An	an	College		Cours	e of A	pplied	d Chem	nical	Year	-	202	4			
De	par	tment Goals													
						Class	s Hours p	er Wee	·k						Divisio
Cou		Course Title	Cours	Credit	Credit		1st Y			Adv.	2nd Y			Instru	Divisio n in
e Cat		Course ride	e Code	Type	s	1st		2nd		1st		2nd		ctor	Learni
ory						1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q		ng
ΑZ	Iso	Instrumental Analysis	5516Z 01	Acade mic Credit	2	2								Yama da Yohei	
AZ	El ec tiv e	Electronic Device Engineering	5596E 01	Acade mic Credit	2			2						Haseg awa Tatsuo	
AZ	El	Electrical Circuits and Analysis	5596E 03	Acade mic Credit	2	2								Naka mura Yuichi	
ΑZ	El ec tiv e	Material Processing	5596M 03	Acade mic Credit	2	2								Yasud a Takes hi	
AZ	El ec tiv e	Simulation Engineering	5596M 04	Acade mic Credit	2			2						Matsu ura Fumin ori	
Sp eci ali ze d	Co m pu lso ry	Synthetic Organic Chemistry	5516Z 02	Acade mic Credit	2	2								Sugiya ma Yuuki	
Sp eci ali ze d	Co m pu lso ry	Advanced Physical Chemistry	5516Z 03	Acade mic Credit	2	2								Konish i Tomoy a	
Sp eci ali ze d	El	Environmental Chemistry	55961 01		2	2								Ota Naoto mo	
Sp eci ali ze d	El ec tiv e	Solid State Chemistry	5596Z 04	Acade mic Credit	2	2								Konish i Tomoy a	
Sp eci ali ze d	Co m pu lso ry	Experiments in Applied Chemistry	5517J 01	Acade mic Credit	2					6				Otani Takas hi,Sugi yama Yuuki, Ueda Kohei, Ezure Ryosu ke	
Sp eci ali ze d	Co m pu lso ry	Synthetic Organic Chemistry	5517Z 02		2					4				Sugiya ma Yuuki	
Sp eci ali ze d	Co m pu lso ry	Advanced Physical Chemistry	5517Z 03	Acade mic Credit	2					2				Konish i Tomoy a	
Sp eci ali ze d	El ec tiv e	Environmental Chemistry	55971 01	Acade mic Credit	2					2				Ota Naoto mo	
Sp eci ali ze d	El ec tiv e	Composite Materials	5597C 04	Acade mic Credit	2					2				Kadon o Takum a	
Sp eci ali ze d	El ec tiv e	Mathematics of Electronics and Information	5597E 02	Acade mic Credit	2					2				Sugino Ryuza buro	

Sp eci ali ze d	El ec tiv e	Semiconductor Material Properties	5597E 04	Acade mic Credit	2	Haseg awa Tatsuo	
Sp eci ali ze d	El ec tiv	Signal Processing Engineering	5597I 03	Acade mic Credit	2	Yasun o Emiko	
Sp eci ali ze d	El e ti> e	Strength and Fracture of Materials	5597M 02	Acade mic Credit	2	Okum oto Yoshih iro	
Sp eci ali ze d	El ec tiv e	Solid State Chemistry	5597Z 04		2	Konish i Tomoy a	

Anan College		Year	2024	Course Title			Instrumental Analysis	
	Informa						ue	
Course Co		5516Z0:	1		Course Categor	rv 🛕	7 / Com	npulsory
Class Forr		Lecture	<u>. </u>		Credits			Credit: 2
Departme			of Applied Chemic	cal Engineering	Student Grade		dv. 1st	9. 94.6. 2
Term		First Ser	•		Classes per We	eek 前	期:2	
Textbook Teaching		エキスパ	ート応用化学テキ	ストシリーズ 機器	分析 大谷肇 編	講談社(]	ISBN97	8-4-06-156807-5)
Instructor	-	Yamada	Yohei					
After takir 1. explain 2. explain 3. discuss	the intera the meas and devis	urse, you w action betw surement po se analytica	inciples of the ar I methods accord	etic waves and ma nalytical instrumen ding to the sample nents used in one's	ts covered in the to be measured	and the i	informa iformati	tion to be obtained. on obtained.
Rubric								
			Ideal Level		Standard Level			Unacceptable Level
			frequency, an electromagne accurately. Yo explain at lease examples of in	nting wavelength, d energy of denergy of tic waves, bu are able to st three specific nteractions rromagnetic waves electronic brational	You are able to equations relat frequency, and electromagneti able to explain specific example between electrand matter (ele transitions, vib transitions, etc	ing wave I energy of c waves. at least t les of inte comagneti ectronic rational	of You are wo eraction	waves. You are able to explain at least two specific examples of
2. To be able to explain the measurement principles of the analytical instruments covered in the lecture.			You are able t six measurem various analyt	to explain at least tent principles of tical instruments te textbook. You plain the s of each	You are able to explain at least four measurement principles of various analytical instruments covered in the textbook. You are able to explain the characteristics of each instrument and how to use them.			If you read textbooks, you are able to explain at least four measurement principles of various analytical instruments covered in the textbook. You are able to explain the characteristics of each instrument and how to use them.
methods a sample to	according	ured and th	the sample are to be obtained	chods according to add the information	You are able to suggest analytical methods according to the sample and the information to be obtained.			
the principused in hi	ples of the	n to others e equipmenterch and ained.	of your resear analytical inst		You are able to do presentation of your research and explain analytical instruments using in your research. Also, you are able to ask question for research of others.			You are able to do presentation of your research and explain analytical instruments using in your research.
Assigne	d Depar	tment Ob	piectives		•			
	g Metho		-					
Outline		Analytica state an all huma medical analysis, students will also instrume	d existencé. Instinactivities, inclucare. In general, electrical analys will learn about learn what kindents.	rumental analysis puding substance de analytical instrum iss, separation anal the principles and of information can	plays a central revelopment, qual ents are classifie ysis, and others equipment confi be obtained fron	ole in ana lity contro ed based of (thermal iguration m the res	lytical collingly, environ their analysi of these	and the analysis of their chemical hemistry and is indispensable in onmental investigation, and principles into electromagnetics, mass spectrometry). First, a analytical instruments. Students ained from these analytical
Style Notice		Dasically	ciassroom learn	ing, but there are	aiso iaboratory e	exercises.		
	orictics	of Class /	Division in Le	narning				
		oi Ciass /		-				☐ Instructor Professionally
☐ Active	Learning		☐ Aided by I	СТ	☐ Applicable t	o Remote	Class	Experienced
Course	Plan							
			Theme			Goals		
		1st		nstrumental Analy tic Waves and Mat			nt, how	explain the principles of the to prepare samples, and how to otained.
1st Semeste Semeste 2nd Interaction of electromagnetic waves with matter, equipment, how to prepare samples, an					explain the principles of the to prepare samples, and how to			
Quarter 3rd			fluorospectropho	uorospectrophotometer			able to nt, how	explain the principles of the to prepare samples, and how to otalined.

		4th	AAS		You are able to explain equipment, how to preview the data obtained.	the principles of the pare samples, and how to		
		5th	ICP-AES, ICP-MS		You are able to explain equipment, how to preview the data obtained.	the principles of the pare samples, and how to		
		6th	experimental design f by using ICP-AES	for analysis of mineral wate	experimental design for by using ICP-AES.	analysis of mineral water		
		7th	Experiment		preparation of standard mineral water.	solution for analysis of		
		8th	Experiment		ICP-AES measurement			
	9th 10th		Data handling of the experiment by	Excel	Data handling of the experiment by Ex	kcel		
			FT-IR		You are able to explain equipment, how to prepied view the data obtained.	pare samples, and how to		
		11th	FT-IR, Raman spectro	ometry	equipment, how to prep	You are able to explain the principles of the equipment, how to prepare samples, and how to view the data obtained.		
	2nd Quarter	12th	XRD, XRF		You are able to explain equipment, how to prepied view the data obtained.	You are able to explain the principles of the equipment, how to prepare samples, and how to view the data obtained.		
		13th	Presentation of the st	udents	Students will present than analytical instruments t	Students will present their own research and the analytical instruments they use.		
		14th	Presentation of the st	cudents	Students will present thanalytical instruments t	neir own research and the hey use.		
		15th	Presentation of the st	tudents	Students will present the analytical instruments t	neir own research and the hey use.		
		16th	final exam		final exam			
Evaluati	on Meth	od an	nd Weight (%)					
			Examination	Presentation	reports	Total		
Subtotal	otal		50	20	30	100		
Basic Prof	iciency		50	20	30	100		
Specialize	d Proficier	псу	0	0	0	0		
Cross Area	a Proficien	су	0	0	0	0		

A	Anan Co	llege		Year	2024			-	Electronic Device Engineering
Course	Informa	tion							
Course Co	ode	5596E01				Course Catego	ry A	AZ / Elect	ive
Class Forr						Credits	P	Academic	Credit: 2
Departme	ent	_			l Engineering	Student Grade		dv. 1st	
Term	17	Second S	Semes	ster		Classes per We	eek [名	後期:2	
Textbook Teaching		基礎から	学ぶ半	導体電子デバ	イス(森北出版)				
Instructor	•	Hasegaw	a Tat	suo					
	Objectiv								
2. pn接合 ² 3. 金属と ² 4. トラン ³	ダイオード 半導体の接行 ジスタ、サ	の特性をエネ 合の特性をエ イリスタの動	マルギー ネルキ 作原理	ーバンド図を月 ドーバンド図を 里をエネルギー	7密度に関する諸式 用いて説明でき、動 E用いて説明でき、 -バンド図を用いて を用いて説明できる	が作に関わる諸量を 動作に関わる諸量 説明できる。	を求める <i>こ</i> 量を求める	ことができ Sことがで	ිිිිිිිිිිිිිිිිිිිිිිිිිිිිිිිිිිිිි
Rubric									
			理想	息的な到達レ/	ベルの目安	標準的な到達レ	ベルの目	安	最低限の到達レベルの目安(不可)
到達目標1	別達目標1			導体のエネルキ でき、キャリア を導出できる。	ドーバンド図を説 7密度に関する諸	半導体のエネル= 明でき、キャリブ 明できる。	ギーバントア密度につ	ド図を説ついて説	半導体のエネルギーバンド図を説 明できる。
到達目標2]達目標2			-バンド図を用	ドの特性をエネル 別いて説明でき、 置を求めることが	pn接合ダイオー ギーバンド図を 。	ドの特性 用いて説明	をエネル 明できる	pn接合ダイオードの特性を説明できる。
到達目標3	別達目標3			ドーバンド図を	接合の特性をエネ E用いて説明でき 諸量を求めること	金属と半導体の打 ルギーバンド図 る。	接合の特性 を用いて記	生をエネ 説明でき	金属と半導体の接合の特性を説明できる。
到達目標4			原理		ナイリスタの動作 -バンド図を用い	トランジスタ、サイリスタの動作 原理を説明できる。			トランジスタ、サイリスタの基本 特性を説明できる。
到達目標5			JFE ルキ る。	ドーバンド図を	の動作原理を工ネ E用いて説明でき	JFET、MOSFET できる。	の動作原	理を説明	JFET、MOSFETの基本特性を説明 できる。
Assigne	d Depar	tment Ob	jecti	ves					
Teachin	g Metho	d							
Outline		- 1トキー接着	合ダイ	゙オード、バイ	ャリア輸送につい [*] ポーラトランジス? いて理解すること?	タ、サイリスタ、'	ドモデル電界効果	を用いて ^き トランジ	学習し、pn接合ダイオード、ショッ スタなど、さまざまな電子デバイス
Style		講義形式を	を中心 間30時	に授業を進め 計間+自学自習	る。 3時間60時間】				
Notice									
Charact	eristics o	of Class /	Divis	sion in Lea	arning				
☐ Active	Learning		V.	Aided by ICT		☐ Applicable t	to Remot	e Class	☐ Instructor Professionally Experienced
									1=
Course	Plan								
		-	Them	e			Goals		
		1st	半導体	の基礎			半導体の孤立原子)定義を説 -、結晶の	明できる。 エネルギー構造を説明できる。
		2nd	半導体	 ぶの基礎			真性半導		・n型の不純物半導体について説明で
		3rd :	半導体	エ中のキャリア	·····································		0		リア密度に関する諸式を導出できる
							0		体のキャリア密度の図を説明できる
	3rd Quarter	4th	半導体 半導体	マロキャリア マロウキャリア	'密度 '輸送現象 ————————————————————————————————————		る。 ドリフト	電流と拡	導体のエネルギーバンドを説明でき 散電流を説明できる。
2nd Semeste		5th	pn接合	ラダイオード			pn接合タ て説明で	ブイオード	の特性をエネルギーバンド図を用い
r		6th	pn接合	含ダイオード				ブイオード 出できる	の特性に関する諸式をポアソン方程。
		7th	pn接合	ゔダイオード			pn接合分	ブイオード	の電圧-電流特性の式を導出できる
	<u></u>	8th	中間	試験】					
		9th	金属と	 :半導体の接合	による整流特性		金属と半いて説明		合の特性をエネルギーバンド図を用
	4th Quarter	10th	金属と	半導体の接合	iによる整流特性		1	導体の接	合の特性をエネルギーバンド図を用
		11th :	金属と	半導体の接合	による整流特性		t		の特性に関する諸式をポアソン方程 。

