture Language Japanese										
[Outline and Purpose of the Course]											
Organic transformations including stereoselective and stereospecific reactions, pericyclic reactions, and radical reactions, are reliable methods to construct complicated frameworks in highly-functionalized medicine and materials. In the class, stereoselective and stereospecific reactions of cyclic and non-cyclic compounds as well as non-ionic transformations, such as pericyclic reactions, rearrangement, and radical reactions, are explained.											
[Course Go	als]										
-To understand -To understand											mpounds. , and radical reactions.
[Course Sch	edul	e and Co	onter	nts]							
-Pericyclic rea -Pericyclic rea -Rearrangemen -Fragmentation -Radical reacti -Final examina	ctions: nts, 2 t n, 1 tin ons, 3 ition, 1	: sigmatro times ne times 1 time			clic rea	ctio	ns, 2 tin	nes			
[Class requi											
It is desirable t this class.	or stu	dents to ta	ike cl	asses of Org	ganic Cl	nemi	istry I, I	I, & I	III (Fund	ament	al Chemistry) before
[Method, Po	int of	view. a	nd A	ttainment	levels	of E	Evaluat	tion1			
										attend	dance and short reports
[Textbook]											
Nick Greeves, Stuart Warren, Peter Wothers, Jonathan Clayden [@] Organic Chemistry 2nd Edition _d (Oxford University Press) ISBN:978-0-199-27029-3											
[Reference	oook	s, etc.]	_								
(Referenc											
(Reference books) Continue to 有機化学 (工業基礎化学)(2)											

有機化学 (工業基礎化学)(2)

*

[Regarding studies out of class (preparation and review)]

Before the class, read the textbook and check the contents. When you have a question, ask via e-mail (kojimiki@scl.kyoto-u.ac.jp or anagaki@sbchem.kyoto-u.ac.jp).

(Others (office hour, etc.)) Better to bring the textbook.

											*
Numbering	g cod	e									
Course title <english></english>					(工業基礎 y I(Fundamental (dep	'iliated partment b title,Na	t, Pr Fa		
Target ye	ar 3	3rd year	r students o	ır above	Number o	of cred	its	7	Cours	se offered period	2019/First semester
							Japanese				
[Outline and Purpose of the Course]											
		-					_				
[Course G	ioals	4									
[Course S	ched	lule	and Co	onten	ts]						
18times, 18times, 18times, 11times, 7times,											
[Class req	juirer	ment	t]								
None											
Method,	Point	t of v	/iew, ar	nd At	tainment	levels	of E	valuat	ion]		
_											
[Textbook	۲]										
[Referenc	e bor	oks,	etc.]								
(Referei			,								
[Regardin	g stu	udies	s out of	clas	ss (prepara	ation a	nd	review)]		
(Others (office	e ho	ur, etc.))							
Please visit	t KUL	ASIS	S to find	l out a	about office	hours.					

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Numbering co	ode										
				工業基礎(II(Fundamental			ated rtment itle,Na	,		ANA ngir	
Target year	3rd ye	year students or above Number of credits 7 Course offere year/period							I	2019/Second semester	
Day/period	ay/period Tec.345.Wed345.Thu.345 Class style Experiment Language							je .	Japanese		
[Outline and	Purp	ose of t	he Co	ourse]							
[Course Goa	ls]										
[Course Sche	edule	and Co	ontent	s]							
,18times, ,18times, ,11times, ,7times,											
[Class requir	emer	ntl			_	_					
None											
[Method, Poi	nt of	view, ar	nd Att	ainment	levels o	of Ev	aluat	ion]			
[Textbook]											
[Reference b	ooks	, etc.]									
(Reference	bool	ks)									
[Regarding s	tudie	es out of	class	s (prepara	ation ar	nd re	view)]			
(Others (offi	ice ho	our, etc.))								
*Please visit KU	JLAS	IS to find	l out al	bout office	hours.						

										*
Numbering	code									
					Affiliated department, Job title,Name			Graduate School of Engineering Professor,ATOMI HARUYUKI Graduate School of Engineering Professor,MORI YASUO Graduate School of Engineering Professor,UMEDA MASATO Graduate School of Engineering Senior Lecturer,KANAI TAMOTSUU Graduate School of Engineering Professor,HARA YUUJI Graduate School of Engineering Professor,HARA YUUJI Graduate School of Engineering Associate Professor,KIYONAKA SHIGEI Graduate School of Engineering Associate Professor,KIYONAKA SHIGEI Graduate School of Engineering		
Target yea	ar 2nd y	year students o	or above Number	of cred	lits	2			e offered eriod	2019/Second semester
Day/perio			Class style	Lectur	e				Language	Japanese
[Outline ar	nd Pur	pose of t	he Course]							
[Course G	oals]									
[Course Se	chedul	e and Co	ontents]							
,2times,										
,2times, .3times.										
,3times,										
,3times,										
,1time,										
,1time,							_			
[Class req	uireme	ent]								
None										
[Method, F	oint of	f view, ar	nd Attainment	levels	of E	Evaluat	ion]		
[Textbook]						_				
							-	- Co	ntinue to 生命化	学基礎(工業基礎化学)(2)

主命化学基礎(工業基礎化学) (2)	
上叩儿子蓥碇(上未蓥碇儿子)(4)	
	1
[Reference books, etc.]	
(Reference books)	
[Regarding studies out of class (preparation and review)]	
(Others (office hour, etc.))	
Please visit KULASIS to find out about office hours.	

							*
Numbering	code						
	科学英語 (工業 ccientific English			Affiliated departme Job title,I		Professor,MOF Graduate Scho Professor,SHIF Graduate Scho Associate Profe	ol of Engineering RI YASUO ol of Engineering RAKAWA MASAHIRO ol of Engineering essor,MIKI KOUJI er,BOLSTAD, Francesco
Target yea	r 3rd year students	ourse offered ar/period	2019/Second semester				
Day/period	Mon.3	Class style	Lecture	e		Language	English
[Outline an	d Purpose of	the Course]					
		echnological Eng I use in the field					deas in English,
[Course Go	als]						
quotpractical	luot English is g	ionally as scientis ained through un sults, discussion o	derstand	ing the w	ay to		
[Course Sc	hedule and Co	ontents]					
,4times,Techr ,5times,Short	presentations.		_		_		
None	lineinentj						
[Method, P	oint of view, a	nd Attainment	levels	of Evalu	ation	1	
Regular easy	reports.					-	
[Textbook]							
None							
[Reference	books, etc.]						
(Referend N/A	ce books)						
(Related	URLs)						
(N/A)							
[Regarding N/A	studies out o	f class (prepar	ation a	nd revie	w)]		
	ffice hour, etc	1)					
	ording to studen						
	0	1	hours				
"Piease visit I	KULASIS to fin	d out about office	e nours.				

												*	
Numbering	g cod	le											
Course title <english></english>			语(工業 c English	化学)	Affilia depar Job ti				Graduate School of Engineering Professor,MORI YASUO Graduate School of Engineering Professor,SHIRAKAWA MASAHIRO Graduate School of Engineering Associate Professor,MIKI KOUJI				
Target ye	ar	3rd ye	ear students o	or above	Number					urse	e offered eriod	er,BOLSTAD , Francesco 2019/Second semester	
Day/perio	d M	lon.4	4	Cla	ss style	Lecture	e				Language	English	
[Outline a	nd P	Purp	ose of t	he C	ourse]								
especially E	nglis	h foi									press your n	deas in English,	
	lquot	t Eng	glish is g	ained	through un	derstand	ing	the way	tov			ing things in n backgrounds,	
[Course S	che	dule	e and Co	onten	ts]								
detection. Intrusion De based IDS b issued from Intrusion De traffic by ma	etection y studies IDS a etection achin	on by dyin and on by ie lea ne,Ba	y Signatu g open so communi y Machir arning alg ased on th	ure-Ba ource s icatior ne Lea gorithr he exe	sed IDS,5t signature-b ns, and add rning,7time ns and pub rcise, stude	imes,Lea ased ID: ing signa es,Learn lic datas ents pres	arn f S an atur the et fo	the mech ad attack es to det method or bench s their m	hani s, su ect of c imai	sm o uch a attac class rking	of intrusion as correspon- cks. sifying norm g intrusion of	h help the intrusion detection by signature- ndence between alarms nal and malicious detection performance. detection using	
[Class rec	quire	mei	nt]										
None													
[Method, I	Poin	t of	view, a	nd At	tainment	levels	of E	Evaluat	ion]			
Regular eas	y repo	orts.											
[Textbook	(]												
None													
[Referenc	e bo	oks	s, etc.]										
(Referei	nce I	boo	ks)										
						· ·				Co	ntinue to 科学	英語(工業基礎化学)(2)	

科学英語(工業基礎化学)(2) (Related URLs)

(N/A)

[Regarding studies out of class (preparation and review)] N/A

(Others (office hour, etc.)) Available according to students#039 requests.

*Please visit KULASIS to find out about office hours.

		_											
Numbering	g coc	le											
	Sourse title 物理化学 I (化学工学) English> Physical Chemistry I (Chemical Engineerin							nt, Iame	Pro Gra As: Gra	Graduate School of Engineering Professor,MAE KAZUHIRO Graduate School of Engineering Associate Professor,MAKI TAISUKE Graduate School of Engineering Associate Professor, TANA BE KATSUAK I			
Target ye	ar	2nd ye	ar students o	or above	Number	Cou				e offered eriod	2019/Second semester		
Day/perio	d W	Ved.2	2	Cla	ss style	Lectur	e			Language	Japanese		
[Outline a	nd P	Purp	ose of t	he C	ourse]								
Thermodyna level of cher							cal enginee	ering	g. Thi	is class prov	ides an elementaly		
[Course G	oals	5]											
The goal is t	o lea	rn th	e way to	apply	the basics	of therr	nodynaaic	s to	chem	ical process	caluculations.		
[Course S	che	dule	and Co	onten	ts]								
Introduction The First Lo Volumetric I Thermochen The Second Confirmation Balance for G Thermodyna Phase Equili Application Confirmation	w of Propenistry Low n of t Oper unic briut of TI n of t	The erties y,1.5 of T the L n Sys Prop m,1ti herm the L	rmodyna s of Pure times, 'hrmodyr ævel of A tems,2tir erties of me, odynami ævel of A	Fluid namic: Attainn nes, Fluid: cs to 1	s,1.5times, s,2times, ment 1,1t s,2times, Industrial F	ime, Processes		time	es,				
[Class req													
The basic kn	owle	edge	of physic	cal ch	emistry is r	equired.							
[Method, F	Poin	t of	view, aı	nd At	tainment	levels	of Evalua	atio	on]				
The score is	eval	uated	l by repo	rts (ho	omeworks)	and exa	minations						
[Textbook]	_		_					_				
J. M. Smith (McGraw-H							nical Engir	ieeri	ing T	hermodynar	nics, Eighth Edition		

物理化学 I (化学工学)(2)

[Reference books, etc.]

(Reference books)

[Regarding studies out of class (preparation and review)]

For lectures using English textbooks, prepare in advance and understand the outline of the contents. Since we pose homework of 1-3 problems from the end of the chapter every week, please submit the report at the bigining of next lecture.

_____Continue to 物理化学 I〔化学工学〕(2)

(Others (office hour, etc.))

Implement as many exercises as possible according to the progress of the lecture and try to acquire the content of the lecture. Impose tasks every week. Bring a scientific calculator.

	g co	ode							
Course title <english></english>		機化学 I (化 rganic Chemistr			neering)	Affiliated department Job title,Na		Professor,SAK Institute of Ad Professor,NOH Graduate School of Professor,ABE Graduate Schoo Associate Profess Graduate School of Associate School of Associate Professor	vanced Energy IIRA TOSHIYUKI Global Environmental Studie Jol of Engineering sor,MATSUI TOSHIAK Jol Engineering the Professer,HOSOKAWA SABURG Global Environmental Studie ,FUKUTSUKA TOMOKAZ Jol of Engineering
Target ye	ar	2nd year students o	or above	Number	of cred	lits 2		urse offered ar/period	2019/Second semeste
Developerie									
Day/peric				s style	Lectur	2	_	Language	Japanese
[Outline a In quotInors and bases of	nd gani f inc rsta	Purpose of t ic Chemistry I (organic compounding of molec	he Co (Chemi ands 2)	ourse] ical Engine Oxidation	eering)q	uot, followi duction 3) C	lonc	ive topics will b ept of group the	Japanese e explained: 1) Acids ory, which is necessary inds, 5) Corrosion

[Class requirement]

Based on the understanding of quotFundamental Inorganic Chemistryquot, lectures will be done.

[Method, Point of view, and Attainment levels of Evaluation]

Grading is based on the examination held at the end of the semester. The attendance rate and the reports submitted during the course may be counted in evaluation.

Continue to 無機化学I(化学工学)(2)

無機化学I(化学工学)(2) [Textbook] Inorganic Chemistry (4th edition) P. Atkins, T. Overton, J. Rourke, M. Weller, F. Armstrong isbn{}{ 0199264635}

[Reference books, etc.]

(Reference books) Supplemental explanation will be delivered at the first class.

[Regarding studies out of class (preparation and review)]

(Others (office hour, etc.))

*Please visit KULASIS to find out about office hours.

Numbering	g co	ode									
Course title <english></english>		学工学数学 I nematics for Chemical		/	ngineering)	de	filiated partment b title,Na	, me	Ass Gra	ociate Profess aduate Scho	ol of Engineering or,NAGAMINE SHINSUKE ol of Engineering or,TANIGUCHI TAKASHI
Target ye	ar	2nd year students	or above	Number	of cred	lits	2			e offered eriod	2019/Second semester
Day/perio	d	Thu.1	Cla	iss style	Lecture	e				Language	Japanese
[Outline a	nd	Purpose of t	he C	ourse]							
		class is to lear									nical Process

Engineering, Chemical System Engineering, such as ordinary differential equations, Laplace transformation, nethods to solve differential equations by using Laplace transformation, and vector analysis. The style of the class is mainly lecture style.

[Course Goals]

To attain the mathematical knowledge and skill how to solve ordinal differential equations by using Laplace ransformations

[Course Schedule and Contents]

Vector Analysis,7times.We learn the following items; \\ Vector Analysis (including differentiation of vectors) (Integration of vectors) Integral Theorem (Gauss divergence Theorem, Stokes Theorem) Ordinary differential Equation,4times,We learn that various physical phenomena seen in our daily life can be described by ordinary differential equations. \\ As method to solve 1st and 2nd order ordinary differential equation, the following methods will be learned : 1. Method of separation of variables \\ 2. Method of variation of parameters \

Laplace Transformation, 3 times, After learning the historical background and the discovery of Laplace transformation. We learn how to solve ordinal differential equations and integral equations by using Laplace transformation, and also learn applications of Laplace transformation to definite integration. Confirmation of the level of attainment, 1time, Confirmation of the level of attainment (Comments on the term-end Exam

[Class requirement]

Basic knowledge on differentiation, integral, matrix operations

[Method, Point of view, and Attainment levels of Evaluation]

Grade will be evaluated by (i) the examination at the end of semester and (ii) homework during semester.

[Textbook]

戸田 盛和 『ベクトル解析 (理工系の数学入門コース 3)』(岩波書店)ISBN:400007732 布川 昊 『ラプラス変換と常微分方程式』(昭晃堂)ISBN:4785670215

[Reference books, etc.]

(Reference books) (佐藤 總夫 『自然の数理と社会の数理』(日本評論社)ISBN:4535603014 Continue to 化学工学数学I(化学工学)(2)

化学工学数学 I (化学工学)**(2)**

大岩 正芳 『化学者のための数学十講』(化学同人)ISBN:4759800085

[Regarding studies out of class (preparation and review)]

After each class of vector analysis, homework is given to students, and their solution will be shown at the class in two weeks. It is highly recommended that students solve them before the class.

(Others (office hour, etc.)) *Please visit KULASIS to find out about office hours

									*
Numbering	g code								
Course title <english></english>		分離工学 Phase Sepa		Engineerin	~	Affiliated departmen Job title,Na	t, As Gi	sociate Prof aduate Scho	ol of Engineering essor,MAKI TAISUKE ol of Engineering IO NORIAKI
Target ye	ar Brd	year students of	or above	Number	of credi	ts 2		se offered period	2019/First semester
Day/perio	d Thu	.1	Cla	ss style	Lecture			Language	Japanese
[Outline a	nd Pur	pose of t	he C	ourse]					
	which a	aim substa	nce se	paration and	d purifica				osorption, extraction, sic principle and
[Course G	ioals]								
	sfer, an	d equilibri	um, ar	nd they will	master h	ow to use	them in	n quantitative	nderstand the concept e manner. Additionally,
[Course S	chedu	le and Co	onten	ts]					
distillation,4 of distillatio continuous r extraction,3 of distillatio continuous r Feedback cl give advanc and distillati	times, n operate ectifyin imes, n operate ectifyin ass,1tim ed know on.	Method to c tion is expl ag trays tow lethod to cr tion is expl ag trays tow ne, A supple vledge or to	correla lained wer wi orrela lained wer wi ement	ate the gas-l as operatio ill be lecture te the gas-li as operatio ill be lecture ary lecture	iquid equ n for pur ed as the s quid equi n for pur ed as the s or exercis	tilibrium v ification of most simp ilibrium w ification of most simp se class w	vill be l f liquid le mult ill be le f liquid le mult ill be co	ectured, and mixture. Th i-stage conta cetured, and mixture. Th i-stage conta nducted as a	tital contact operation. fundamental principle e design method of cct operation method. fundamental principle e design method of cct operation method. m additional class to fusion, gas absorption
[Class rec	uirem	ent]							
Introduction Engineering		strial Cher	mistry	(Material a	and energ	y balance	s), Fund	lamentals of	Chemical Process
[Method, I	Point o	of view, a	nd At	tainment	levels o	f Evalua	tion]		
Evaluation v in lectures.	vill be r	nade based	l on m	idterm exa	m, routine	e exam at	the end	of semester,	and reports often given
_							c	ontinue to	五体系分離工学 (2)

Textbook]	
	Kogaku,quot K. Hashimoto and F. Ogino (Sangyo Tosho) isbn{} {4782826095} sumu Nyumon,quot H. Tamon (Nikkan Kogyo Shinbun) isbn{}{9784526069697}
Reference books	
(Reference boc uotKagakukikai no	ks) Riron to Keisan,quot S. Kamei (Sangyo Tosho) isbn{}{4782825099}
Regarding studi	es out of class (preparation and review)]
Others (office h	
	basen on the textbook. Exercise problems will be given to students to deepen
Please visit KULAS	SIS to find out about office hours.