		12th	バイポ・	ーラトランジスタ				バイポーラトランジスタの特性をエネルギーバンド® を用いて説明できる。			
		13th	バイポ・	ーラトランジスタ			サイリスタの できる。	特性をエネルギーバン	ンド図を用いて説明		
		14th	接合型的	接合型電界効果トランジスタ(JFET)				持性を構造図を用いて	て説明できる。		
		15th	MOS型	電界効果トランジスク	タ(MOSFET)		MOS形FETの いて説明でき	特性を構造図とエネル る。	ルギーバンド図を用		
	16th 【学年末試験、答案返却】										
Evaluation	on Metl	hod and '	Weigh	t (%)							
		定期試験		小テスト	ポートフォリオ	発表勢	・取り組み姿	その他	Total		
Subtotal		80		0	20	0		0	100		
基礎的能力		40		0	10	0		0	50		
専門的能力		40	·	0	10	0		0	50		
分野横断的	能力	0		0	0	0		0	0		

Į.	Anan Co	llege	Year	2024				Electrical Circuits and Analysis	
Course 1	Informa	tion					TICIC	Allulysis	
Course Co		5596E03	3		Course Categor	ν	AZ / Elec	tive	
Class Forr	nat	Lecture			Credits	,	Academi	Credit: 2	
Departme	nt	Course o	of Applied Chemi	cal Engineering	Student Grade		Adv. 1st		
Term		First Ser	nester		Classes per We				
Textbook Teaching					·				
Instructor	,	Nakamu	ra Yuichi						
Course (Objectiv	es							
2. Able to 3. Can exp 4. Unders	derive cir plain how tand the c	cuit equation to derive a concept of s	ons for basic circ nd solve circuit e system equations	ons of basic eleme uits and explain dy equations for circuits and be able to ex the dynamic characters.	namic characteri ts containing L ar press system eau	nd C. Jations	s correspo	nding to circuits.	
RUDITIC			Ideal Level		Standard Level			Minimum Attainment Lovel	
				n in dotail the	Standard Level			Minimum Attainment Level	
Achievem	ent 1		characteristics basic element	n in detail the s and effects of s using formulas, etc.	Able to explain characteristics a basic elements	and eff	fects of formulas.	Able to explain the characteristics and actions of basic elements.	
Achievem	ent 2		circuit equation	be able to solve it s dynamic	Able to derive of for basic circuit to explain the sequation.	s. Also	, be able	Able to derive circuit equations for simple circuits.	
Achievem	ent 3		expressed as differentials.	e circuit equations higher-order Also, be able to ve the problem.	Able to derive of expressed up to differentials. Als explain the solu	secor so, be	nd-order	Able to derive circuit equations expressed as first-order differentials. Also, be able to explain the solution.	
Achievem	ent 4		Understand the system equat to express system corresponding circuits.	ions and be able stem equations	Understand the concept of system equations and be able to express system equations that correspond to basic circuits.			Understand the concept of system equations and be able to express system equations that correspond to simple circuits.	
Achievem	ent 5		Able to solve equations and dynamic char- circuits in det	acteristics of	Able to solve basic system equations and outline the dynamic characteristics of a circuit.			Able to solve simple system equations and provide an overview of the dynamic characteristics of a circuit.	
Assigne	d Depar	tment Ob	jectives						
	g Metho								
Outline	<u> </u>	Transien The goal	∣iṡ to learn abou	r circuits with varion t multiple types of select the most su	analysis method	s and	unďerstan	sing system state equations. d the characteristics and methods	
Style		Learn ab	out the concepts	s and methods for	analyzing the dy	namic	characteri	istics of electrical circuits.	
Notice		The cont systems By becor	s and report assi ent of this lectur ming familiar wit	gnments will also left is a method that	be conducted to l can be common analysis procedu	help st ily app	udents un lied to the	derstand the content of the class. analysis of linear dynamical students will develop skills that	
Charact	eristics o	of Class /	Division in L	earning	,				
□ Active			☑ Aided by I		☐ Applicable to	o Rem	ote Class	☐ Instructor Professionally Experienced	
Course	Plan								
			Theme			Goals			
		1st	1. Dynamic char (1) Dynamic ele	racteristics of basic ment	circuits	and ex	kplain dyn to explair	rcuit equations for basic circuits amic characteristics. If the individual characteristics and nic elements.	
		2nd	1. Dynamic char (2) Circuit equat	racteristics of basic tion		and ex	kplain dyn	rcuit equations for basic circuits amic characteristics. ns can be found for basic circuits.	
1st Semeste r	1st Quarter	3rd	Dynamic char Oynamic char	racteristics of basic aracteristics	circuits	and ex	kplain dyn to solve c	rcuit equations for basic circuits amic characteristics. ircuit equations of basic circuits amic characteristics.	
		4th	Dynamic char Oynamic char	racteristics of basic aracteristics	circuits	and ex	kplain dyn to solve c	rcuit equations for basic circuits amic characteristics. ircuit equations of basic circuits amic characteristics.	
		5th	Dynamic anal Ordinary diff solutions	ysis method erential equations	and their	equati - Unde differe	ons for cirerstand co	now to derive and solve circuit reuits containing L and C. Instant coefficient ordinary Itions and be able to explain the	

		6th	2. Dynamic analysis method (1) Ordinary differential equations a solutions	and their	equations for circ	ow to derive and solve circuit uits containing L and C. stant coefficient ordinary ions and be able to explain the em.	
		7th	2. Dynamic analysis method (1) Ordinary differential equations a solutions	and their	equations for circ - Understand con	ow to derive and solve circuit uits containing L and C. stant coefficient ordinary ions and be able to explain the em.	
		8th	[Midterm Exam]		Check your under up to the midterr	rstanding of the lesson content n exam.	
			3. System equations and their solut (1) Representation of system equat		Understand the c be able to specific - Understand the	oncept of system equations and cally derive and solve them. concept of system equations erive them for a given circuit.	
		10th	3. System equations and their solut (1) Representation of system equat		be able to specific - Understand the	oncept of system equations and cally derive and solve them. concept of system equations erive them for a given circuit.	
	11th	3. System equations and their solut (2) Exponential function of matrix a properties		Understand the concept of system equations and be able to specifically derive and solve them. - Able to explain the exponential function of the matrix used to solve system equations and its properties.			
	2nd Quarter	12th	3. System equations and their solut (2) Exponential function of matrix a properties	tions and its	be able to specific	oncept of system equations and cally derive and solve them. the exponential function of the live system equations and its	
		13th	System equations and their solut Solution of system equations	cions	Understand the concept of system equations and be able to specifically derive and solve them Able to specifically derive the derived system equation.		
		14th	3. System equations and their solut (3) Solution of system equations	cions	be able to specific	oncept of system equations and cally derive and solve them. ally derive the derived system	
		15th	3. System equations and their solut (3) Solution of system equations	cions	be able to specific	oncept of system equations and cally derive and solve them. ally derive the derived system	
		16th	[Final exam] [Answer return time]		Check your under	rstanding of the lesson content.	
Evaluat	aluation Method and W		Veight (%)				
			Examination	Report/Assignr	ment	Total	
Subtotal	 ototal		80	20	100		
Basic Pro	Basic Proficiency		30	5		35	
Specialize	d Proficier	псу	40	10		50	
I .			1	I_			

Cross Area Proficiency

	Anan College		Year	2024			ourse Title	Material Processing
Course	Informa	tion						
Course Co	ode	5596M03			Course Category	у	AZ / Ele	ctive
Class Forr	mat	Lecture			Credits		Academ	ic Credit: 2
Departme	ent	Course of	f Applied Chemic	cal Engineering	Student Grade		Adv. 1st	
Term		First Sem	ester		Classes per Wee	ek	前期:2	
Textbook Teaching	Matérials	+	will be distribut	ed as needed.				
Instructor		Yasuda T	akeshi					
1. Studen relevance 2. Studen characteri 3. Studen	t be able t istics. t be able t	o understar o understar o understar	nd and explain value and explain h	arious molding mo		cs, resi nt, thei	ins, and o	nd their characteristics and composite materials, and their ity and effects.
Rubric								
			Ideal Level		Standard Level			Minimum Level
Achievem	ent 1		and explain va methods of m	le to understand arious processing etallic materials acteristics and	Student be able and explain vari methods for me	ious pr	ocessing	processing methods for metal
Achievem	ent 2			sites and their	Student be able and explain vari methods for cer resins/composit	ious fo amics	rming	Student understand various molding methods for ceramics resins and composites.
Achievem	ent 3		and explain the effects of heat surface treatm		Student be able and explain hea surface treatme	t treat		
Achievem	ent 4		Student be ab and explain va methods and characteristics	their	Student be able and explain vari methods.			Student understand various joining methods.
Assigne	d Depar	tment Ob	jectives					
Outline Style		processed manufact processin basic kno well as he Classes w	d into various shousing, it is necest g in order to sel wledge of varioue at treatment ar vill be conducted	apés accórding to ssary to understa ect appropriate m us processing and ad surface treatm	o their applications nd the phenomena naterial processing forming methods ent of some mater . Reports will be r	s. As end of methor methors and of methors are more reals.	ngineers character ods. In the etallic ma	utilized in industrial products, are and designers involved in istics of various materials during his course, students will acquire aterials, ceramics, and resins, as and post-assessments.
Notice								
Charact	eristics	of Class /	Division in Le	earning				
	Learning	,	☐ Aided by I		☐ Applicable to	Remo	ote Class	☐ Instructor Professionally Experienced
Course	Plan							
		-	 Γheme		10	Goals		
				naterial processin	g methods	Studer	and an	e to explain an overview of this view overall how materials are
		2nd I	Processing meth	ods for metallic m		Studer	nt be able	e to explain various processing etallic materials.
		3rd F	Processing meth	ods for metallic m	laterials	metho	ds for m	e to explain various processing etallic materials.
	1st Quarter	4th	Ceramics formin	g methods		metho	ds.	e to explain ceramics forming
st Semeste	Quarter	5th I	Molding methods	s for resins and co	omposites	Studer resins	nt be able and com	e to explain molding methods for posites.
		6th	Basics of heat tr	eatment	1	treatm	ent of st	e to explain the basics of heat eel materials.
		7th	Basics of heat tre	eatment	1	treatm	ent of st	e to explain the basics of heat eel materials.
		8th I	Heat treatment i	n actual		Studer actual.		e to explain heat treatment in
-		9th I	Midterm examina	ation				
	2nd	2011	пассти схатин	ation	Student be able to explain various sur treatment methods.			

	11th	Surfa	ace Treatment			Student be able t treatment metho		surface	
	12th	Mech	nanical bonding	3		Student be able to explain various mechanical bonding.			
	13th	Adhe	esion		:	Student be able t	o explain about a	dhesion.	
	14th	Liquio	Liquid phase bonding and solid phase bonding St			Student be able t liquid-phase bond	o explain various ling and solid-pha	methods of ase bonding.	
	15th Liquid phase bonding and solid phase bonding				se bonding	Student be able t liquid-phase bond	o explain various ling and solid-pha	methods of ase bonding.	
	16th	Final	examination a	and return exam.	paper				
Evaluation	Method an	d Weigl	ht (%)						
	Midterm/F exam	inal Qu	Jiz	Portfolio	Presentation/At titude	Portfolio	Other	Total	
Subtotal	80	0		20	0	0	0	100	
Basic Proficiency	0	0		0	0	0	0	0	
Specialized Proficiency	60	0		20	0	0	0	80	
Cross Area Proficiency	20	0		0	0	0	0	20	