Course title <english></english>		里化学II(化: sical Chemistry		/	ineering)	Affiliated departmen Job title,N	t, ame A A	ssistant Profe raduate Scho ssociate Prof	ool of Engineering essor,SUZUKI TET ool of Engineering essor,TANAKA HII
Target ye	ar	3rd year students	or above	Number	of cred	its 2		se offered period	2019/First semest
Day/peric	d	Fri.2	Clas	s style	Lecture	•		Language	Japanese
Based on th	e cor		ical Ch	emistry I,					ration for multi- in the view of quan
[Course G	ioal	s]							
Understand	the p urthe	bhase-separati er, understand							er how to read the p nysical chemistry of
Physical che	emist emist	dule and Co try of multi-co try of molecul e: 1 time	ompone	nt liquids		es: 8 times			
Physical che Physical che Feedback le [Class rec Assume the	emist emist cture juire com	rry of multi-co try of molecu e: 1 time ement] pletion of Phy	ompone les and s ysical C	nt liquids solids: 6 t hemistry	imes I (Chem	ical Engine	eering)		
Physical che Physical che Feedback le [Class rec Assume the [Method,	emist emist cture juire com	try of multi-co try of molecu e: 1 time ement]	ompone les and s ysical C nd Atta	nt liquids solids: 6 t hemistry	imes I (Chem	ical Engine	eering)		
Physical che Physical che Feedback le [Class rec Assume the [Method,	emist emist cture com Poir erm)	rry of multi-co rry of molecu :: 1 time ement] pletion of Phy nt of view, a	ompone les and s ysical C nd Atta	nt liquids solids: 6 t hemistry	imes I (Chem	ical Engine	eering)		
Physical che Physical che Feedback le [Class rec Assume the [Method, Final (end-te [Textbool	emist emist ceture com Poir erm)	rry of multi-co rry of molecu :: 1 time ement] pletion of Phy nt of view, a	ompone les and s ysical C nd Atta etc.	hemistry	imes I (Chem levels o	ical Engino of Evalua	eering)		
Physical che Physical che Feedback le [Class rec Assume the [Method, Final (end-to [Textbool Atkins [#] Pf	emist emist cture com Poir erm)	try of multi-co try of molecu e: 1 time ement] pletion of Physical exam score, of	ompone les and s ysical C nd Atta etc.	hemistry	imes I (Chem levels o	ical Engino of Evalua	eering)		
Physical che Physical che Feedback le [Class rec Assume the [Method, Final (end-to [Textbool Atkins [#] Pf	emist emist cture com Poir erm) :] yysic e bo	rry of multi-co try of molecul e: 1 time ement] pletion of Phy at of view, at exam score, of al Chemistry, pooks, etc.]	ompone les and s ysical C nd Atta etc.	hemistry	imes I (Chem levels o	ical Engino of Evalua	eering)		
Physical che Physical che Feedback le [Class rec Assume the [Method, Final (end-to [Textbool Atkins [#] Pf [Referenc (Referenc [Regardin	emist emist cture com Poir erm) C ysic e bo nce g st	rry of multi-co try of molecules: 1 time ement] pletion of Phy at of view, a exam score, of al Chemistry, poks, etc.] books) tudies out o	mpone ysical C nd Atta a (10t	hemistry hedition,	imes I (Chem levels of Chaps. 4	ical Engino of Evalua 4-10) nd review	vering) tion]		
Physical che Physical che Feedback le [Class rec Assume the [Method, Final (end-to [Textbool Atkins [#] Pf [Referenc (Referenc [Regardin	emist emist cture com Poir erm) C ysic e bo nce g st	rry of multi-co try of molecul :: 1 time sement] pletion of Phy at of view, a exam score, o al Chemistry, poks, etc.] books)	mpone ysical C nd Atta a (10t	hemistry hedition,	imes I (Chem levels of Chaps. 4	ical Engino of Evalua 4-10) nd review	vering) tion]		

Numbering	g code										
Course title <english></english>			Chemi	ical Engine	ering II	dep	iliated partment b title,Na	mo	Asso Gra	ociate Profess iduate Scho	ol of Engineering or,NAGAMINE SHINSUKE ol of Engineering sor,TANIGUCHI TAKASHI
Target ye	ar βrdy	ear students of	r above	Number	of cred	lits	2			e offered eriod	2019/First semester
Day/perio	d Fri.1		Cla	ss style	Lecture	e				Language	Japanese
[Outline a	nd Pur	oose of t	he C	ourse]							
	he chem	ical engin									n students will learn ourier Transformation,
[Course G	ioals]										
Goal of the subjects in t					y mathe	mat	ical kno	owle	dge	that is need	led when students learn
[Course S	chedul	e and Co	onten	its]							
function, \\ Multi-stocha conditional Probability a functions \\ large numbe Fourier Trar Partial Diffe wave \\ Diff Confirmatio	astic vari probabili and Stati (ers \\ nsformat erential E usion eq	able case ity \\ stics,2tim b) Poissor Centra ion,4times equation,3 uation \\ M	(c) es,1-5 distri distri s,3-1. times, Aulti-o	covariance . Various d ibution fund it theorem \ Euler#039s .4. Fundame dimensiona	ultaneou , correla istributi ctions \\ formula entals to l proble	IS di Ition on f No: a \\ 3 o sol m	stributio coeffic unction (c) rmal dis 3-2. Fou ve parti	on fu ient \\ Gaus strib urier al di	ss di utio inte	ion \\ (a) binom istribution f n gral \\ 3-3. ential equat	nerating function \\ 1-4. (b) marginal and inaldistribution functions \\ 1-6. Law of Fourier transformation ions \\ Equation of
[Class red	luireme	nt]									
It is required former seme		dents hav	e alrea	ady had the	lecture	: Ma	athemat	ics f	or C	Chemical Er	ngineering I in the
[Method,	Point of	f view, a	nd At	tainment	levels	of E	Valuat	ion]		
Grading wil necessary.	l be dete	rmined by	a test	t at the end	of serie:	s of	lectures	, an	d rej	ports and sh	ort tests in class, if

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化学工学数学II(2) 「Fextbook] 薩摩順吉 『理工系の数学入門コース 7. 確率・統計』(岩波書店)ISBN:4000077775 阿部寛治 『フーリ工解析と偏微分方程式』(培風館)ISBN:9784563011178 [Reference books, etc.] (Reference books) 薩摩順吉 『岩波基礎物理シリーズ 10.物理の数学』(岩波書店)ISBN:4000079301 [Regarding studies out of class (preparation and review)] After each class of Probability and Statistics, homework is given to students, and their solution will be show at the class in two weeks. It is highly recommended that students solve them before the class. (Others (office hour, etc.)) *Please visit KULASIS to find out about office hours.

								*
Numbering	g code	e						
Course title <english></english>			on Engineering	п	Affiliated departmer Job title,N	nt, ame	sociate Professo raduate Scho rofessor,KAV raduate Scho	ol of Engineering r,NAKAGAWA HIROYUKI ol of Engineering VASE MOTOAKI ol of Engineering r,ASHIDA RIYUUICHI
Target ye	ear 31	rd year students	or above Numbe	er of crea	lits 2		se offered period	2019/First semester
Day/perio	d M	on.2	Class style	Lectur	e		Language	Japanese
-			the Course]					
Kinetic anal described.	ysis a	nd reactor d	esign of heterog	geneous cl	nemical rea	ctions a	and nonideal	flow reactors are
[Course G	ioals]							
[Course S	ched	ule and C	ontents]					
Complicated Macromixin Gas-solid re Solid-cataly	d react g and action st reac	tion rate equi micromixin as and reactor ctions and re	ous reactions,1 ations,1time, g in nonideal fl rs,3.5times, actors,3.5times d-catalyst react	low,3time		nes,		
[Class rec	quirer	nent]						
None								
[Method, I	Point	of view, a	nd Attainmer	nt levels	of Evalua	tion]		
[Textbook	(]							
[Referenc	e boo	oks, etc.]						
(Referei	nce b	ooks)						
[Regardin	g stu	dies out o	f class (prep	aration a	nd review	v)]		
(Others (office	e hour, etc	.))	_				
			d out about offi	ce hours.				

Course title <english></english>		相系分離工学 lid-Phase Sep	é aration Engineer	ng	Affiliated departmen Job title,Na	t, A	Graduate Scho Associate Profess Graduate Scho Professor,SAN	or,WATANAB
Target y	ear	3rd year students	or above Numbe	of cred	its 2		rse offered /period	2019/Secon
Day/perio	bd	Wed.2	Class style	Lecture			Language	Japanese
[Outline a	and	Purpose of	the Course]					
phenomena	, trai	nsport propert	tion opertions us ies, methods to o tion and crystalli	lesign sep	aration ope	eration	ns will be lectu	ired. Expecia
[Course 0	Goa	ls]						
of mass and	l hea	t, (2) cultivat	nderstanding ma ing the ability to (3) developing k	design an	d develop	separa	tion units and	materials use
[Course S	Sche	edule and C	ontontol					
in pores and operation a Humidifica	Ope d at s nd ho tion	rations,4time surface, adsor ow to calculat Operations,1t	s,Adsorption equ ption rate, and so te breakthrough o ime,Humidicatio	forth wil arve in fi on operation	ll be explai xed bed typ on will be l	ned. Ir pe ads ecture	n addition, how orbing column ed as example	w to disign ac n will be lectu of simultaneo
in pores and operation as transport of temperature Drying Ope dyring unit Membrane and process Crystallizat growth will apparatuses Feedback c give advance	Ope d at s nd ho tion f hea e and eratio type Sepa s des s des ion (l be 1 s. Fir lass, cced k	rations,4time surface, adsor ow to calculat Operations,1t t and mass at h how to use h ons,4times,Th will be lectur aration Operations,2ti ectured, follo hally, students 1 time,A supp snowledge or	s,Adsorption equ ption rate, and so the breakthrough of	of forth will surve in fi in operative acc. The s ad kinetics ation com- n the mair processes hism of th nation on ling on the e or exerce	Il be explain xed bed typ on will be l tudents will s of drying distions wi n focus on t will be lect e crystalliz t the popula e course w ise class wi	and extra and ex	n addition, how orbing column ed as example erstand the ide xpertise to sele pertise of the of s separation, p and kinetic an obalance require tested.	w to disign ac n will be lectu of simultanet a of wet-bulb ect and desing dried product ermeability e alysis of the o ed for the des
in pores and operation as Humidifica transport of temperature Drying Ope dyring unit Membrane and process Crystallizat growth will apparatuses Feedback c give advance [Class ref Introduction	Ope d at s nd hd tion Thea e and eratio type Sepa s des s des s des s for type be l be l s. Fin lass, ced k	rations,4time surface, adsor ow to calculat Operations,1t t and mass at how to use h swill be lectur ration Operations,2ti ectured, follo ally, students 1 time,A supp cnowledge or ement] Industrial Che	s,Adsorption equ ption rate, and sg le breakthrough c ime,Humidicati gas-liquid interfa umidity chart. e mechanisms an red, relating oper ions,3times,With ane separation p imes,The mechan wed by the exple rsquo understam lementary lectur	o forth will urve in fi no operati- ice. The s ad kinetics ation con- the main processes isom of the main processes isom of the main processes isom of the nation on ling on the or exerce tainment	Il be explai: xed bed typ on will be l tudents will s of drying distions wi h focus on t will be lect e crystalliz the popula e course w ise class wi level of the	ned. Ir pe adsecture I under and en th prophe gas tured. ation a till be t ill be cours	n addition, how orbing column ed as example erstand the ide xpertise to sele pertise of the of s separation, p and kinetic an obalance require tested.	w to disign ac n will be lect of simultanea a of wet-bulk ect and desin, dried product ermeability e alysis of the o

固相系分離工学(2)

[Method, Point of view, and Attainment levels of Evaluation]

Evaluation will be made based on midterm exam, routine exam at the end of semester, and reports often given in lectures.

[Textbook]

quotGendai Kagaku Kogaku,quot K. Hashimoto and F. Ogino (Sangyo Tosho) isbn{}{4782826095} quotKanso Gijutu Jitsumu Nyumon,quot H. Tamon (Nikkan Kogyo Shinbun) isbn{}{9784526069697}

[Reference books, etc.]

(Reference books) quotKagakukikai no Riron to Keisan,quot S. Kamei (Sangyo Tosho) isbn{}{4782825099}

[Regarding studies out of class (preparation and review)]

(Others (office hour, etc.))

Lecture will be given basen on the textbook. Exercise problems will be given to students to deepen understanding in due course.

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Numbering	g co	de										
Course title <english></english>					学) nemical Engi	neering)	dep	iliated partment p title,Na	,			ol of Engineering AHARA MINORU
Target ye	ar	3rd ye	ear students o	or above	Number	of cred	lits	2		urse ar/pe	offered riod	2019/Second semester
Day/perio		Гue.1			ss style	Lecture	e			I	Language	Japanese
[Outline a	nd l	Purp	oose of t	he C	ourse]							
		_										
[Course G	ioal	s]										
[Course S	che	edule	e and Co	onten	ts]							
3times, 1time, 1time, 1.5times, 1.5times, 2times, 1time, 2times, 1time, 2times, 1time, 2times, 1time, 2times, 1time, 2times, 1time, 2times, 1time, 1t	_		-	nd At	tainment	levels (of E	valuat	ion]]		
[Textbook]											
[Referenc	e bo	ooks	s, etc.]									
(Referei												
[Regardin	g si	tudie	es out of	f clas	s (prepara	ation a	nd	review)]			
(Others (offi	ce h	our, etc.))								
*Please visit	KU	JLAS	SIS to find	l out a	bout office	hours.						

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Numbering	g code											
Course title <english></english>		ロセス工学 ocessEngineerinș				depa	iated artment, title,Nar	me	Profe Grad Associa Facu	essor,MIY uate Scho		U
Target ye	ar Brd y	year students or	r above Nu i	nber of	cred	lits 5	5	Cou		offered	2019/First semes	ster
Day/perio	d Thu.3,4	4,5,Fri.3,4,5	Class s	tyle E	xperii	ment			L	anguage	Japanese	
[Outline a	nd Pur	pose of th	ne Cours	e]								
Experimenta chemical en											nd fundamentals o etc.)	f
[Course G	ioals]											
This course engineering.		ance studer	ntsrsquo u	nderstand	ding o	of qua	antitativ	ve cl	hemio	cal analysi	s and chemical	
[Course S	chedul	e and Co	ntents]									
density and j diffusivity, f Chemical Er flow Chemical Er flow reactor Chemical Er	ngineerir partial m fabricatio ngineerir ngineerir ngineerir	ng I/Physic nolar volun on of pH m ng I/Transp ng I/Reaction ng I/Appara	cal Chemis ne, Liquid neter, surfa port Pheno on Engine	stry,14tim -liquid ec ace tensio mena,4ti ering,4tii	nes,fre quilib on and imes,v mes,k	eezing rium, l wett viscos	g point gas-lic ability sity and c analy:	droj quid I flov sis ii	op, pre l equi ow dyn n bate	librium, m namics, pr ch reactor,	urement of liquid easurement of gas essure drop in liqu characterization o ed batch,	s uid
[Class req	uireme	ent]										
Fundamenta Fluid Mecha											neering), Fundam	ental
[Method, I	Point of	f view, an	d Attain	ment lev	vels	of Ev	/aluati	ion]]			
Attendance,	perform	ance in exp	periments	reports v	will b	e eva	luated.					
[Textbook]											
Textbook ed	ited by t	eaching sta	aff in depa	irtment o	of chei	mical	engine	eerin	ıg			
[Reference	e book	s, etc.]										
(Referen Bird, Stewar Hashimoto	rt, Lightf	foot, Trans							}{478	82826095		

化学プロセス工学実験 I (化学工学)(2)

Hashimoto, Hanno Kogaku (Baifukan)isbn{}{4563045187} Smith, Van Ness, Abbott, Introduction to Chemical Engineering Thermodynamics, 7th Ed.(McGraw Hill) isbn{}{0071247084}

[Regarding studies out of class (preparation and review)]

(Others (office hour, etc.))

										*
Numbering	g code									
Course title <english></english>				験Ⅱ(化学 toryII(Chemical I			ited tment, tle,Nai	ne P A F	rofessor, YAM raduate Scho	
Target ye	e ar Brd	year students	or above	Number	of cred	lits 5			se offered period	2019/Second semester
Day/perio	d Wed.3	,4,5,Thu.3,4,	Cla	iss style	Experi	ment			Language	Japanese
[Outline a	nd Pur	pose of	the C	ourse]						
Experimenta reaction eng							transp	ort pl	ienomena, se	paration engineering,
[Course G	ioals]									
This course	will enl	nance stud	entsrs	quo underst	tanding	of cher	nical	engin	eering, and th	e students will learn
typical oper-	ations i	the experi	riment	s.	-			-	-	
[Course S	chedu	le and C	onter	nts]						
Chemical En	ngineeri	ng II/Trar	sport	phenomena	,9times	unstea	dy sta	te hea	t transfer, he	at transfer with forced
flow, mass t										
									llation, press	ure drop and gas
absorption in Chamical Fr									as and solid i	reaction, gas-solid
catalytic rea								i, 7uii	cs,gas-sonu i	caetion, gas-sonu
[Class red		•								
-			nical	Engineering	a) Eund	amonta	al Flui	d Mo	chanice Trar	sport Phenomena,
										le Technology, Process
Control are					ise bepa	ration	Engin	cering	, 1 me 1 artie	le reemology, riceess
[Method,	Point c	of view, a	nd A	ttainment	levels	of Eva	aluati	ion]		
Attendance,	perform	nance in e	xperin	nents, repor	ts will b	e evalu	uated.			
[Textbook	4]									
Textbook ed	lited by	teaching s	taff in	n departmen	nt of che	mical e	engine	ering		
[Referenc	e bool	s, etc.]								
(Refere										
									9780470115	
							yo) is	bn{}{	4782826095	}
Hashimoto,										
$smith, van isbn{}{0071}$			roduci	tion to Chei	mical Er	igineer	ing I	nermo	aynamics, /	th Ed.(McGraw Hill)
[Regardin		,	fola	e (propar	ation a	nd ro	viow	1		
Inegardin	ອິຈເດີນ	ies out u	i uida	a (hiehai	ationa	nuie	* 10 W)			
(Others (1						
*Please visi	t KULA	SIS to fin	d out a	about office	e hours.					