,	Anan College Course Information		Year	2024		Course Title	Simulation Engineering			
Course	Informa	tion								
Course Co	ode	5596M04			Course Categor	y AZ / Elec	ctive			
Class Forr	mat	Lecture			Credits	Academi	c Credit: 2			
Departme	ent	Course of A	Applied Chemica	al Engineering	Student Grade	Adv. 1st				
Term		Second Se	mester		Classes per We	ek 後期:2				
Textbook Teaching		Pythonによ	る数値計算とショ	ミュレーション(オ						
Instructor	r	Matsuura F	uminori							
Course	Objectiv	es								
2. Can cre	erform mod eate a pro	deling with 3D gram that sim	CAD and carry Julates the moti	out linear stress on of a particle ba	analysis, fluid ar ased on ordinary	nalysis, and hea differential equ	t transfer analysis. ations.			
Rubric					Т		1			
			Ideal Level		Standard Level		Unacceptable Level			
SolidWork	ks Simulat	ion	Can perform el- considering and and conduct lin and heat transf	alysis accuracy lear stress, fluid,	Can model com 3D-CAD and pe stress, fluid, an analyses.		Can model simple parts with 3D-CAD and perform linear stress, fluid, and heat transfer analyses.			
Creating (Simulation	Own Nume n Code	erical		onal features to in the textbook.		ulation code wit alent to the cod tbook.				
Assigne	d Depar	tment Obje	ectives							
Teachin	ng Metho	od								
Outline		fields. In the analysis, a learn abou	nis lecture, we u nd fluid analysis t physical simul	ıtilize analysis sof s. In the latter par	tware linked witl rt, students will a ordinary different	h 3D CAD to per acquire the basi	e powerful tools for all engineering form stress analysis, heat transfer cs of computational mechanics and mulations using cellular automata,			
Style		the second in Python 3 course offe	half, students of B, students are a ers academic cre	create programs f allowed to implem	for numerical cal nent in any prog of reports as pre	culation. Althou ramming langua	analysis using 3D CAD software. In gh program examples are provided ige they are proficient in. As this y activities is mandatory.			
Notice		Proficiency	in operating 3D	CAD software ar	nd programming	languages is de	esirable.			
Charact	eristics	of Class / D	ivision in Lea	arning						
□ Active		,	☐ Aided by IC		☐ Applicable t	o Remote Class	☐ Instructor Professionally Experienced			
Course	Plan									
Course		Th	neme			Goals				
				nd Mass Properties	S		ember, apply materials, and ss properties.			
		2nd St	ress Analysis				ı linear stress analysis.			
			eat Transfer Ana	alysis		Can calculate th	Iculate the steady-state temperature ution of a member.			
	3rd	4th He	eat Transfer Ana	alysis		Can calculate the distribution of a	Can calculate the transient temperature distribution of a member.			
	Quarter	5th Flu	uid Analysis			distribution of a	ne velocity and pressure in external flow fluid.			
		6th Flu	uid Analysis			Can calculate the	ne velocity and pressure In internal flow fluid.			
			dterm Exam				using SolidWorks.			
24				Numerical Calcula	ation	Can perform sq numerical calcu	uare root calculations through lation and explain numerical			
2nd Semeste r				on Based on Ordin	nary Differential		ulation code for free fall and			
		10th Ph		on Based on Ordin	nary Differential	Can create sim	aft using Euler's method. Ulation code for 2D motion based			
			luations mulation Using	Cellular Automata	a l	on potential. Can create similautomata.	ulation code using 1D cellular			
	4th	12th Si	mulation Using	Cellular Automata	a		ulation code for traffic flow and the			
	Quarter 1	13th St	ochastic Simula	tion Using Randor	m Numbers	Can explain pse numerical integ Can create sim	explain pseudo-random numbers and lerical integration. create simulation code for the knapsack			
I						problem.				
		14th St	ochastic Simula	tion Using Randor	m Numbers	•	ulation code for a random walk.			
			ochastic Simula nal Exam	tion Using Randor	m Numbers	•	ulation code for a random walk.			
				tion Using Randor	m Numbers	•	ulation code for a random walk.			

	Examination	Presentation	Mutual Evaluations between students	Behavior	Portfolio	Other	Total
Subtotal	10	0	0	0	90	0	100
Basic Proficiency	0	0	0	0	0	0	0
Specialized Proficiency	10	0	0	0	90	0	100
Cross Area Proficiency	0	0	0	0	0	0	0

	Anan College		Year	2024			Course		vanced Physical
			1 Cai	2024			Title	Che	emistry
Course Co		tion 5516Z03			Cauras Catago		Cnasialia	/	Company
Class Forr		Lecture			Course Categor	У	Academi		Compulsory
Departme		1	f Applied Chemic	al Engineering	Student Grade		Adv. 1st		suit. Z
Term		First Sem		ar Engineering	Classes per We				
Textbook Teaching		平山令明	「はじめての量子化	と学」講談社ブルー/	•		機分子の分	子軌	道計算と活用」九州大学出版会
Instructor		Konishi T	omoya						
Course	Objectiv	es							
2. Uses m	iolecular o	rbital calcula	ation software.	ar orbital method. molecules using n		calcul	ation.		
Rubric			1		I				
			Ideal Level		Standard Level			Ac	cceptable Level
Achievem	ent 1		Explains the ca of molecular o	alculation method rbital method.	Discusses the r molecules by m method.	eactiv nolecu	ity of lar orbital	Ex	xplains molecular orbitals.
Achievem	ent 2		Calculates cha and electron d molecular orbi		Discusses the r molecules by m method.			co	alculates molecular Information by molecular bital method.
Achievem	ent 3		Discusses the molecules by method.	reactivity of nolecular orbital	Discusses the r molecules by m method.			m	scusses the stability of olecules by molecular orbital ethod.
Assigne	d Depar	tment Ob	jectives						
	g Metho								
Outline		the electr properties quantum method) molecules applicatio with the r	ronic state of a new can be explain chemical calculations will be introduced and discuss the conference will results calculated.	nolecule is determined in principle by the dition methods (Haist). At the dition methods is the dition method in the dition method in the dition of the diti	ined by its "cominem. After review tree-Fock methowill perform actional actions and absorption sponsital method."	position wing od, va ual mo color, pectra	on" and "s the conce riational r blecular or reactivity, of organi	tructi pt of nethor bital , and c poly	rials and that "physical Why is that? The key is the ethod, we will understand that ure," and that physical molecular orbital, specific od, and self-consistency calculations on several so on. As a practical ymers and compare them
Style		so bring y structure	our own laptop modeling softwa	computer and ear are and quantum o	phones. Hands-c chemical calculat	on lea ion so	rning will oftware ins	be co stalled	e conducted in a BYOD style, onducted using molecular d on each student's laptop. alculation software.
Notice		advance.	•	read the sections c ence book: 藤永茂				ntent	ts of each week's class in
Charact	eristics (of Class /	Division in Le	earning					
□ Active	Learning	•	☑ Aided by IO	CT .	☑ Applicable to	o Rem	ote Class		Instructor Professionally perienced
Course	Dlan								
Course	Pian	 	 Гhете			Goals			
			ecture: The Ori	gin of Atoms		Goals 1. Explains atomic structure and electro configuration. 2. Explains wavefunction Schrödinger equation. 3. Explains quan numbers and their constitutive principle			
		2nd L	_ecture: From At	coms to Molecules	(1)	1. Exp	plains mol e molecula	lecula ar orb	or orbitals. 2. Explains how to oitals. 3. Derives molecular molecules.
		3rd E	Exercise: From A	toms to Molecules	(2)	2. Ca moled	lculates m	iolecu Displa	emical calculation software. ular orbitals of hydrogen ays molecular orbitals of
1st Semeste	1st		ecture: What is method (1)	obtained from mo	lecular orbital	1. Exp	plains mar	ny-bo on. 3	ody problems. 2. Explains . Explains variational and self-
r	Quarter	5th E	Exercise: What worbital method (2	ve can obtain from 2)	molecular	Calcu	lates mole lates elect	ecular	formation of ethane. 2. r orbitals of ethane. 3. density and heat of formation
			Lecture: What is Method (3)	required from Mol	ecular Orbital	equat and to Expla	tion. 2. Ex he Hartree ins the dif	xplair e-Foc feren	eterminant and Hartree-Fock is the LCAO approximation k-Roothaan equation. 3. ice between non-empirical molecular orbital methods.
		7th E	Exercise: Knowir	ng the structure of	molecules (1)	optim deloca optim	iization ca alization o iization ca	lculat of pi e Iculat	atrix. 2. Performs structural tions and explains the electrons by structural tion. 3. Performs ysis of molecules.

	8th	Lecture/Exercise: Knowing the Molecules (2)	Structure of	discusses its state of molecules and	at of formation of a molecule and bility 2. Calculates orbital energy discusses reactivity. 3. static potential of molecules and y.	
	9th	Lecture/Exercise: Distribution o determines molecular propertie		phenol, and acet	erences in acidity of ethanol, ic acid. 2. Calculates narge distribution. 3. Discusses veen molecules.	
	10th	Lecture/Exercise: Distribution o determines properties of moleco		1. Explains the effects of solvents. 2. Calculates the change in chemical structure of glycine by solvent. 3. Calculates and explains the function of Grignard reagent.		
	11th	Lecture/Exercise: Color of mole	cules (1)	configuration into	ron correlation. 2. Explains the eraction (CI) method. 3. d states and electronic spectra of	
2nd Ouarte	12th r	Exercise: Knowing the color of r	molecules (2)	1. Draws and modifies molecules with complex structures. 2. Evaluates changes in molecular structure and their effects on electronic spectra. 3. Predicts changes in indicator color by calculation.		
	13th	Lecture/Exercise: Predicting che (1)	emical reactions	Evaluate the dist	stability of carbocations. 2. ribution of frontier orbitals on redicts reactivity from the ontier orbitals.	
	14th	Exercise: Predicting chemical re	eactions (2)	modes. 2. Perfo calculations for S	ared spectra and vibrational rms TS optimization and IRC N2 reactions and predicts the eaction. 3. Evaluates substituent actions.	
	15th	Exercise: Predicting chemical re	Exercise: Predicting chemical reactions (3)		er orbital theory and Woodward- Explains and calculates of electron cyclic reactions. 3. culates the endo rule of the Diels-	
	16th	[Return of final exam]				
Evaluation Me	thod and	Weight (%)				
		Examination	Portfolio		Total	
Subtotal		70	30		100	
Basic Proficiency		35	15		50	
Specialized Profic	iency	35	15		50	

	Anan Co	llege	Year	2024		Course Title	Environmental Chemistry			
Course	Informa	tion				TICIC				
Course Co		5596101			Course Category	Specializ	red / Elective			
Class For	mat	Lecture			Credits	: 2	,			
Departme	ent	Course of	f Applied Chemic	cal Engineering	Student Grade	Adv. 1st				
Term		First Sem	nester		Classes per Wee	per Week 前期:2				
	Materials		学, 萩野ら, 東京	化学同人						
Instructo		Ota Naote	omo							
1.Explain 2. To be 3. To be 4. To be	able to exp able to exp	ater pollution plain about co plain about e	climate change a energy and wast	ental protection tec and preservation of e recycling in relat Il compounds by gi	ozone layer from to chemistry.		it of view. tal problems related to plastics.			
Rubric			T-1 11 1		la		T			
			Ideal Level	-il abaut air and	Standard Level		minimum Level			
Achievement 1			water pollutio		Explain air and wand environmen technologies wit the material.	tal protection	and environmental protection			
Achievement 2			about climate layer conserva	t of view without	To be able to ex climate change a conservation fro point of view wit materials.	and ozone laye m a chemical	conservation from a chemical			
Achievem	nent 3		between ener	chemistry without	recycling in relat	ion to	Explain energy and waste recycling in relation to chemistry with reference to materials.			
Achievem	nent 4		To be able to explain in detail the generation of useful compounds by green chemistry and environmental issues related to plastics without looking at materials. To be able to explain in detail To be able to expend on the generation of use of the generation of useful to the genera			eful compound stry and ssues related to	by green chemistry and			
Assigne	ed Depar	tment Ob	jectives		•					
Teachin	ng Metho	od								
Outline		the field of	of chemistry, stu	udents learn the re	lationship betwee	n various envii	mentally friendly manufacturing in ronmental problems and vironmentally friendly and			
Style		Students	will be given a	quiz to check their self-study time).	preparation, pres	entations by st	tudents, and reports (30 hours of			
Notice										
Charact	eristics	of Class /	Division in Le	earning	1		1			
□ Active	e Learning		☐ Aided by I	СТ	☐ Applicable to	Remote Class	☐ Instructor Professionally Experienced			
Course	Plan									
Course	i iui i	-	Theme		10	Goals				
			What is Green C	hemistry?			philosophy of green chemistry			
					1	To be able to e	xplain the formation of the			
		2nd (Clean air		ā	itmosphere, ai	r pollutants and acid rain			
		3rd (Clean air				ution trends and countermeasures			
		4th \	Valuable water r	resources		explain the pro as a resource	perties of water and its importance			
	1st Ouarter	5th \	Valuable water r	esources	(Can explain abo environment co	out water purification and water			
		6th (Chemistry of Clir	mate Change			bal warming chemically			
1st Semeste			Chemistry of Clir		E	xplain the cur	rent state of climate change due to s and global warming			
r		8th F	Protect the Ozon	ne Layer	E		ction and destruction of the ozone			
		9th F	Protect the Ozon	ne Layer	Ē		ction and destruction of the ozone			
	10th					بطح منجامين مح	out human society and energy			
		10th 7	Take care of you	ır energy	(zan expiain abo	sat mamam secret, and energy			
	2nd	11th 7	Take care of you	ır energy	(Can explain abo	out renewable energy			
	2nd Quarter	11th 7		ır energy	C E	Can explain abo Explain chemic	out renewable energy al synthesis and greenness			
		11th 7 12th (Take care of you	ir energy bstances	E E	Can explain abo Explain chemic	out renewable energy			

	15th	Waste Recycling			To be able to explain about recycling and recycling-oriented society						
	16th										
Evaluation Method and Weight (%)											
Examination quiz Mutual Evaluations between students Behavior Portfolio Other Total											
Subtotal	0	50	0	0	50	0	100				
Basic Proficiency	0	0	0	0	0	0	0				
Specialized Proficiency	0	50	0	0	50	0	100				
Cross Area Proficiency	0	0	0	0	0	0	0				