Numbering c	ode										
Course title 化 <english> M</english>	学工学量論 aterial and ener	gy balances		Affiliated department Job title,Na	r, me C A	Associate Professor, MAKI TAISUKE Graduate School of Engineering Associate Professor, TANABE KATSUAKI					
Target year	Course offered										
Day/period	Wed.1	Class style	Lectur	e		Language	Japanese				
material and er	nergy balance in ement), and energy	neering. Physical problems about rgy balance as fo	chemica	al processes	are le	ctured. How	to calculate the mass,				
To acquire cap well as to cope	ability to analyz	d operation of ch					ce point of view as				
Week 1: Dime	nsions and units	How to expre of dimensions ar			units, v	which are basi	ic concept of				
		material balance- position of mixtu									
		energy balance cal reactions, and			calcula	ation of appare	ent and latent heats,				
		ram and unit ope agram are lecture		Various ı	ınit op	perations, prin	ciples of separation				
including chen	nical reactions o		is lectur	ed. As well,	how	to understand	balance of processes material balance in ned.				
		ng balance in che sses is exercised.		rocesses	Calcu	lation of mate	rial and energy balance				
	le-up. Methodo ed for design is		p appara	tus is gener	ally e	xplained as w	ell as introduction to				
Week 15: Lear	ning achieveme	nt evaluation.									

_____Continue to 化学工学量論(2)

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[Class req	irement]
	lge on thermodynamics lectured in Physical Chemistry: Fundamentals and Exercises, and nistry I (Chemical Engineering) is required.
Method, P	int of view, and Attainment levels of Evaluation]
Evaluation w	ll be based on exercises at class, assignments, and an examination.
[Textbook]	
Aasao Sudo	d. [@] Kiso Kagakukogakua (Kyoritsu Shuppan) ISBN:9784320088702
[Reference	books, etc.]
	e books)
Some handou	s are given at class.
Degarding	
	studies out of class (preparation and review)]
	studies out of class (preparation and review)]
As many exe	studies out of class (preparation and review)] cises as possible will be imposed at class. Assignments will be imposed every week. Bring a plator to the class.
As many exe scientific calo	cises as possible will be imposed at class. Assignments will be imposed every week. Bring a
As many exe scientific calo (Others (c	cises as possible will be imposed at class. Assignments will be imposed every week. Bring a alator to the class.
As many exe scientific calo (Others (c	cises as possible will be imposed at class. Assignments will be imposed every week. Bring a ulator to the class. fice hour, etc.)
As many exe scientific calo (Others (c	cises as possible will be imposed at class. Assignments will be imposed every week. Bring a ulator to the class. fice hour, etc.)
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As many exe scientific calo (Others (c	cises as possible will be imposed at class. Assignments will be imposed every week. Bring a ulator to the class. fice hour, etc.)

		学英語(化学) entific English)		Affiliated department Job title,Na	,] me	Profe	essor,MAT	Graduate School of Engineering Professor,MATSUSAKA SHIYUUJ Part-time Lecturer,John Pryce			
Target ye	ar	3rd year students o	r above	Number	of credit	ts 2		ırse (r/per	offered iod	2019/Second sem			
Day/perio	d N	Aon.3	Cla	ss style	Lecture			L	.anguage	English			
[Outline a	nd F	Purpose of t	he C	ourse]									
Scientific co English, the	ntex cour	t, specifically	withi creat	n the field o	of Chemic ronment v	cal Engine where stud	ering	g. In a	addition, s	glish skills in a ince all instruction eir overall skills in			
[Course G	oal	s]											
[Course S	che	dule and Co	onten	ts]		*			•	ve been selected and			
sequenced to	tak	e the students	throu	gh key aspe	ects of Ch	nemical En	ginee	ering	beginning	g with elementary ad presentation of a			
1time,The st Japanese and	udei I En	nt will be able glish chemistr	to co y non	rrectly pron nenclature.					fferences	stry nomenclature, in terminology betw			
calculations	and	tical Sciences,											
		results obtain		experiment			2			matical operations,			
pumps, vess measuremen Unit 4-11 Un and Mechan describe how	t and nit C ical v the	Measurement/I nd various pro d Conversions Operations - Fl Processes,8tin ey integrate wi	Expla ocess , expl uid T nes,Tl th dif	experiment ining proces equipment) ain physica ransportation ne student v	:. ss equipm ,1time,Th I dimensi on, Heat T vill be abl	nent dimen ne student ions and pr Fransfer, N le to descr	isions will t roces fass 7 ibe v	s (pip be ab s equ Trans ariou	bing, valve le to expre lipment fe sfer, Therr is unit ope	es, instrumentation, ess units of			
pumps, vess measuremen Unit 4-11 Un and Mechan describe how order of adje Unit 12 Oral and explain	t and nit C ical v the ctiv Ass the a	Measurement/I ind various pro d Conversions Operations - Fl Processes,8tin ey integrate wi es in describir sessment - Pre application to	Expla ocess , expl uid T nes,Tl th dif ng, sentat a proc	experiment ining proces equipment) ain physica ransportation he student v ferent procession of a uni- tess for a uni-	 ss equipm ,1time,Th I dimensi on, Heat T vill be abl esses. Foc it operatio it operatio	nent dimen ne student fransfer, M le to descr cusing on s on, 1 time, T	isions will t toces fass 7 ibe v ibe v specif the st choi	s (pip be ab s equ Trans ariou fic vo uden ice.	bing, valve le to expre ipment fe sfer, Therr is unit ope ocabulary, t will be a	es, instrumentation, ess units of atures. nodynamic Process rations in English a phrasal verbs and ible to present, desc			
pumps, vess measuremen Unit 4-11 Ui and Mechan describe how order of adje Unit 12 Oral and explain Unit 13 Proc read and exp	t and nit C ical v the ctiv Ass the a ess lain	Measurement/l nd various pro d Conversions operations - FI Processes,8tin ey integrate wi es in describir sessment - Pre upplication to and Instrumen process instru	Expla ocess , expl uid T nes,Tl th dif ng. sentat a proc atatior ument	experiment ining proces equipment) ain physica ransportation to student v ferent proces ion of a unit ess for a unit Diagrams ation diagra	 ss equipm ,1time,Th Il dimensi on, Heat T vill be abl esses. Foc it operationit operationit operationit incorpora ums in En	nent dimen ne student ions and pr fransfer, M le to descr cusing on s on, 1 time, T ion of their ating unit o rglish.	isions will b fass 7 ibe v specif he st choi	s (pip be ab s equ Trans ariou fic vo uden ice. tions	bing, valve le to expre sipment fe sfer, Therr is unit ope ocabulary, t will be a ,1time,Th	es, instrumentation, ess units of atures. nodynamic Process erations in English a			
pumps, vess- neasuremen Unit 4-11 Un and Mechan lescribe how order of adje Unit 12 Oral and explain Unit 13 Proce read and exp Unit 14 Plan describe seq	t and nit C ical v the ctiv Ass the a ess lain t Sta uenc	Measurement/I nd various pro d Conversions - FI Processes,8tin yy integrate wi es in describir essment - Pre and Instrumen process instru- trt-up and Shu- ing instructio	Expla- pocess , expl uid T nes,Tl th dif ng. sentat a proc ttatior unent tt-dow ns for	experiment ining process equipment) ain physica ransportatio ferent proce ion of a uni ess for a un blagrams ation diagras plant operating plant opera	ss equipm ,1 time,Th 1 dimensi n, Heat T will be abl esses. Foc it operatic incorpora ums in En g instructi utions.	nent dimen ne student i fransfer, M le to descr cusing on s on, 1 time, T ion of their ating unit o gglish.	isions will t roces fass fass fibe v specif the st choi opera ,The	s (pip be ab s equ Trans ariou fic vo udent ice. tions stude	bing, valve le to expre- ipment fe sfer, Therr is unit ope scabulary, t will be a ,1time,Th ent will be	es, instrumentation ess units of atures. nodynamic Process rations in English phrasal verbs and bble to present, des e student will be a			

nit 15 Oral Assessment - 1 roubleshooting and explaining solutions, solutions to 科学英語(化学工学)(2)

科学英語(化学工学)**(2)**

critical thinking skills to troubleshoot a Process and instrumentation diagram and explain their solution.

[Class requirement]

Students enrolled in the Chemical Process Engineering Course of the School of Industrial Chemistry.

[Method, Point of view, and Attainment levels of Evaluation]

Assessment 1 (week 12) - 20% Assessment 2 (week 15) - 20% Final Written exam - 60%

[Textbook]

Handouts will be given each lesson.

[Reference books, etc.]

(Reference books) Nothing specified.

(Related URLs) (Nothing specified.)