A	Anan Co	llege	Year	2024				Experiments in Applied Chemistry	
Course	Informa	tion							
Course Co	ode	5517J01			Course Categor	ry	Specialize	ed / Compulsory	
Class Forr	mat	Experime	t / Practical trai	ning	Credits		Academic	Credit: 2	
Departme	ent	Course of	Applied Chemica	al Engineering	Student Grade				
Term		First Sem	ester		Classes per We	ek	前期:6		
Textbook Teaching		Experime	t description de	signated by each i	instructor / Bibli	ograph	ny assigne	d by each instructor	
Instructor	-	Otani Tak	shi,Sugiyama Yuuki,Ueda Kohei,Ezure Ryosuke						
Course	Objectiv	es							
2. The stu	udents will udents con	acquire the sider the res	pasic experimen ults of experime	tal techniques app ents and solve prob	propriate to the plems from an e	purpos nginee	se of the exering persp	xperiment and experiment. ective.	
Rubric			T		le			Tag	
			Ideal Level		Standard Level			Minimum Level	
Objective	1		Acquire basic e techniques for carry out expend by applying the innovations.	each topic and riments efficiently	Acquire basic e techniques for carry out exper	each to	opic and	Acquire a minimum of basic experimental techniques for each topic and carry out experiments.	
Objective	2		but also proble	om an rspective and conly problems	Consider the re experiments fro engineering pe understand and problems.	om an rspecti	ve, and	Consider the results of the experiment from an engineering point of view and manage to solve the given problem.	
Assigne	d Depar	tment Obj	ectives					•	
	g Metho								
	<u> </u>	The progr	am's objective is	s to cultivate the a	bility to think cr	eativel	y, find and	solve practical problems, and	
Outline		Theme 1:	omplex technolo Synthetic Inora	ogical developmen anic Material expe	t that leads to " riment (1-7 wee	monoz eks)	ukuri" (ma	anufacturing).	
Style		Theme 2:	Synthetic organ of class time]	ic chemistry expe	riment (8-15 we	eekś)			
Notice		One them safety and	e will be conduc follow the instr	ted over 7-8 week uctions of the inst	ks. During the ex ructor in charge	kperim 	ent, stude	nts must pay close attention to	
Charact	eristics (of Class / I	<u>Division in Le</u>	arning					
□ Active	Learning		☑ Aided by IC	Т	☐ Applicable t	o Rem	ote Class	☐ Instructor Professionally Experienced	
Course	Plan								
		Т	neme			Goals			
		1st T	neme 1: Synthe	tic Inorganic Mate	rial experiment	(1) Ur by the experi the ex	nderstand l e sol-gel m imental sec perimenta	now to prepare powder samples ethod, and be able to read the ction in English and understand I procedure accurately.	
		2nd T	neme 1: Synthe	tic Inorganic Mate	rial experiment		epare TiO2 entrifuging	powder by weighing, stirring,	
		3rd T	neme 1: Synthe	tic Inorganic Mate	rial experiment	(3) Sinter the powder.			
	1st	4th T	neme 1: Synthe	tic Inorganic Mate	rial experiment	(4) Me	easure the	xrd of the powder	
	Quarter	5th T	neme 1: Synthe	tic Inorganic Mate	rial experiment	(5) FE	-SEM obse	ervation	
		6th T	neme 1: Synthe	tic Inorganic Mate	rial experiment	(6) FT	-IR measu	irement	
		7th T	neme 1: Synthe	tic Inorganic Mate	rial experiment	(7) Su by ref	ımmarize t lecting on	the entire experiment in a report it.	
1st			neme 2: Synthe operiments	tic organic chemis	try	experi	imental sed	the Diels-Alder reaction, read the ction in English, and understand I procedure accurately.	
Semeste r			neme 2: Synthe operiments	tic organic chemis	try	(9) In cyclop	carrying o	out the Diels-Alder reaction, is distilled.	
			neme 2: Synthe eperiments	tic organic chemis	try			ne Diels-Alder reaction.	
			neme 2: Synthe eperiments	tic organic chemis	try	(11) P	urify addu	cts.	
	2nd		neme 2: Synthe eperiments	tic organic chemis	try	(12) A	analyze the	e NMR of the adducts.	
	Quarter		neme 2: Synthe	tic organic chemis	try	(13)	Determine	the steric structure of the adduct.	
			neme 2: Synthe operiments	tic organic chemis	try	(14) E adduc	xplain the ts using or	steric structure and endo rule of bital theory.	
			neme 2: Synthe operiments	tic organic chemis	try	(15) Summarize the entire experiment in a rep by reflecting on it.			
		16th							
Evaluati	ion Meth	od and W	eight (%)						

	Examination	Quiz	Portfolio	Presentation and Attitude	Other	Total
Subtotal	0	0	100	0	0	100
Basic Proficiency	0	0	0	0	0	0
Specialized Proficiency	0	0	80	0	0	80
Cross Area Proficiency	0	0	20	0	0	20

A	Anan Co	llege	Year	2024		C	Course Title	Advanced Physical Chemistry		
Course	Informa	tion	1	•		•	-	,		
Course Co		5517Z03			Course Categor	У	Specializ	ed / Compulsory		
Class Forr	nat	Lecture			Credits	•	Academi	c Credit: 2		
Departme	ent	Course of	Applied Chemi	cal Engineering	Student Grade					
Term		First Sem	ester		Classes per We					
Textbook Teaching		平山令明	「はじめての量子	化学」講談社ブルー	- バックス / 染川賢一「有機分子の分子軌道計算と活用」九州大学出版会					
Instructor	-	Konishi T	omoya							
2. Uses m	is the cond	cept and prir	ation software.	lar orbital method.		calcul	ation			
Rubric	ocs variou	s properties	and reactions o	Tholecales asing h	noicealar orbitar	caicai	acion.			
Kubi ic			Ideal Level		Standard Level			Acceptable Level		
					Discusses the re	aactivi	ity of	Acceptable Level		
Achievem	ent 1		of molecular of	alculation method orbital method.	molecules by m method.	olecul	lar orbital	Explains molecular orbitals.		
Achievement 2			Calculates cha and electron of molecular orb	arge distribution density by ital method.	Discusses the remolecules by method.	eactivi olecul	ity of lar orbital	Calculates molecular conformation by molecular orbital method.		
Achievem	Discusses the reactivity of molecules by molecular orbital method.				Discusses the remolecules by method.			Discusses the stability of molecules by molecular orbital method.		
Assigne	d Depar	tment Ob	jectives							
Teachin	g Metho	od								
Outline		properties quantum method) molecules applicatio with the r	s can be explain chemical calcul. will be introduce and discuss the n, students will results calculate will learn through	ned in principle by to ation methods (Hai ed. Next, students eir conformation, persaure the infrared by the moleculared hectures and pragh lectures and pragation methods.	hem. After revie rtree-Fock metho will perform actu oolarity, acidity, o ed absorption sp orbital method. actical training. T	wing tod, valual mocolor, oectra	the concepriational molecular or reactivity, of organic	ructure," and that physical of of molecular orbital, specific nethod, and self-consistency bital calculations on several and so on. As a practical polymers and compare them ill be conducted in a BYOD style,		
Style		structure The perio	modeling softw dic examination	rare and quantum on will include a prac	themical calculati tical test on the	ion so quant	ftware ins um chemi	pe conducted using molecular ´ ´ talled on each student's laptop. cal calculation software.		
Notice		ladvance.	·	read the sections or rence book: 藤永茂				ntents of each week's class in		
Charact	eristics	of Class /	Division in Le	earning	1					
□ Active	Learning		☑ Aided by I	СТ	☑ Applicable to	Rem	ote Class	☐ Instructor Professionally Experienced		
Course	Plan									
		1	Theme		Goals					
		1st L	ecture: The Ori	igin of Atoms		config Schrö	juration. 2	nic structure and electron 2. Explains wavefunction and Jation. 3. Explains quantum Jeir constitutive principles.		
		2nd L	ecture: From A	toms to Molecules	(1)	derive	e molecula	ecular orbitals. 2. Explains how to r orbitals. 3. Derives molecular ogen molecules.		
		3rd E	Exercise: From A	Atoms to Molecules	(2)	2. Cal molec	culates m	n chemical calculation software. olecular orbitals of hydrogen Displays molecular orbitals of cules.		
1st Semeste	1st	4th L	ecture: What is nethod (1)	obtained from mo	ileculai orbitai	Hartre		y-body problems. 2. Explains n. 3. Explains variational and self- thods.		
r	Quarter		Exercise: What vorbital method (we can obtain from 2)	molecular	Calcul	lates mole lates elect	conformation of ethane. 2. cular orbitals of ethane. 3. ron density and heat of formation		
			ecture: What is Method (3)	required from Mol	ecular Orbital	equat and th Explai	ion. 2. Ex ne Hartree ins the diff	er determinant and Hartree-Fock plains the LCAO approximation Fock-Roothaan equation. 3. Ference between non-empirical ical molecular orbital methods.		
		7th E	Exercise: Knowii	ng the structure of	molecules (1)	optim deloca optim	ization cal alization o ization cal	Z-matrix. 2. Performs structural culations and explains the fpi electrons by structural culation. 3. Performs analysis of molecules.		

	8th	Lecture/Exercise: Knowing the Molecules (2)	Structure of	discusses its state of molecules and	at of formation of a molecule and bility 2. Calculates orbital energy discusses reactivity. 3. static potential of molecules and y.	
	9th	Lecture/Exercise: Distribution o determines molecular propertie		phenol, and acet	erences in acidity of ethanol, ic acid. 2. Calculates narge distribution. 3. Discusses veen molecules.	
	10th	Lecture/Exercise: Distribution o determines properties of moleco		1. Explains the effects of solvents. 2. Calculates the change in chemical structure of glycine by solvent. 3. Calculates and explains the function of Grignard reagent.		
	11th	Lecture/Exercise: Color of mole	cules (1)	configuration into	ron correlation. 2. Explains the eraction (CI) method. 3. d states and electronic spectra of	
2nd Ouarte	12th r	Exercise: Knowing the color of r	molecules (2)	1. Draws and modifies molecules with complex structures. 2. Evaluates changes in molecular structure and their effects on electronic spectra. 3. Predicts changes in indicator color by calculation.		
	13th	Lecture/Exercise: Predicting che (1)	emical reactions	Evaluate the dist	stability of carbocations. 2. ribution of frontier orbitals on redicts reactivity from the ontier orbitals.	
	14th	Exercise: Predicting chemical re	eactions (2)	modes. 2. Perfo calculations for S	ared spectra and vibrational rms TS optimization and IRC N2 reactions and predicts the eaction. 3. Evaluates substituent actions.	
	15th	Exercise: Predicting chemical re	Exercise: Predicting chemical reactions (3)		er orbital theory and Woodward- Explains and calculates of electron cyclic reactions. 3. culates the endo rule of the Diels-	
	16th	[Return of final exam]				
Evaluation Me	thod and	Weight (%)				
		Examination	Portfolio		Total	
Subtotal		70	30		100	
Basic Proficiency		35	15		50	
Specialized Profic	iency	35	15		50	

,	Anan Co	llege	Year	2024			ourse Title	Environmental Chemistry
Course	Informa	tion	I				TICIC	
Course Co		5597101			Course Categor	у	Specializ	ed / Elective
Class For	mat	Lecture			Credits		Academi	c Credit: 2
Departme	ent	Course o	f Applied Chemic	cal Engineering	Student Grade		Adv. 2nd	1
Term		First Sen	nester		Classes per Wee	ek	前期:2	
	Materials		学, 萩野ら, 東京	化学同人				
Instructo		Ota Naot	tomo					
1.Explain 2. To be a 3. To be a 4. To be a	able to exp able to exp	ater pollutio plain about o plain about o	climate change a energy and wast	ental protection tec and preservation of te recycling in relat al compounds by gi	ozone layer fron ion to chemistry.			t of view.
Rubric			Ideal Loyel		Standard Level			minimum Lovel
			Ideal Level	ail about air and	Standard Level			minimum Level
Achievem	nent 1		water pollutio environmenta		Explain air and and environmer technologies with the material.	ntal pr	otection	Explain air and water pollution and environmental protection technologies with reference to materials.
Achievement 2			about climate	t of view without	To be able to ex- climate change conservation fro point of view wi materials.	and o	zone laye hemical	conservation from a chemical
Achievem	nent 3		Explain in deta	ail the relationship gy and waste chemistry without	recycling in rela	tion to)	Explain energy and waste recycling in relation to chemistry with reference to materials.
Achievem	nent 4		compounds by green chemistry by green chemis			useful compounds generation of useful compounds by green chemistry and environmental issues rela		
Assigne	d Depar	tment Ob	jectives		•			
Teachin	ng Metho	od						
Outline		the field chemistr	of chemistry, stu	udents learn the re	lationship betwee	en vari	ious envir	mentally friendly manufacturing in onmental problems and vironmentally friendly and
Style		Students class tim	will be given a of e + 60 hours of	quiz to check their self-study time).	preparation, pres	sentati	ions by st	audents, and reports (30 hours of
Notice								
Charact	eristics	of Class /	Division in Le	earning				
□ Active	Learning		☐ Aided by I	СТ	☐ Applicable to	Rem	ote Class	☐ Instructor Professionally Experienced
Course	Plan							
			Theme			Goals		-
		1 1	What is Green C	hemistry?			xplain the	philosophy of green chemistry
			Clean air	<u> </u>	-	To be	able to ex	xplain the formation of the
							•	r pollutants and acid rain
			Clean air Valuable water r	esources		Explaii	n the pro	ution trends and countermeasures perties of water and its importance
	1st Quarter	5th	Valuable water r	esources		Can ex	esource xplain abo	out water purification and water
	Quarter	6th	Chemistry of Clir	mate Change				bal warming chemically
1st			Chemistry of Clir			Explaii humar	n the curi n activitie	rent state of climate change due to s and global warming
Semeste r		8th	Protect the Ozor	ne Layer		Explaii	ermeasure n the fund	es ction and destruction of the ozone
			Protect the Ozor			layer Explaiı layer	n the fund	ction and destruction of the ozone
			Take care of you	<u> </u>			xplain aho	out human society and energy
	2nd		Take care of you	5,			•	out renewable energy
	Quarter	H	Create useful su	<u> </u>			•	al synthesis and greenness
			Create useful su			Explaii	n the role	of green chemistry in chemical
						synthe		out bisulaction
		14th	Polymer Chemis	try		can ex	xpiain abo	out bioplastics

	15th	Waste Recycling			To be able to explain about recycling and recycling-oriented society						
	16th										
Evaluation Method and Weight (%)											
Examination quiz Mutual Evaluations between students Behavior Portfolio Other Total											
Subtotal	0	50	0	0	50	0	100				
Basic Proficiency	0	0	0	0	0	0	0				
Specialized Proficiency	0	50	0	0	50	0	100				
Cross Area Proficiency	0	0	0	0	0	0	0				

,	Anan Co	llege	Year	2024			ourse Title	Composite Materials	
Course	Informa	tion		· L				1	
Course Co		5597C0 ²	4		Course Categor	ν	Specializ	ed / Elective	
Class Forr		Lecture	•		Credits	,		Credit: 2	
Departme			of Applied Chemic	cal Engineering	Student Grade Adv. 2nd				
Term		First Ser	• •		Classes per We	ek	前期:2		
Textbook Teaching	and/or Materials	FRP Bas	ics (KORONA PU	BLISHING CO., LTI	D)				
Instructor	-	Kadono	Takuma						
1. Able to 2. Able to plastics), 3. Able to	understar and explai	nd the know nd the defir n their bas	nition, uses, mate ics.	erials, molding met	hods, characteri	stics, a	and desig	explain their basics. In methods of FRP (fiber reinforced ional concrete using various	
Rubric									
10.0.10			Ideal Level		Standard Level			Minimum Level	
			Able to under	stand the					
Achievem	ent 1		various compo and explain th problems, and	d technology of osite materials, ne basics, pose make egarding them.	Able to underst knowledge and various compos explain the bas	technosite ma	ology of Iterials ar	Able to explain the basics of knowledge and technology for various composite materials.	
Achievem	Able to understand d uses, materials, mole methods, characteris design methods relat and explain the basic problems, and make			ls, molding racteristics and ds related to FRP, ne basics, pose	Able to underst definitions, use molding metho characteristics methods of FRI their basics.	s, mat ds, and de	erials, sian	Able to explain the basics of FRP definitions, applications, materials, molding methods, properties and design methods.	
Achievement 3			concrete that performance a multifunctiona reinforcing ma	d technology of can be made high and al with various aterials and nd explain the problems, and	concrete that can be made high performance and multi- functional with various			Able to explain the basics of knowledge and technology related to concrete, which can be enhanced and multifunctional with various reinforcing materials and admixtures.	
Assigne	d Depar	tment Ob	piectives		•				
	g Metho		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,						
Outline	<u> </u>	The stud function uses var The st molding	al materials, FRP ious materials to udents of this co methods, proper	that is a composite improve performa urse will will be ab	e material with a ince and increase le to acquire kno ods, and applicat	wide e funct wledgo ions, a	range of ionality. e and skil nd impro	as structural materials and applications, and concrete that ls regarding the materials used, we your technical skills in design, ment.	
Style		【31 cla	ss hours + final e	exam + 60 self-stu		ce this	course is	a credit course, it is necessary to	
Notice		This sub accredite handout world, is use the understa	ject is included ir ed Creative Techi s, videos, etc., so a classic and cu textbooks on con and the basics in	nology System Engo please do not mis tting-edge compos struction materials advance.	alized Fields, whi jineering prograr ss class. Concre ite material. Be	m. Thete, the efore p	iis class is e most wi articipatir	nent for completing the JABBE- ca lecture that uses textbooks, dely used industrial material in the ing in these concrete classes, please construction course and	
Cnaract	eristics (or Class /	Division in Le	earning	1				
□ Active	Learning		☐ Aided by I	СТ	☐ Applicable t	o Rem	ote Class	☐ Instructor Professionally Experienced	
Course	Dlan								
Course	ııaıı		Theme		I	Goalc			
		1st		ous composite mate		them. / Able to describe types of materials, materials used, moldir		ons, etc. of the class, and explain describe types of composite	
1st Semeste	1st Quarter	2nd	Various composi	te materials		Able to mater	o describe	e types of composite materials, molding methods, properties, a, applications, etc.	
r	Quarter	3rd	Various composi	te materials		Able to mater	o describe	e types of composite materials, molding methods, properties, a, applications, etc.	
		4th	Various composi	te materials		Able to mater	o describe	e types of composite materials, molding methods, properties, a, applications, etc.	

		5th	Various composit	e materials		Able to describe materials used, design method	molding meth	posite materials, ods, properties, etc.			
		6th	FRP				Able to explain the definition of FRP, use, material, molding method, characteristics, design method, etc.				
		7th	FRP			Able to explain material, moldi method, etc.	the definition on the method, characteristics	of FRP, use, aracteristics, design			
		8th	FRP			Able to explain material, moldi method, etc.	the definition on the method, characteristics	of FRP, use, aracteristics, design			
		9th	Midterm exam								
		10th	Return of exam p	apers / FRP		Able to explain material, moldi method, etc.		of FRP, use, aracteristics, design			
		11th	FRP			Able to explain material, moldi method, etc.	the definition on the method, characteristics	of FRP, use, aracteristics, design			
	12th 2nd Quarter		FRP			Able to explain material, moldi method, etc.		of FRP, use, aracteristics, design			
			High Performance Concrete	e Concrete / Multi	ifunctional	Able to explain uses of various admixtures for characteristics performance co concrete using	reinforcing ma concrete, and e and application oncrete and mu	explain the s of high-			
		14th	High Performance Concrete	e Concrete / Multi	ifunctional	uses of various admixtures for characteristics performance co	Able to explain the types, characteristics, and uses of various reinforcing materials and admixtures for concrete, and explain the characteristics and applications of high-performance concrete and multifunctional concrete using these.				
		15th	High Performance Concrete	e Concrete / Multi	ifunctional	Able to explain the types, characteristics, and uses of various reinforcing materials and admixtures for concrete, and explain the characteristics and applications of high-performance concrete and multifunctional concrete using these.					
		16th	(Final exam) Retu	ırn of exam pape	rs						
Evaluati	on Meth	nod and \	Weight (%)								
	Ex	Examination Presentation		Mutual Evaluations between students	Behavior	Portfolio	Other	Total			
Subtotal	I 60 0		0	0	40	0	100				
Basic Proficience	у -	10 0 0		0	0	10	0	20			
Specialize Proficience	y 30		0 0 0			20 0 50					
Cross Are Proficience			0	0	0	10	0	30			