[Regarding studies out of class (preparation and review)] All instruction will be in English, so students are advised to work on improving listening skills both before and during the course.

(Others (office hour, etc.)) Nothing specified.

	学英語(化学 ientific English		de	ffiliated epartment, ob title,Nar	P	rofessor,MA	ol of Engineering ISUSAKA SHIYUUJI ırer,John Pryce
Target year	3rd year students of	or above Number	of credits	2		rse offered /period	2019/Second semester
Day/period	Mon.4	Class style	Lecture			Language	English
[Outline and	Purpose of t	the Course]					
Scientific conte English, the co	ext, specifically urse focuses on		of Chemica ronment wh	ll Enginee here stude	ering.	In addition, s	glish skills in a ince all instruction is in eir overall skills in
[Course Goa	ıls]						
speaking, lister Engineering to attend internati	ning, reading an pics. 5. To deve onal conference	nd writing, as we elop and contribu es, conduct prese	Il as, critica ite to the stu	l thinking 1dent#039	; skill 9s cor	s with regards ifidence and k	#039s overall ability in s to Chemical mowledge to be able to
[Course Sch	edule and Co	ontents]					
	ge on the role o	of IDS in network	security ar				cility for this class.\\ help the intrusion
Intrusion Detect based IDS by s issued from ID. Intrusion Detect traffic by mach Presentation, 1t machine learnin	tudying open so S and communi- ction by Machir ine learning alg ime,Based on th ng, and discuss	ource signature- ications, and add ne Learning,7tim	based IDS at ling signatur es,Learn the blic dataset f ents present	nd attacks res to dete e method for bench s their me	s, suc ect at of cla mark ethod	h as correspon tacks. assifying norm ing intrusion of	ndence between alarms nal and malicious letection performance.
Intrusion Detect based IDS by s issued from ID Intrusion Detect traffic by mach Presentation, It machine learnin [Class requi	tudying open so S and communi- tion by Machir ine learning alg ime,Based on th ng, and discuss rement]	ource signature-t ications, and add ne Learning,7tim gorithms and pub he exercise, stud- it with other stud-	based IDS at ling signatures, Learn the olic dataset f ents present dents and in	nd attacks res to dete e method for bench as their me astructors.	s, suc ect at of cla mark ethod	h as correspon tacks. assifying norm ing intrusion o s of intrusion	nal and malicious letection performance. detection using
Intrusion Detect based IDS by s issued from ID Intrusion Detect traffic by mach Presentation, It machine learnin [Class requi	tudying open so S and communi- tion by Machir ine learning alg ime,Based on th ng, and discuss rement]	ource signature-le ications, and add ne Learning,7tim gorithms and pub he exercise, stud	based IDS at ling signatures, Learn the olic dataset f ents present dents and in	nd attacks res to dete e method for bench as their me astructors.	s, suc ect at of cla mark ethod	h as correspon tacks. assifying norm ing intrusion o s of intrusion	ndence between alarms nal and malicious letection performance. detection using
Intrusion Detect based IDS by s issued from ID Intrusion Detect traffic by mach Presentation, It machine learnin [Class requil Students enroll [Method, Poi	tudying open so S and communi- tion by Machir ine learning alg ime, Based on tl ng, and discuss rement] ed in the Chem int of view, al	ource signature-b ications, and add ne Learning.7tim gorithms and pub he exercise, stud- it with other stud- ical Process Eng nd Attainment	based IDS at ling signatures,Learn the olic dataset f ents present dents and in ineering Co-	nd attack: res to dette e method for bench is their me istructors. ourse of th Evaluat	s, suc ect at of cla mark ethod ne Scl	h as correspon tacks. assifying norm ing intrusion of s of intrusion hool of Indust	ndence between alarms nal and malicious detection performance. detection using rial Chemistry.
Intrusion Detect based IDS by s issued from ID Intrusion Detect traffic by mach Presentation, It machine learnin [Class requi Students enroll [Method, Po	tudying open so S and communi- tion by Machir ine learning alg ime, Based on tl ng, and discuss rement] ed in the Chem int of view, al	ource signature-t ications, and add ne Learning,7tim gorithms and put he exercise, stud it with other stu- nical Process Eng	based IDS at ling signatures,Learn the olic dataset f ents present dents and in ineering Co-	nd attack: res to dette e method for bench is their me istructors. ourse of th Evaluat	s, succect at of clamark tethod ne Sclonj d Writ	h as correspon tacks. assifying norm ing intrusion of s of intrusion hool of Indust itten exam - 6	ndence between alarms nal and malicious detection performance. detection using rial Chemistry.

Course title 化 <english> Ch</english>	学プロセス工 ^生 emical Process			成)]	Affiliate departn Job title	nent,	Professor,HAS Graduate Scho Professor,MAT Graduate Scho Associate Profess Graduate Scho Associate Profess	ol of Engineering ISUSAKA SHIYUU ol of Engineering or,WATANABE SATC ol of Engineering essor,MAKI TAISU ol of Engineering
Target year	2nd year students	or above	Number	of cred	its 2		ourse offered ar/period	2019/Second seme
Day/period	Wed.1	Clas	s style	Lecture	e		Language	Japanese
[Outline and	Purpose of	the Co	ourse]					
[Course Goa	ls]							
1000100 000								
[Course Sch	edule and Co	ontent	is]					
,2times,								
,2times, .3times.								
,2times,								
,2times,								
,3times,								
,1time,								
[Class requir	ement]							
None	•							
[Method, Poi	nt of view, a	nd Att	ainment	levels	of Eval	uatio	ז]	
[Textbook]								
[
1								
							Continue to 化学プロ	セス工学 [W202(創成)](2)
							Continue to 化学プロ	をス工学[W 2 0 2 (創成)] (2)

 [Textbook]

 Handouts will be given each lesson.

 [Reference books, etc.]

 (Reference books)

 Nothing specified.

 (Related URLs)

 (Nothing specified.)

 [Regarding studies out of class (preparation and review)]

 All instruction will be in English, so students are advised to work on improving listening skills both before and during the course.

 (Others (office hour, etc.))

 Nothing specified.

 *Please visit KULASIS to find out about office hours.

科学英語(化学工学)**(2)**

化学プロセス工学 [W202(創成)](2)

[Reference books, etc.] (Reference books)

[Regarding studies out of class (preparation and review)]

(Others (office hour, etc.))

Numbering c	ode									
	学プロセス工 aemical Process	学 [N S (工基 Engineering	礎)]	depa	liated artment title,Na	, me	Graduate School of Engineering Associate Professor,MAKI TAISUK Graduate School of Engineering Professor,SANO NORIAKI			
Target year	2nd year students	e offered eriod	2019/Second semester							
Day/period	Wed.1	Class style Lecture Langua							Japanese	
[Outline and	Purpose of t	the Course]								
[Course Goa	-									
•	edule and Co			d ac	dhou	40.11-		ammutin a f-	aility for this aloos "	
Basic knowled; detection. Intrusion Detec	ge on the role o tion by Signatu	f IDS in network are-Based IDS,5t	security	y and arn th	how m	hachi hanis	ne l	learning can	cility for this class.\\ help the intrusion detection by signature-	

issued from IDS and communications, and adding signatures to detect attacks. Intrusion Detection by Machine Learning,7times,Learn the method of classifying normal and malicious

traffic by machine learning algorithms and public dataset for benchmarking intrusion detection performance Presentation, Itime, Based on the exercise, students presents their methods of intrusion detection using nachine learning, and discuss it with other students and instructors.

[Class requirement]

None

[Method, Point of view, and Attainment levels of Evaluation]

化学プロセス工学[NS(工基礎)](2)

[Textbook]

_____Continue to 化学力セス工学 [N S (工基礎)] [2)

[Reference books, etc.]

(Reference books)

[Regarding studies out of class (preparation and review)]

(Others (office hour, etc.))

*Please visit KULASIS to find out about office hours

Course title <english></english>	nglish> Fundamental Fluid Mechanics					de	iliated partment b title,Na		Graduate School of Engineering Associate Professor, TANIGUCHI TAKASH		
Target ye					of cred	lits	2			e offered eriod	2019/Second semester
Day/perio	d 1	Гue.2								Language	Japanese
[Outline a	nd l	Purpose of t	he C	ourse]							
Lecture on f	unda	amentals of flu	id dy	namics nee	ded for	Che	mical E	ngin	ieer	ing	
[Course G	Goal	s]									
Goal of this	clas	s is to underst	and th	e fundamer	ntal pric	ipal	s in fluio	d dy	nan	nics.	
[Course S	iche	dule and Co	onten	ts]							
Introduction to fluid dynamics, 3times, 0. Example of flows \\ 0-1. flow of ideal fluid \\ 0-2. Laminar fl 0-3. Stability of flow \\ 0-4. Turbulent \\ 0-5. Computational fluid dynamics \\ 1. Properties of fluid \\ Viscopity \\ 1. Compressibility \\ 1.3 Laminar on turbulent turbulent (bury \\ 2. Computers of fluid \\ 1. Processibility \\ 1.4 Processibility \\ 1.2 Compared to the turbulent turbu								operties of fluid \\ 1-1.			