Course Information Course Code		Anan Co	lleae	Year	2024		Course	Mathematics of Electronics		
Course Code Class Format Lecture Credits Case Format Lecture Credits Case Format Course of Appled Chemical Engineering Student Grade First Semester First Semester First Semester First Course of Dispectives Supino Ryuzaburo Course Objectives 1. We can understand Supino Ryuzaburo Course Objectives 1. We can understand the construction method of differental equation, and compute of its fundamental computation. 3. We can understand the construction method of differental equation, and compute of its fundamental problems. Rubric Lideal Level We can understand Fourier series an its tranformations and grade problems. Rubric Lideal Level We can understand Fourier series an its tranformations and problems. Rubric Lideal Level We can understand Fourier series an its tranformations and grade problems. Achievement 2 Lideal Level We can understand spates transformation and problems. Achievement 2 We can understand spates transformation and problems. Achievement 3 We can understand the construction method of differential equation and apply differential equation and apply differential equation and grade problems. Assigned Department Objectives Teaching Method We are to make a concentration for our class and use the knowledges and techniques about basic construction method of problems. Lideal Level We are to make a concentration for our class and use the knowledges and techniques about basic construction of the next three phases. 1. Review the important facts from the previous class. 2. Lecture about the new section. Please make a good preparation and self-review. You will built up the good style to dis homework of the previous class. Characteristics of Class / Division in Learning List Fourier Series Themse List Fourier Series Themse List Fourier Series List Course Series List Fourier Series L					1-0-		Title	and Information		
Class Format Lecture Course of Applied Chemical Engineering Classes per Week Right 2						Course Categor	y Specializ	ed / Flective		
Department First Semuster First Double Market Semuster First Semus								-		
Texthook and/or Teaching Materials Enshu to Ouyo Bibunhouteishiki, Saiensu Sha Institutor Sugno Ryuzaburo Sugn				Applied Chemica	al Engineering					
Teaching Materials Sugine Nyuraburo	Term			• •		Classes per Wee				
Course Objectives 1. We can understand Furier series and its transformation, and compute of its fundamental computation. 3. We can understand the construction method of differental equation, and compute of its fundamental problems. Rubric Ideal Level We can understand the construction method of differental equation, and compute of its fundamental problems. Rubric Ideal Level We can understand formation and apply these for the various appl			Enshu to C	ouyo Bibunhout	eishiki, Saiensu Sh	na				
1. We can understand Funiter series and its transformation, and compute of its fundamental computation. 2. We can understand Laplace transformation and operational classulus, and compute of its fundamental computation. 3. We can understand the construction method of differental equation, and compute of its fundamental problems. Rubric Ideal Level	Instructor	r	Sugino Ryı	uzaburo						
2. We can understand the construction method of differential equation, and compute of its fundamental computation. Rubric Ideal Level	Course	Objectiv	es							
Ideal Level We can understand Fourier series an its tranformations and apply these for the various problems. We can understand fourier series and the construction method and apply problems. We can understand the coperation method and apply problems. We can understand the coperation method and apply problems. We can understand the coperation method and compute the fundamental problems. We can understand the coperation method and compute the construction method of differential equation and apply these for the fundamental problems. We can understand the coperation method of differential equation and apply these for the fundamental problems. We can understand the construction method of differential equation and compute the fundamental problems. We can understand the construction method of differential equation and compute the fundamental problems. We can understand the construction method of differential equation and compute the fundamental problems. We can understand the construction method of differential equation and compute the fundamental problems. We can understand the construction method of differential equation and compute the fundamental problems. We can understand the construction method of differential equation and compute the fundamental problems. We can understand the construction method of differential equation and compute the fundamental problems. I review the important facts from the previous class. Province about the new section. 3. short exercises. Short exercises. Applicable to Remote Class I review the important facts from the previous class. Please make a good preparation and self-review. Ye will build up the good style to do homework of the previous class. I review the important facts from the previous class. I review the important problems. I st. Fourier Series We can understand Fourier series and compute its fundamental problems. St. Fourier Series We can understand the problems. St. Fourier Series We can understand the four	2. We car	า understa	nd Laplace tra	ansformation ar	nd operational cals	sulus, and compu	ite of its fundar	nental computaion.		
Achievement 1 We can understand Fourier series an its transformations and apply these for the various problems. We can understand Laplace transformations and the fundamental problems. We can understand Laplace transformations and the operation method and compute fundamental problems. We can understand taplace transformations and the operation method and compute fundamental problems. We can understand the construction method of differential equation and apply problems. We can understand the construction method of differential equation and apply problems. We can understand the construction method of differential equation and apply problems. We are to make a concentration for our class and use the fundamental problems.	Rubric									
Achievement 1 series an its tranformations and apply these for the various problems. We can understand Laplace transformations and the ophyshese for the fundamental problems. We can understand Laplace transformations and the ophyshese for the fundamental problems. We can understand the problems. We can understand the construction method of differential equation and apply these for the fundamental problems. We can understand the construction method of differential equation and apply these for the fundamental problems. Assigned Department Objectives Teaching Method Outline We are to make a concentration for our class and use the knowledges and techniques about basic mathematics to construction of understanding of Fourier and Laplace transformations and the construction method of differential equation and compute the fundamental problems. Assigned Department Objectives Teaching Method Outline We are to make a concentration for our class and use the knowledges and techniques about basic mathematics to construction of understanding of Fourier and Laplace transformations and the construction method of differential equation and compute the fundamental problems. Style Our class is construction for our class and use the knowledges and techniques about basic mathematics to construction of the next three phases. 1. Review the important facts from the previous class. 2. Lecture about the new section. 3. Short exercises. Please make a good preparation and self-review. You will build up the good style to do homework of the previous class. Characteristics of Class / Division in Learning Active Learning Them Goals Theme Goals We can understand the applications of Fourier series and compute its fundamental problems. The fourier Series The fourier Series The fourier series and compute its fundamental problems. The fourier series and compute its fundamental problems. The fou				Ideal Level		Standard Level		Unacceptable Level		
Achievement 2 bransformations and the operation method and apply these for the fundamental problems. We can understand the construction method and apply these for the fundamental problems. We can understand the construction method of compute the fundamental problems. We can understand the construction method of compute the fundamental problems. Achievement 3 bransformations and part of the fundamental problems. Achievement 3 bransformations and part of the fundamental problems. Assigned Department Objectives Teaching Method Outline We are to make a concentration for our class and use the knowledges and techniques about basic mathematics to construction of understanding of Fourier and Laplace transformation and building up the solutions of ordinary and partial differential equations. Our class is construction of the next three phases. 1. Review the important facts from the previous class. 2. Lecture about the new section. 3. Short overcless. Notice Please make a good preparation and self-review. You will build up the good style to do homework of the previous class. Characteristics of Class / Division in Learning Active Learning Active Learning Applicable to Remote Class Series and compute its fundamental problems. Theme Goals Fourier Series We can understand Fourier series and compute its fundamental problems. Theme We can understand formation and compute its fundamental problems. The fourier Series We can understand formation and compute its fundamental problems. The fourier Analysis Fourier series we contend the applications of Fourier series and compute its fundamental problems. The fourier Analysis Fourier series and compute its fundamental problems. The fourier Analysis We can understand the popular analysis using Fourier transformation and compute its fundamental problems. We can understand the fourier analysis of differential equation and compute its fundamental problems. We can understand the basis and dimension of subspace and compute its fundamental problems. We can understand	Achievem	Achievement 1			anformations and	series an its tra compute these	nformations and for the	series an its tranformations, and compute of its elementary		
Achievement 3 construction method of differential equation and apply these for the fundamental problems. construction method of differential equation and compute the fundamental problems. Assigned Department Objectives Teaching Method Outline We are to make a concentration for our class and use the knowledges and techniques about basic mathematics to construction of understanding of Fourier and Laplace transeformation and building up the solutions of ordinary and partial differential equations. Our class is construction of the next three phases. 1. Review the important facts from the previous class. 2. Lecture about the new section. 3. Short exercises. Notice Please make a good preparation and self-review. You will build up the good style to do homework of the previous class. Characteristics of Class / Division in Learning Applicable to Remote Class Instructor Professionally Experienced Instructor Professionally Experienced Soals Instructor Professionally Experienced Soals Instructor Professionally Experienced	Achievem	ent 2		transformation operation meth these for the fu	s and the nod and apply	transformations operation method	and the od and compute	Laplace transformations and the operation method and compute		
Teaching Method We are to make a concentration for our class and use the knowledges and techniques about basic mathematics to construction of understanding of Fourier and Laplace transeformation and building up the solutions of ordinary and partial differential equations. Style Our class is construction of the next three phases. 1. Review the important facts from the previous class. 2. Lecture about the new section. 3. Short exercises. Notice Please make a good preparation and self-review. You will build up the good style to do homework of the previous class. Characteristics of Class / Division in Learning Active Learning Active Learning Theme Goals Theme Goals 1st Fourier Series Ye can understand Fourier series and compute its fundamental problems. 2nd Fourier Series We can understand complex Fourier series and compute its fundamental problems. 1st Quarter Atther Fourier Series We can understand Complex Fourier series and compute its fundamental problems. 4th Fourier Series We can understand Fourier transeformation and compute its fundamental problems. 4th Fourier Series We can understand Fourier transeformation and compute its fundamental problems. We can understand Fourier transeformation and compute its fundamental problems. We can understand the fourier analysis using Fourier transeformation and compute its fundamental problems. We can understand the frequency analysis using Fourier transeformation and compute its fundamental problems. We can understand the frourier analysis of differential equation and compute its fundamental problems. We can understand the frourier analysis of differential equation and compute its fundamental problems. We can understand the frourier transeformation and compute its fundamental problems. 10th Laplace Transeformation We can understand the problems. We can understand the fundamental problems.	Achievem	Achievement 3			nethod of nation and apply	construction method of differentail equation and compute the fundamental		construction method of differentail equation and compute of its elementary		
Outline	Assigne	d Depar	tment Obje	ectives						
Outline mathematics to construction of understanding of Fourier and Laplace transeformation and building up the solutions of ordinary and partial eduations. Style Our class is construction of the next three phases.	Teachin	ig Metho	d							
1. Review the important facts from the previous class. 2. Lecture about the new section. 3. Short exercises. Notice Please make a good preparation and self-review. You will build up the good style to do homework of the previous class. Characteristics of Class / Division in Learning	Outline		mathemati	ics to constructi	ion of understandi	ng of Fourier and	nowledges and t d Laplace transe	echniques about basic eformation and building up the		
Notice	Style		1. Review 2. Lecture	the important for about the new	acts from the prev	hases. vious class.				
□ Active Learning □ Aided by ICT □ Applicable to Remote Class □ Instructor Professionally Experienced Course Plan Theme □ Goals 1st Fourier Series □ We can understand Fourier series and compute its fundamental problems. 2nd Fourier Series □ We can understand the applications of Fourier series and compute its fundamental problems. 4th Fourier Series □ We can understand Fourier ranseformation and compute its fundamental problems. 4th Fourier Series □ We can understand Fourier transeformation and compute its fundamental problems. 5th Fourier Series □ We can understand Fourier intergrals and compute its fundamental problems. 6th Fourier Analysis □ We can understand Fourier intergrals and compute its fundamental problems. 7th Fourier Analysis □ We can understand the frequency analysis using Fourier transeformation and compute its fundamental problems. 8th Mid-term examination □ We can understand the Fourier analysis of differential equation and compute its fundamental problems. 1th Laplace Transeformation □ We can understand the applications of Laplace transformation and compute its fundamental problems. 1th Laplace Transeformation □ We can understand the basis and dimension of subspace and compute its fundamental problems. 1th Differential Equation and Vector understand the basis and dimension of subspace and compute its fundamental problems.	Notice		Please mak You will bu	ke a good prepa ild up the good	aration and self-re style to do home	view. work of the previ	ious class.			
Course Plan Theme Goals Ist Fourier Series Indiamental problems. Ist Quarter Theme Goals We can understand Fourier series and compute its fundamental problems. We can understand complex Fourier series and compute its fundamental problems. We can understand complex Fourier series and compute its fundamental problems. We can understand Fourier transeformation and compute its fundamental problems. The Fourier Series We can understand Fourier transeformation and compute its fundamental problems. We can understand Fourier intergrals and compute its fundamental problems. We can understand Fourier intergrals and compute its fundamental problems. We can understand the frequency analysis using Fourier transeformation and compute its fundamental problems. We can understand the Fourier analysis of differential equation and compute its fundamental problems. We can understand the problems and compute its fundamental problems. We can understand the problems. We can understand Laplace transeformation and compute its fundamental problems. We can understand the applications of Laplace transformation and compute its fundamental problems. We can understand the applications of Laplace transformation and compute its fundamental problems. We can understand the basis and dimension of subspace and compute its fundamental problems. We can understand the basis and dimension of subspace and compute its fundamental problems. We can understand the linear mapping of vector	Charact	eristics	of Class / D	ivision in Le	arning					
Theme Goals Start Fourier Series We can understand Fourier series and compute its fundamental problems.	□ Active	Learning		☐ Aided by IC	CT	☐ Applicable to	Remote Class			
Theme Goals Start Fourier Series We can understand Fourier series and compute its fundamental problems.	Course	Dlan								
1st Fourier Series We can understand Fourier series and compute its fundamental problems. 2nd Fourier Series We can understand the applications of Fourier series and compute its fundamental problems. 3rd Fourier Series We can understand complex Fourier series and compute its fundamental problems. 4th Fourier Series We can understand Fourier transeformation and compute its fundamental problems. 5th Fourier Series We can understand Fourier intergrals and compute its fundamental problems. 6th Fourier Analysis We can understand the frequency analysis using Fourier transeformation and compute its fundamental problems. 7th Fourier Analysis We can understand the Fourier analysis of differential equation and compute its fundamental problems. 8th Mid-term examination 9th Laplace Transeformation We can understand Laplace transeformation and compute its fundamental problems. 10th Laplace Transeformation We can understand the applications of Laplace transformation and compute its fundamental problems. 11th Laplace Transeformation We can understand the paplications of Laplace transformation and compute its fundamental problems. We can understand the paplications of Laplace transformation and compute its fundamental problems. We can understand the basis and dimension of subspace and compute its fundamental problems.	Course	riall		neme		I.	Goals			
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Series and compute its fundamental problems. 3rd Fourier Series We can understand complex Fourier series and compute its fundamental problems. 4th Fourier Series We can understand Fourier transeformation and compute its fundamental problems. 5th Fourier Series We can understand Fourier intergrals and compute its fundamental problems. 6th Fourier Analysis We can understand the frequency analysis using Fourier transeformation and compute its fundamental problems. 7th Fourier Analysis We can understand the Fourier analysis of differential equation and compute its fundamental problems. 8th Mid-term examination 9th Laplace Transeformation We can understand Laplace transeformation and compute its fundamental problems. 10th Laplace Transeformation We can understand the applications of Laplace transformation and compute its fundamental problems. 11th Laplace Transeformation We can understand the basis and dimension of subspace and compute its fundamental problems. We can understand the basis and dimension of subspace and compute its fundamental problems. We can understand the basis and dimension of subspace and compute its fundamental problems.			1st Fo	ourier Series						
Stand Quarter Sth Fourier Series We can understand Fourier transeformation and compute its fundamental problems.			2nd Fo	ourier Series			series and com	pute its fundamental problems.		
1st Quarter Sth Fourier Series Compute its fundamental problems. We can understand Fourier intergrals and compute its fundamental problems. We can understand the frequency analysis using Fourier transeformation and compute its fundamental problems. 7th Fourier Analysis We can understand the Fourier analysis of differential equation and compute its fundamental problems. 8th Mid-term examination 9th Laplace Transeformation We can understand Laplace transeformation and compute its fundamental problems. 10th Laplace Transeformation We can understand the applications of Laplace transformation and compute its fundamental problems. 11th Laplace Transeformation We can understand the basis and dimension of subspace and compute its fundamental problems. We can understand the basis and dimension of subspace and compute its fundamental problems. We can understand the basis and dimension of subspace and compute its fundamental problems.			3rd Fo	ourier Series				•		
Pourier Series Sth Fourier Series We can understand Fourier intergrals and compute its fundamental problems. We can understand the frequency analysis using Fourier transeformation and compute its fundamental problems. We can understand the Fourier analysis of differential equation and compute its fundamental problems. We can understand the Fourier analysis of differential equation and compute its fundamental problems. We can understand Laplace transeformation and compute its fundamental problems. We can understand Laplace transeformation and compute its fundamental problems. We can understand the applications of Laplace transformation and compute its fundamental problems. We can understand the basis and dimension of subspace and compute its fundamental problems. We can understand the basis and dimension of subspace and compute its fundamental problems. We can understand the basis and dimension of subspace and compute its fundamental problems.		1st	4th Fo	ourier Series			compute its fun	damental problems.		
1st Semeste r The Fourier Analysis Fourier transeformation and compute its fundamental problems. We can understand the Fourier analysis of differential equation and compute its fundamental problems. 8th Mid-term examination 9th Laplace Transeformation We can understand Laplace transeformation and compute its fundamental problems. We can understand Laplace transeformation and compute its fundamental problems. We can understand the applications of Laplace transformation and compute its fundamental problems. 10th Laplace Transeformation We can understand the basis and dimension of subspace and compute its fundamental problems. We can understand the basis and dimension of subspace and compute its fundamental problems. We can understand the basis and dimension of subspace and compute its fundamental problems. We can understand the basis and dimension of subspace and compute its fundamental problems.			5th Fo	ourier Series						
7th Fourier Analysis We can understand the Fourier analysis of differential equation and compute its fundamental problems. 8th Mid-term examination 9th Laplace Transeformation We can understand Laplace transeformation and compute its fundamental problems. We can understand the applications of Laplace transformation and compute its fundamental problems. We can understand the applications of Laplace transformation and compute its fundamental problems. We can understand the basis and dimension of subspace and compute its fundamental problems. We can understand the basis and dimension of subspace and compute its fundamental problems. We can understand the basis and dimension of subspace and compute its fundamental problems.			6th Fo	ourier Analysis			Fourier transefo fundamental pr	ormation and compute its oblems.		
9th Laplace Transeformation We can understand Laplace transeformation and compute its fundamental problems. 10th Laplace Transeformation We can understand the applications of Laplace transformation and compute its fundamental problems. 11th Laplace Transeformation We can understand the basis and dimension of subspace and compute its fundamental problems. 12th Differential Equation and Its Function Chase We can understand the linear mapping of vector			7th Fo	ourier Analysis	rier Analysis			Idifferential equation and compute its fundamental		
2nd Quarter 10th Laplace Transeformation Laplace Transeformation Laplace Transeformation Laplace Transeformation Laplace Transeformation Laplace Transeformation Me can understand the problems. We can understand the basis and dimension of subspace and compute its fundamental problems. We can understand the basis and dimension of subspace and compute its fundamental problems. We can understand the linear mapping of vector			8th Mi	d-term examin	ation					
2nd Quarter 10th Laplace Transeformation transformation and compute its fundamental problems. 11th Laplace Transeformation We can understand the basis and dimension of subspace and compute its fundamental problems. 12th Differential Equation and Its Function Chasses We can understand the linear mapping of vector			9th La	place Transefo	rmation					
11th Laplace Transeformation We can understand the basis and dimension of subspace and compute its fundamental problems. 12th Differential Equation and Its Function Chass			10th La	place Transefo	rmation		transformation	and the applications of Laplace and compute its fundamental		
12th Differential Equation and Its Function Chase We can understand the linear mapping of vector		Quarter	11th La	place Transefo	rmation		We can understand the basis and dimension of			
			12th Di	fferential Equat	ion and Its Function	on Space	We can underst	and the linear mapping of vector oute its fundamental problems.		