2. Laminar flow \\ ies of fluid \\ 1-1. \\ 2-1. Pressure \\

2-2. Buoyancy Dynamics of Ideal Fluid,6times,3. Fundamentals on flows \\ 3-1. Particles and continuum body \\ 3-2. One dimensional flow \ 3-3. Three dimensional flow (Preparation of Mathematics) \\ 4-1. Mechanics in the ideal fluid \\ 4-2. Equation of continuity \\ 4-3. Euler#039s equation of motion \\ 4-4. Bernoulli#039s theorem \\ 4-5

Examples \\ 4-6. Streaming function and potential flow Dynamics of viscous fluid,5times,5. Dynamics of viscous fluid \\ 5-1. Viscosity \\ 5-2. Stress tensor \\ 5-3. Exact soluble problems described by Navier-Stokes equation Confirmation of the level of attainment, ltime, Confirmation of the level of attainment\\ Comments on the

term-end Exam

[Class requirement]

Numbering code

It is highly recommended for students to take the class: quotMathematics for Chemical Engineers Iquot. [Method, Point of view, and Attainment levels of Evaluation]

Grade will be determined by (i) the examination at the end of semester and (ii) homeworks during semester

[Textbook]

_____Continue to 基礎流体力学(2)

基礎流体力学(2)

[Reference books, etc.]

(Reference books) Bird, Stewart, Lightfoot [®]Transport Phenomena 2nd Ed. (Wiley) ISBN:9780470115398

(Related URLs)

(http://www-tph.cheme.kyoto-u.ac.jp/p/taniguch/class.html)

[Regarding studies out of class (preparation and review)]

Because the content of the class basically follows the textbook raised above, it is recommended that the students look through before the class.

In addition, because the students need fundamental knowledge of vector analysis as prerequisite knowledge, it is highly recommended for the students to parallelly take a class of "vector analysis".

(Others (office hour, etc.))

									*
Numbering	g code								
Course title	化学工	学計算機	演習			iliated			nool of Engineering AWASE MOTOAKI
<english></english>	Computer	Programm	ing in Chemical Eng	gineering		partment b title,Na	, mo	Graduate Sch	nool of Engineering
		-				5 1110,140			rer,ASHIDA RIYUUICHI
Target ye	ear 2nd y	ear students o	or above Number	of cred	its	2		urse offered r/period	2019/Second semester
Day/perio	d Tue.4	1	Class style	Lecture	e			Language	e Japanese
[Outline a	nd Purp	oose of t	he Course]						
[Course G	ioals]								
							_		
[Course S	chedul	e and Co	ontents]						
,3times,									
,2times,									
,3times, .3times.									
,5times, .1time.									
.2times.									
,1time,									
,									
[Class red	quireme	nt]							
None		-							
[Method,	Point of	i view, ai	nd Attainment	levels	of E	valuat	ion]		
IT such a st	.1				_				
[Textbook	q								
[Referenc	e book	s, etc.]							
(Refere	nce boo	oks)							
[Regardin	g studi	es out of	f class (prepar	ation a	nd	review)]		
	-								
(Others (office h	our, etc.))						
			l out about office	e hours					

											*	
Numbering	g co	ode										
Course title <english></english>		料有機合成化 ganic Material		netic Chemi	stry	dep	iliated partment p title,Na		Pro Gra	fessor,MA7 duate Scho	ol of Engineering ISUBARA SEIJIROU ol of Engineering or,KURAHASHI TAKUYA	
Target ye	ar	3rd year students	or above	Number	of cred	lits	2			e offered eriod	2019/Second semester	
Day/perio				ss style	Lecture	e				Language	Japanese	
[Outline a	nd	Purpose of	the C	ourse]								
[Course G	ioa	ls]										
[Course S	ch	edule and Co	onter	its]								
,1time, .2times.												
,4times,												
,4times, ,1time,	,4times,											
,1time, ,2times,												
,1time,												
[Class red	ļuii	ement]										
None												
[Method,	Poi	nt of view, a	nd A	ttainment	levels	of E	valuat	ion]			
[Textbook	[]											
[Referenc	e b	ooks, etc.]										
(Refere	nce	books)										
[Regardin	g s	tudies out o	f clas	s (prepar	ation a	nd	review)]				
		ce hour, etc		1	,							
*Please visi	t K	ULASIS to fin	d out a	about office	e hours.							

Numbering	g code										
Course title <english></english>	Job title, Name Professor, KAWASE MOTOAKI										
Target ye	e ar 2nd	l year students	or above	Number	of cred	its	2		ourse offe ar/period		2019/Second semester
Day/perio	//period Fri.1 Class style Lecture Language Japanese										
[Outline a	nd Pu	rpose of	the Co	ourse]							
Homogeneo complex rea											peration of reactors,
[Course G	ioals]										
	nd kine	tic analysi	s of ho								els for design, litions and to be
[Course S Design equa											
Complex rea Kinetic anal Nonisothern ,1time, [Class req It is required ordinary diff	ysis of nal reac Juirem I to lear	reactions a ctors,4.5tin	entals	of Chemica						/e basi	ic knowledge of
[Method, I	Point	of view. a	nd At	tainment	levels	of E	valuat	ion	1		
Absolute ev									-		
[Textbook]										
Kenji Hashi	moto ^I	^r Han'no K	ogaku	(Chemical	Reactio	n Eı	ıgineeri	ng),	a (Baifu	ıkan)	
[Reference	e bool	ks, etc.]									
(Referer	nce bo	ooks)									
[Regardin	g stud	lies out c	of clas	s (prepara	ation a	nd	review)]			
Take home a	assignn	nents almo	st ever	y week.							
(Others (
*Please visit	KULA	ASIS to fin	d out a	bout office	hours.						

Numbering	g code								
Course title <english></english>		角 [工化1] o Industrial Chemistr	у	dep	liated artment title,Na				ol of Engineering AKAMI MASAHIRO
Target ye	ar 1st year stud	ents or above Number	of credi	its	2		urse of ar/peric		2019/First semester
Day/perio	d Wed.1	Class style	Lecture				Lai	nguage	Japanese
[Outline a	nd Purpose	of the Course]							
[Course G	ioals]								
-	chedule and	Contents]							
,2times, ,2times, ,2times, ,2times, ,2times, ,2times, ,2times,									
[Class red	uirement]								
None									
[Method.]	Point of view	, and Attainment	levels o	of E	valuat	ion	1		
		,							
[Textbook	4								
[Referenc	e books, etc	.]							
(Refere	nce books)								
[Regardin	g studies ou	t of class (prepara	ation ar	nd r	eview)]			
(Others (office hour,	etc.))	_		_		_	_	
*Please visi	t KULASIS to	find out about office	hours.						

Numbering	code											
		学概論 [ction to In		2] al Chemist	iry	dep	iliated partment p title,Na					of Engineering KAMI MASAHIRO
Target yea	ir 1st y	ear students o	or above	Number	of cred	lits	2			e offered eriod	2	2019/First semester
Day/period				ss style	Lectur	e				Language	Ja	apanese
[Outline an	d Purp	pose of t	he C	ourse]								
[Course Go	oals]											
[Course So	hedul	e and Co	onten	its]								
Basic knowle detection. Intrusion Det based IDS by issued from I Intrusion Det	dge on ection t studyin DS and ection t chine le ltime,B ning, an	the role of oy Signatu ng open sa commun oy Machir arning alg ased on the discuss	of IDS nre-Ba ource ication ne Lea gorithm he exe it with	in networl signature-b ns, and add rning,7tim ms and pub ercise, stud h other stu	times,Le based ID ling sign les,Learn blic datas ents pres dents and	y and arn t S an ature a the set fo sents d ins	I how m he mech d attack es to det method or bench their m tructors	hani hani tect ; l of c nmai aetho ;.	ism o uch attac class rking ods o	learning ca of intrusion as correspond cks. sifying non g intrusion	an he n de onde mal dete	lity for this class.\\ elp the intrusion stection by signature- ence between alarms I and malicious ection performance. tection using
[Textbook]												
[Reference	book	s, etc.]										
(Referen	ce boo	oks)										
[Regarding	studi	es out o	f clas	s (prepa	ration a	Ind I	review)]				
(Others (o												
*Please visit	KULAS	SIS to find	d out a	about offic	e hours.							

											*
Numbering	code										
		学概論 [ction to In		3] al Chemistr	гy	de	iliated partment p title,Na				ol of Engineering RAKAMI MASAHIRC
Target yea	r 1st ye	ear students o	r above	Number	of cred	its	2			e offered eriod	2019/First semester
Day/period	Wed.	.1	Cla	ss style	Lecture	•				Language	Japanese
[Outline an	d Purp	pose of t	he C	ourse]							
[Course Go	als]										
-	-					_		_	_		
[Course Sc	hodul	o and Ca	nton	401		_		_	_		
Basic knowled detection. Intrusion Dete based IDS by issued from II Intrusion Dete traffic by mac	dge on ection b studyir DS and ection b hine le time,B ing, an	the role o by Signatu ng open se communi by Machin arning alg assed on th d discuss	f IDS are-Ba ource cation ae Lea gorithm e exe it wit	in network ssed IDS,5ti signature-b ns, and addi urning,7time ms and publ ercise, stude h other stud	security imes,Lea ased IDS ing signa es,Learn lic datass nts press lents and	arn t arn t S an ature the et fo ents I ins	d how n he mech d attack es to det method or bench their m structors	hani tect l of a nma aetho 3.	nine ism (uch attac class rkin ods (learning car of intrusion as correspo cks. sifying norr g intrusion	acility for this class.\\ n help the intrusion detection by signature- ndence between alarms nal and malicious detection performance. detection using
Defense	heel	a 44 1				_		_			
[Reference (Reference											
(,									
[Regarding	studi	es out of	f clas	ss (prepar	ation a	nd	review)]			
(Others (or	ffice h	our, etc.))								
*Please visit l	KULAS	SIS to find	l out a	about office	hours.						