		13th	Differential Equat	ion and Its Func	tion Space		matrix and co	ge of basis and mpute its
		14th	The Solutions of F	Partial Differentia	al Equation			ruction method of nd explain of it.
		15th	The Solutions of F	Partial Differentia	l Equation	We can compu problems using differential equ	ite the fundam construction lation's solution	ental applicated method of partial าร.
		16th	Final examination	l				
Evaluati	on Me	ethod and \	Weight (%)					
		Examination	Presentation	Mutual Evaluations between students	Behavior	Portfolio	Other	Total
Subtotal		60	0	0	0	40	0	100
Basic Proficiency	y	30	0	0	0	20	0	50
Specialize Proficiency	d y	20	0	0	0	10	0	30
Cross Area Proficiency		10	0	0	0	10	0	20

,	Anan Co	llege	Year	2024		Course Title	Semiconductor Material Properties		
Course	Informa	tion	<u> </u>			, ,,,,,,,	1		
Course C		5597E04			Course Category	Speciali	zed / Elective		
Class For	mat	Lecture				Acaden	nic Credit: 2		
Departme	ent		Applied Chemic	al Engineering	Student Grade	Adv. 2r	nd		
Term		Second Se	emester Classes per			k 後期:2			
	Matérials			※ 共著(森北出版)				
Instructo		Hasegawa	a ratsuo						
1. 固体の 2. 半導位 3. 3種类	本中のキャ! 頁の電気分析	造について説明 Jア密度の温度	夏変化について説明 これで説明できる。	明できる。					
Rubric									
			理想的な到達レ	• •	標準的な到達レベ	ル(艮)	最低限の到達レベル(可)		
到達目標1			き、ブロッホの	造について説明で 定理を用いてその することができる	固体のバンド構造 シャルと関連付け				
到達目標2			リア密度の温度	純物半導体のキャ 変化について、フ を用いて説明でき	真性半導体と不純 リア密度の温度変 性的な説明をする	化について、元	F 十号体中のイヤッグに関するちん		
到達目標3	1		3種類の電気分	極の機構についてをすることができ	3種類の電気分極 、定性的な説明を る。				
到達目標4			原子の磁気モー を考慮して、磁 いて定量的に説	メントや伝導電子 性の発現機構につ 明できる。	磁性の発現機構に な説明をすること		放性に関する考え方を理解することができる。		
Assigne	d Depar	tment Obj	jectives						
Teachir	ig Metho								
Outline Style		る舞いに起発した学生	2因したものである 必修のための基礎を と教員が、その経験 で授業を行ってい 、その後誘電体、 ます	3。本講義は量子力 を身に着けることを 食を活かし、様々な いく。内容としては 磁性体へと進んで	学を出発点として、 目的としている。な 物質の特性について 、先ず量子力学の基	最も基本的な お、この科目(講義形式で授 礎的な事柄を	物性のほとんどは、物質中の電子の振生質について述べていき、将来のよりは企業で半導体の要素技術の開発を担業を行うものである。 学んだ後、エネルギーバンド構造と半ため、事前事後学習としてレポート等		
Notice		本講義を習問題を解	を履修するためには	寅習は課題として提	形代数に関する知識 出してもらいます。	が不可欠です。 内容の理解の	, また、内容が多いため、講義中に演 ために、課題は他の多くの書物を参照		
Charact	aristics		Division in Le						
	Learning	or class /	☐ Aided by IC		☐ Applicable to	Remote Class	Instructor Professionally Experienced		
							Experienced		
Course	Plan								
			heme 物質の粒子性と波動	動性、不確定性原理	4		波動性、及び不確定性原理について説		
		 	#戸型ポテンシャル		-	明できる。 1次元井戸型ポテンシャルにおけるシュレーディ 一方程式の解を求めることができる。			
		3rd l	トンネル効果		:	1 次元系におい	て、矩形のポテンシャル障壁における 求めることができる。		
	3rd Quarter	4th 2	k素原子のエネル=	ギー準位	Į.	- フールルーというもことが クーロンポテンシャルにおけるシュレーディンガー方 程式の解が、3つの量子数で表されることを理解でき る。			
		5th 🕏	金属の自由電子論	属の自由電子論			変数分離法により、3次元系の自由電子の波動関数、 及び状態密度を求めることができる。		
2nd Semeste		6th	フェルミ・ディラ	ック分布関数		フェルミ・ディラック分布関数について説明できる。			
r		7th	金属の電子密度分布	布とフェルミレベル			ルミレベル、フェルミ波数、フェルミ道くことができる。		
		8th	中間試験		i i	温度との関係を導くことができる。			
					·分散	フローニッヒ・ 対の様子につい			
	4+4-	10th		子の運動とバンド理	ż		ンド理論の考え方について理解できる		
	4th Quarter	11th 厚			ē	電子密度・正孔	密度の温度依存性を導出できる。		
			下純物半導体			電子密度・正孔密度の温度似存住を停山できる。 n型・p型半導体の特徴について説明できる。			
		13th			Ē	電子分極、イオ	ン分極、配向分極について理解できる		
		P		電 体			0		

	14th	原子の	磁気モーメント			軌道磁気モー 説明できる。	メントとスピン磁気 ⁻	モーメントについて
	15th	磁性体	の分類			常磁性、反磁 解できる。	性、強磁性、反強磁性	性の特徴について理
	16th	期末試	験返却					
Evaluation Me	thod and	Weigh	t (%)					
	定期試験		小テスト	ポートフォリオ	発表 勢	・取り組み姿	その他	Total
Subtotal	60		0	40	0		0	100
基礎的能力	20		0	10	0		0	30
専門的能力	40		0	30	0	·	0	70
分野横断的能力	0		0	0	0		0	0

	Anan Co	llege	Year	2024		Course	Signal Processing	
	Informa					Title	Engineering	
Course Co		5597103			Course Category	Special	ized / Elective	
Class For		Lecture			Credits		nic Credit: 2	
Departme		_	Applied Chemic	al Engineering	Student Grade	Adv. 2		
Term		First Seme			Classes per Wee			
Textbook Teaching		信号処理入	門(オーム社)					
Instructo	r	Yasuno En	niko					
1. アナロ 2. 相関队 3. フーリ	関数の定義を リエ級数展開	ディジタル信号 を理解し、簡単 閉の基本事項を	な計算ができる。 理解し、基本的	的事項を理解し、説。 な関数のフ-リエ級				
	ノ工変換の定	E義を理解し、	就明できる。					
Rubric			理想的な到達レ		標準的な到達レベ			
			1	<u>ベルの日女</u> ディジタル信号に			フナロガ信セレディジカル信セに	
到達目標1				大インタル信号に、実際の問題に適	アナログ信号とデついて、説明でき	ィジタル信号(る。	こ アノログ信号とディンタル信号に ついて、基本的事項を理解し、説 明できる。	
到達目標2			相関関数の定義 計算ができ、課 る。	を理解し、簡単な 題解決に応用でき	相関関数の定義をできる。	理解し、計算	が 相関関数の定義を理解し、簡単な 計算ができる。	
到達目標3				開を理解し、フ ができる。	フーリエ級数展開 的な関数のフーリ きる。	の理解し、基 工級数展開が	本 フーリエ級数展開の基本事項を理 で 解し、基本的な関数のフーリエ級 数展開ができる。	
到達目標4			フーリエ変換の 題解決に応用で	定義を理解し、課 きる。	フーリエ変換の定明できる。	義を理解し、		
Assigne	d Depar	tment Obj	ectives					
Teachin	g Metho	od						
Outline		自然現象に 処理するた	は不規則に変動すめの基礎的信号	するものがきわめて 処理技法を修得する	多い。本講義では、 ことを目標とする。	そこに埋もれ	ている信号の性質を解析したり、抽出	
Style		【授業時間	31時間+自学自	習時間60時間】			に臨むと理解が深まります。	
Notice					修としてレポート等 演習にも積極的に取			
	oristics	-	文画するだりで Division in Le		次日に ひ領極的に取	(ソルロ/して へ)と	CV10	
	Learning	oi Ciass / L	☐ Aided by I		☐ Applicable to	Remote Clas	s ☐ Instructor Professionally Experienced	
Course	Plan							
		+	neme		G	Goals		
		1st :	号処理とは 信号の種類 アナログ信号と サンプリング問	ディジタル信号 題	7	アナログ信号と	ディジタル信号について説明できる。	
		2nd ·	号処理の例 波形の平滑化 雑音の圧縮).	皮形の平滑化、	雑音の圧縮について説明できる。	
			学の準備体操 信号の表現			正規直交基について正しく理解し、計算によって値を 求めることができる。		
	1st Quarter	4th ·	多次元ベクトル	空間から関数空間へ		多次元ベクトル空間から関数空間への拡張について理解できる。		
			正規直交関数系		立 恒	正規直交関数形について正しく理解し、計算に 値を求めることができる。		
1st Semeste		6th .	関関数 正規直交関数系 相互相関関数	関数の類似性		目互相関関数に と求めることか	こついて正しく理解し、計算によって値 ができる。	
r		7th •	自己相関関数			自己相関関数について正しく理解し、計算によって値 を求めることができる。		
		1	習		淳	寅習問題を解く	ことができる。	
			間試験					
		1001	ーリエ級数展開 フーリエ級数展	開とは		フーリエ級数国 引することがて	開について理解し、与えられた式を展 ざきる。	
	2nd		偶関数と奇関数 周期が2πでない		-	偶関数と奇関数について説明できる。		
	Quarter		複素フーリエ級			複素フーリエ級数展開を導くことができる。		
			フーリエ級数展 パーシバルの定			開の実例について理解し、説明と計算		
	14th •	フーリエ級数展	開の重要な性質		フーリエ級数展開の重要な性質について理解し、説明できる。			

	15th	フーリ: ・フー ・フー	フーリエ変換 ・フーリエ級数展開からフーリエ変換へ ・フーリエ変換の性質					フーリエ変換の性質について理解し、説明できる。			
	16th	答案返	答案返却								
Evaluation Met	hod and V	Veigh [.]	t (%)								
	定期試験		小テスト	ボー	-トフォリオ	発表 勢	・取り組み姿	その他	Total		
Subtotal	70		0	30		0		0	100		
基礎的能力	30		0	15		0		0	45		
専門的能力	40		0	15		0		0	55		
分野横断的能力	0		0	0		0		0	0		