		業化学概論 [工化4] roduction to Industrial Chemistry				Affiliated department, Job title,Name		Graduate School of Engineering Professor,MURAKAMI MASAHI		
Target yea	ır	1st year students	or above	Number	of credits	2		rse offered /period	2019/First semeste	
Day/period	i W	/ed.1	Cla	ss style	Lecture			Language	Japanese	
[Outline an	d P	urpose of t	the C	ourse]						
[Course Go	hale	-1	_				_			
	Jaia	·]								
[Course Sc	he	dule and Co	onten	ts]						
	DS :	and commun	ication	ns, and add	ling signatu	nd attacl res to de	ts, suc	ttacks.	ndence between al	
Intrusion Dete traffic by mac Presentation, J machine learr [Class requ None [Method, Po	DS : ectio chin 1tim ning uire	and commun on by Machin e learning alg he,Based on t and discuss ment]	ication ne Lea gorithn he exe it with	ns, and add rning,7tim ns and pul rcise, stud h other stu	ling signatu nes,Learn th blic dataset lents presen dents and in	nd attach res to de e methoo for bencl ts their n hstructors	tect at l of cl nmark nethod	ch as correspon ttacks. assifying norm ing intrusion of ls of intrusion		
Intrusion Dete traffic by mac Presentation, I machine learr [Class requ None	DS : ectio chin 1tim ning uire	and commun on by Machin e learning alg he,Based on t and discuss ment]	ication ne Lea gorithn he exe it with	ns, and add rning,7tim ns and pul rcise, stud h other stu	ling signatu nes,Learn th blic dataset lents presen dents and in	nd attach res to de e methoo for bencl ts their n hstructors	tect at l of cl nmark nethod	ch as correspon ttacks. assifying norm ing intrusion of ls of intrusion	ndence between al nal and malicious detection performa	
Intrusion Dete traffic by mac Presentation, J machine learr [Class requ None [Method, Po	DS a ection thim time uire	and commun on by Machin e learning de learning de and discuss ment] t of view, a	ication ne Lea gorithn he exe it with	ns, and add rning,7tim ns and pul rcise, stud h other stu	ling signatu nes,Learn th blic dataset lents presen dents and in	nd attach res to de e methoo for bencl ts their n hstructors	tect at l of cl nmark nethod	ch as correspon ttacks. assifying norm ing intrusion of ls of intrusion	ndence between al nal and malicious detection performa	
Intrusion Dete traffic by man, Presentation, 1) machine learr [Class requ None [Method, P/ [Textbook]	DS a ection thin ning uire oin	and commun on by Machin e learning alg e,Based on t , and discuss ment] t of view, a oks, etc.]	ication ne Lea gorithn he exe it with	ns, and add rning,7tim ns and pul rcise, stud h other stu	ling signatu nes,Learn th blic dataset lents presen dents and in	nd attach res to de e methoo for bencl ts their n hstructors	tect at l of cl nmark nethod	ch as correspon ttacks. assifying norm ing intrusion of ls of intrusion	ndence between al nal and malicious detection performa	
Intrusion Dete traffic by mac Presentation, I machine learr [Class requ None [Method, P [Textbook] [Reference	DS : ection chining uire oin	and commun on by Machin e elearning alg e, Based on ti , and discuss ment] t of view, a oks, etc.] pooks)	ication ne Lea gorithn he exe it with nd At	as, and addrning, 7tim ns and pul recise, stud h other stu tainment	ling signatu les,Learn th blic dataset ents presen dents and it t levels of	nd attack res to de e methoc for bencl ts their m isstructors	tect at l of cl nmark teethood s.	ch as correspon ttacks. assifying norm ing intrusion of ls of intrusion	ndence between al nal and malicious detection performa	
Intrusion Deta traffic by mac Presentation, I IClass requ None [Method, P/ [Textbook] [Reference (Reference [Regarding	DS : ectid chin 1tim ning uire oin oin	and commun on by Machin e learning alg e,Based on ti , and discuss ment] t of view, a oks, etc.] books) udies out o	ication ne Lea gorithi he exe it with nd At	as, and addrning, 7tim ns and pul recise, stud h other stu tainment	ling signatu les,Learn th blic dataset ents presen dents and it t levels of	nd attack res to de e methoc for bencl ts their m isstructors	tect at l of cl nmark teethood s.	ch as correspon ttacks. assifying norm ing intrusion of ls of intrusion	ndence between al nal and malicious detection performa	
Intrusion Deta traffic by mac Presentation machine learn [Class requ None [Method, Pr [Textbook] [Reference (Reference	DS = ection chinal time uire oin oin bo ce l	and commun on by Machin e learning alg e,Based on ti , and discuss ment] t of view, a oks, etc.] pooks) udies out o e hour, etc	ication ne Lea gorithi he exe it with nd At	as, and add rning.7tim ns and pul rcise, stud h other stu tainment	ling signatu les,Learn th blic dataset lents presen dents and in t levels of	nd attack res to de e methoc for bencl ts their m isstructors	tect at l of cl nmark teethood s.	ch as correspon ttacks. assifying norm ing intrusion of ls of intrusion	ndence between al nal and malicious detection performa	

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Numbering	g code	•											
		高分子化学序論 ntroduction of Polymer Chemistry								Pro	Graduate School of Engineering Professor,AKIYOSHI KAZUNARI		
Target ye	2nd year students or above Number of cred					its	2			e offered eriod	2019/First semester		
Day/perio					ss style	s style Lecture				Language		Japanese	
[Outline a	nd Pu	ırp	ose of t	he C	ourse]								
10	· · · ·												
[Course G	oaisj												
[Course S	ched	ule	and Co	onten	ts]								
, 1 times,													
, 5 times,													
, 3 times,													
, 4 times,													
, 1 times,													
[Class req	luiren	ner	nt]				_			_			
None													
[Method, I	Point	of	view. a	nd At	tainment	levels	of E	valuat	ion	1			
L ,			,										
[Textbook	4												
[Referenc	e boo	ks	, etc.]		_								
(Refere													
-													
[Regarding studies out of class (preparation and review)]													
(Others (office	e ho	our, etc.))	_								
(Others (office hour, etc.)) *Please visit KULASIS to find out about office hours.													
r lease visi	INUL	АЗ	13 10 1110	i out a	ioout office	: nours.							
		_					_			_			

Numberin	g code	U-EN	G27 27407 EJ61								
Course title <english></english>			・実験 Design and Exper	iment	department			Graduate School of Engineering Professor,SANO NORIAKI Faculty of Engineering			
Target ye	e ar 2nd	year students o	or above Number of	above Number of cred				rse offered /period	2019/Second semester		
Day/peric	d Fri.4	1,5	Class style	Practic	al tr	aining		Language	Japanese		
[Outline and Purpose of the Course] 制御された化学反応を駆動力とする化学自動車模型(Chem-E-Car)をグループで設計、製作する。 設計開始前には電池や熱電効果等に関する実験を行い、Chem-E-Carに関する基礎を習得する。製作 したChem-E-Carが、決められた荷重を搭載して目的とする距離を走行できるかをコンテスト形式で 競う。											
[Course G	ioals]										
電気化学、 を磨く。	熱電効	果、発熱		生等を	含む	〕、様々	な化	学・物理的現	見象を利用する発想力 □夫を通して創造性を		
[Course S	chedu	le and Co	ontents]								
 (2)基礎 等を使用し (3)設計 (4)工作 (5)Chem 本データの (6)発表 	実習【! たモデ 方針習【デ -E-Car 採取 会【1〕	5週】:電 ルChem-E 侖【1週】 1週】: C 製作、試選 週】:グル	-Carの作製 :グループによ Chem-E-Catの製作 重転【5週】:グ ノープによるChe	か果、等 たるChe たに必要 ブルーこ cm-E-Ca	手に m-E 要な パ に	関する E-Carの 工作技行 よるCh 関する	構義 設計: がや. em-E 発表	; 一次電池、 方針の討論 工作機械の使 -Carの設計、 (走行・停止	^習 燃料電池、熱電効果 用方法の説明、実習 製作、走行実験、基 の原理、特徴、等) の走行データに関す		
[Class red	quirem	ent]									
None											
•			nd Attainment ンテスト結果)				-	o発表、レポ-	- トにより評価する。		
[Textbook 教員が配布	-	リント									
								Continue to Che	m-E-Car設計・実験(2)		

Chem-E-Car設計・実験(2)
[Reference books, etc.]
(Reference books)
アトキンス『物理化学(上) 第10版。
[Regarding studies out of class (preparation and review)]
授業中に指示する
(Others (office hour, etc.))
*Please visit KULASIS to find out about office hours.