Anan College		Year	2024		Course Title	Strength a Materials	and Fracture of		
Course	Informa	tion							
Course Co	ode	5597M02			Course Category	Specia	lized / Elective		
Class Forr	mat	Lecture			Credits	Acadeı	mic Credit: 2	Credit: 2	
Departme	ent	Course of A	pplied Chemica	al Engineering	Student Grade	Adv. 2nd			
Term		First Semes	ster		Classes per Week 前期:2				
Textbook Teaching				文(森北出版)/百万	· · · · · · · · · · · · · · · · · · ·	1	-) 、材料の科学	と工学1~4(培風館	
Instructor	r	Okumoto Y	oshihiro						
Course	Objectiv	es es							
1. 弾性変 2. 金属の	で形と塑性変 D理論的強原	変形が区別でき、 度について概算 ⁻ こついて説明でる	説明できる。 ごきる。 きる。						
Rubric									
Rubiic			理想的な到達レ	 ベルの日安	標準的な到達レベ	ルの日安	是低限の到決	 達レベルの目安(可)	
								(- /	
到達目標1			理性変形と望性 図表等を作成し	変形が区別でき、 説明でる。	弾性変形と塑性変 口頭で説明できる	形が区別でき	、 押注发形 乙氢	塑性変形が区別できる	
到達目標2			金属の理論的強力	度を考える際のモ でき、概算できる	金属の理論的強度デリングが理解でできる。	を考える際の		的強度を考える際のモ 里解できい。	
到達目標3	}			について、具体例 きに解析できる。	金属の破壊現象にた上で、分類・説		し 金属の破壊球ない。	現象について理解でき	
<u>As</u> signe	<u>d D</u> epar	tment Obje	ctives						
	ng Metho								
	ig i icciic		*料の強さに善日	 31. 原子レベルで	 のミクロか俎占から	材料の破壊電	魚を詰み取る力を		
Outline		講義で対象	ではる対料は金属である	に限定する。	グベブロは依黒がつ	1471年10710区4交4元	38.Cm(0)はXの71.0	に良味する。なの、本	
Style		ついてはma	したがって講義を進めていきます。必要な計算問題等については追加します。講義でやりきれなかった内容に manabaを使って伝達します。 聞30時間+自学自習時間60時間】						
Notice		れない。材料	4の微視的構造を	と考慮に入れて材料の	物質の強さとの結び の破壊の原理につい 科で学んでいるもの	て学ぶことは	必ずや物質の強度	機会がなかったかもし 度を理解する際に役立	
Charact	arictics		ivision in Le						
☑ Active		,	☐ Aided by IC		☑ Applicable to	Remote Clas	Instruct	tor Professionally d	
					•		•		
Course	Dlan								
Course	lian	l l_tb	eme			Goals			
		1 1					3 40 + 不労 / 不士		
			構義ガイダンス 1557はないこち				_1にまじ子んじさ.	たっした軟田でキフ	
]原子結合から見	1に弾性変形	עב		945 11 + 1947	たことを整理できる。	
				7-A +6-717E (6-7/)		単性変形の微視	見的モデルを理解	できる。	
	1st			理論的引張り強さ	I	単性変形の微視 理論的引張り強	強さの導出過程を	できる。	
		4th 2.4	皮壊力学概説 砀	皮壊靭性(1)	<u>到</u>	単性変形の微視 理論的引張り弱 皮壊靭性の概念	強さの導出過程を 家を理解できる。	できる。	
	1st Quarter	4th 2.7 5th 2.7	皮壞力学概説 硕 皮壞力学概説 硕	皮壊靭性(1) 皮壊靱性(2)	<u>到</u>	単性変形の微視 理論的引張り弱 皮壊靭性の概念	強さの導出過程を	できる。	
		4th 2.3 5th 2.3	皮壊力学概説 砀	皮壊靭性(1) 皮壊靱性(2)	± 石 石	単性変形の微視 理論的引張り強 皮壊靭性の概念 皮壊靭性の概念	強さの導出過程を 家を理解できる。	できる。 理解できる。	
		4th 2.4 5th 2.4 6th 2.4	皮壞力学概説 硕 皮壞力学概説 硕	皮壊靭性(1) 皮壊靱性(2)	王 石 石 石	単性変形の微視 理論的引張り弱 皮壊靭性の概念 皮壊靭性の概念 皮壊靭性の概念	強さの導出過程を 家を理解できる。 家を理解できる。	できる。 理解できる。 る。	
1st		4th 2.4 5th 2.4 6th 2.4 7th 3.9	皮壞力学概説 硕 皮壞力学概説 硕 皮壞力学概説 硕	皮壊靭性(1) 皮壊靱性(2)	五 石 石 石 日 日	単性変形の微視 理論的引張り弱 皮壊靭性の概念 皮壊靭性の概念 皮壊靭性の概念	強さの導出過程を 家を理解できる。 家を理解できる。 官方法が理解でき	できる。 理解できる。 る。	
1st Semeste r		4th 2.引 5th 2.引 6th 2.引 7th 3.别 8th 中	皮壞力学概説 码 皮壞力学概説 码 皮壞力学概説 码 安労破壊 聞試験	皮壊靭性(1) 皮壊靱性(2)	፲ መ መ መ ይ 6	単性変形の微視 理論的引張り強 皮壊靭性の概念 皮壊靭性の概念 皮壊靭性の測算 なで金属におい の点以上	強さの導出過程を 家を理解できる。 家を理解できる。 官方法が理解でき	できる。 理解できる。 る。 が理解できる。	
		4th 2.引 5th 2.引 6th 2.引 7th 3.引 8th 中国 9th 4.3	皮壞力学概説 码 皮壞力学概説 码 皮壞力学概説 码 安労破壊 聞試験	皮壊靭性(1) 皮壊靭性(2) 皮壊靭性(3) 理論的せん断強さ	五 石 石 石 日 6 五	単性変形の微視 理論的引張り強 皮壊靭性の概念 皮壊靭性の概念 皮壊靭性の測算 なで金属におい の点以上	強さの導出過程を えを理解できる。 えを理解できる。 主方法が理解でき ける疲労破壊現象 強さの導出過程を	できる。 理解できる。 る。 が理解できる。	
		4th 2.引 5th 2.引 6th 2.引 7th 3.别 8th 中 9th 4.引	皮壊力学概説 の 皮壊力学概説 の 皮壊力学概説 の 支労破壊 間試験 金属の塑性変形 金属の塑性変形	皮壊靭性(1) 皮壊靭性(2) 皮壊靭性(3) 理論的せん断強さ 転位論の導入	五 石 石 石 日 日 6 五 里	単性変形の微視 理論的引張り強 皮壊靭性の概念 皮壊靭性の概念 皮壊靭性の測定 BCC金属においる の点以上 理論的せん断強 気位の存在が到	強さの導出過程を えを理解できる。 えを理解できる。 主方法が理解でき ける疲労破壊現象 強さの導出過程を 理解できる。	できる。 理解できる。 る。 が理解できる。 理解できる。	
	Quarter	4th 2.引 5th 2.引 6th 2.引 7th 3.别 8th 中 9th 4.引 10th 4.引	皮壊力学概説 の 皮壊力学概説 の 皮壊力学概説 の 支労破壊 間試験 金属の塑性変形 金属の塑性変形 型性変形における	皮壊靭性(1) 皮壊靭性(2) 皮壊靭性(3) 理論的せん断強さ 転位論の導入 3温度の影響(1)	五 石 石 石 日 日 6 6 五 里 章 車	単性変形の微視型論的引張り頭皮壊靭性の概念 皮壊靭性の概念 皮壊靭性の概念 皮壊靭性の測定 BCC金属においる の点以上 理論的せん断列 気でなったが まではの存在が まではないにないます。 まではないでは、またいは またが、またいでは	強さの導出過程を 念を理解できる。 念を理解できる。 を方法が理解でき ける疲労破壊現象 強さの導出過程を 理解できる。 ドーの概念が理解	できる。 理解できる。 る。 が理解できる。 理解できる。	
		4th 2.4 5th 2.4 6th 2.4 7th 3.9 8th ФГ 9th 4.3 10th 4.3 11th 5.3 12th 5.3	破壊力学概説 砂 破壊力学概説 砂 皮壊力学概説 砂 支労破壊 間試験 金属の塑性変形 金属の塑性変形 望性変形における 型性変形における	皮壊靭性(1) 皮壊靭性(2) 皮壊靭性(3) 理論的せん断強さ 転位論の導入	五 石 石 石 日 日 6 日 五 五 日 日 日 日 日 日 日 日 日 日 日 日 日 日	単性変形の微視型論的引張り引張り引張り受壊靭性の概念 皮壊靭性の概念 皮壊靭性の概念 の点のにあいるのには上型論的せん断引 は近の存在が到ませんである。	はさの導出過程を 記を理解できる。 記を理解できる。 記を理解できる。 記を対してきます。 はさの導出過程を 理解できる。 デーの概念が理解 が計算できる。	できる。 理解できる。 る。 が理解できる。 理解できる。	
	Quarter 2nd	4th 2.4 5th 2.4 6th 2.4 7th 3.3 8th 中 9th 4.3 10th 4.3 11th 5.3 12th 5.3 13th 6.6	破壊力学概説 研 破壊力学概説 研 皮壊力学概説 研 支労破壊 間試験 金属の塑性変形 金属の塑性変形 望性変形における 型性変形における	皮壊靭性(1) 皮壊靭性(2) 皮壊靭性(3) 理論的せん断強さ 転位論の導入 3温度の影響(1) 3温度の影響(2)	五 る る る 日 6 5 5 5 7 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8	単性変形の微視 理論的引張り強 皮壊靭性の概念 皮壊靭性の概念 皮壊靭性の測定 BCC金属におい の点以上 理論的せん断強 気位の存在が理 気性化エネルロ フリープ寿命な な散の法則に	はさの導出過程を 念を理解できる。 念を理解できる。 定方法が理解でき ける疲労破壊現象 はさの導出過程を 理解できる。 詳一の概念が理解 が計算できる。 まづく計算ができ	できる。 理解できる。 る。 が理解できる。 理解できる。 できる。	
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	Quarter 2nd	4th 2.引 5th 2.引 6th 2.引 7th 3.引 8th 中国 9th 4.引 10th 4.引 11th 5.当 12th 5.当 13th 6.目 14th 7.引 15th 7.引	皮壊力学概説 を映っ 学概説 を映っ 学概説 を映っ 学概説 をまり 学概説 をまい	皮壊靭性(1) 皮壊靭性(2) 皮壊靭性(3) 理論的せん断強さ 転位論の導入 3温度の影響(1) 3温度の影響(2)	五 る る の の の の の の の の の の の の の 五 り ら ら ら ら り え う え う こ う た う た う た う た う た う た う た う た う た	単性変形の微視理論的引張り頭皮壊靭性の概念皮壊靭性の概念皮壊靭性の概念皮壊靭性の測定の点以上理論的せん断頭気性化である。 対したの存在が到したができません。 対したができませんができません。 対しては、対しては、対しては、対しては、対しては、対しては、対しては、対しては、	はさの導出過程を 念を理解できる。 念を理解できる。 定方法が理解でき ける疲労破壊現象 はさの導出過程を 理解できる。 詳一の概念が理解 が計算できる。 まづく計算ができ	できる。 理解できる。 る。 が理解できる。 理解できる。 できる。 る。 る。	
Semeste r	Quarter 2nd Quarter	4th 2.4 5th 2.4 6th 2.4 7th 3.9 8th 中 9th 4.5 10th 4.5 11th 5.5 12th 5.5 13th 6.6 14th 7.5 15th 7.5 16th 期	皮壊力学概説 研 皮壊力学概説 研 皮壊力学概説 研 支労破壊 間試験 金属の塑性変形 健性変形における 型性変形における 型性変形における 型性の強化メカニ 金属の強化メカニ 未試験の返却	皮壊靭性(1) 皮壊靭性(2) 皮壊靭性(3) 理論的せん断強さ 転位論の導入 3温度の影響(1) 3温度の影響(2)	五 る る の の の の の の の の の の の の の 五 り ら ら ら ら り え う え う こ う た う た う た う た う た う た う た う た う た	単性変形の微視 理論的引張り強 皮壊靭性の概念 皮壊靭性の概念 皮壊靭性の測定 BCC金属におい の点以上 理論的せん断強 気位の存在が到 気性化エプ寿命が な散の法則に基 な工硬化と固済	強さの導出過程を 念を理解できる。 念を理解できる。 定方法が理解でき ける疲労破壊現象 強さの導出過程を 理解できる。 デーの概念が理解 が計算できる。 まづく計算ができ 容強化が理解でき	できる。 理解できる。 る。 が理解できる。 理解できる。 できる。 る。 る。	
Semeste r	Quarter 2nd Quarter	4th 2.引 5th 2.引 6th 2.引 7th 3.引 8th 中国 9th 4.引 10th 4.引 11th 5.当 12th 5.当 13th 6.目 14th 7.引 15th 7.引	皮壊力学概説 研 皮壊力学概説 研 皮壊力学概説 研 支労破壊 間試験 金属の塑性変形 健性変形における 型性変形における 型性変形における 型性の強化メカニ 金属の強化メカニ 未試験の返却	皮壊靭性(1) 皮壊靭性(2) 皮壊靭性(3) 理論的せん断強さ 転位論の導入 3温度の影響(1) 3温度の影響(2)	五 る る の の の の の の の の の の の の の 五 り ら ら ら ら り え う え う こ う た う た う た う た う た う た う た う た う た	単性変形の微視理論的引張り頭皮壊靭性の概念皮壊靭性の概念皮壊靭性の概念皮壊靭性の測定の点以上理論的せん断頭気性化である。 対したの存在が到したができません。 対したができませんができません。 対しては、対しては、対しては、対しては、対しては、対しては、対しては、対しては、	強さの導出過程を 念を理解できる。 念を理解できる。 定方法が理解でき ける疲労破壊現象 強さの導出過程を 理解できる。 デーの概念が理解 が計算できる。 まづく計算ができ 容強化が理解でき	できる。 理解できる。 る。 が理解できる。 理解できる。 できる。 る。 る。	
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Semeste r	2nd Quarter ion Meth	4th 2.4 5th 2.4 6th 2.4 7th 3.9 8th 中国 9th 4.3 10th 4.3 12th 5.3 12th 5.3 13th 6.6 14th 7.3 15th 7.3 16th 期	皮壊力学概説 研 皮壊力学概説 研 皮壊力学概説 研 支労破壊 間試験 金属の塑性変形 型性変形における 型性変形における 型性変形における 型体内の拡散 金属の強化メカニ 未試験の返却 ight (%)	皮壊靭性(1) 皮壊靭性(2) 皮壊靭性(3) 理論的せん断強さ 転位論の導入 3温度の影響(1) 3温度の影響(2) ニズム(1)	・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・	単性変形の微視理論的引張り頭皮壊靭性の概念皮壊靭性の概念皮壊靭性の概念皮壊靭性の概念の点以上の場合の点以上を関いませんが可動性化のでは、対して、対して、対して、対して、対して、対して、対して、対して、対し、対し、対し、対し、対し、対し、対し、対し、対し、対し、対し、対し、対し、	はさの導出過程を 念を理解できる。 念を理解できる。 定方法が理解でき ける疲労破壊現象。 はさの導出過程を 理解できる。 ドーの概念が理解 が計算できる。 まづく計算ができ 容強化が理解でき 容強化が理解でき	できる。 理解できる。 る。 が理解できる。 理解できる。 できる。 る。 る。	
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Semeste r Evaluati Subtotal	2nd Quarter ion Meth	4th 2.₹ 5th 2.₹ 6th 2.₹ 7th 3.₹ 8th 中 9th 4.5 10th 5.5 13th 6.€ 13th 7.5 15th 7.5 16th 期 mod and We 定期試験 70	皮壊力学概説 研 皮壊力学概説 研 皮壊力学概説 研 支労破壊 間試験 金属の塑性変形 型性変形における 型性変形における 型性変形における 型体内の拡散 金属の強化メカニ 未試験の返却 ight (%)	re r	世 の の の の を を を を を を を を を を を を を	単性変形の微視 理論的引張り強 皮壊靭性の概念 皮壊靭性の側別 BCC金以上のにおいる の点的で存在が到 気はでのによりである。 では他化プラリーの法して ではないでする。 ではないでする。 ではないでする。 ではないでする。 ではないでする。 ではないでする。 ではないでする。 ではないでする。 ではないでする。 ではないできる。 ではないでもでもでもできる。 ではないでもでもでもでもでもでもでもでもでもでもでもでもでもでもでもでもでもでもでも	はさの導出過程を 念を理解できる。 念を理解できる。 定方法が理解でき ける疲労破壊現象 はさの導出過程を 理解できる。 はずの概念が理解が計算できる。 まづく計算ができ 容強化が理解できる。 を発化が理解できる。 を必要態強化が理解できる。	できる。 理解できる。 る。 が理解できる。 理解できる。 できる。 る。 る。 てきる。	