Syllabus

International Master's Degree Program (2013-Fall Term)

(M40030020)Industrial Policies[Industrial Policies]

Subject name[English]	Industrial Policies	[Industrial Policies]							
Schedule number	M40030020	Subject area	General	Required or	Elective				
			courses	elective					
Time of starting a course	Fall term	Day of the week.period	Wed.4~4	Credit(s)	2				
Faculty	Graduate Program	n for Master's Degre	e	Subject grade	1~2				
Department Offered				Beggining grade					
Charge teacher name[Roman	渋澤 博幸 SHIBI	法澤 博幸 SHIBUSAWA Hiroyuki							
Objectives of class									
In this course, students learn the	fundamental of inp	ut-output analysis a	nd the industrial	policy evaluation met	hodology.				
In this course, students learn the	fundamental of inp	ut-output analysis a	nd the industrial	policy evaluation met	hodology.				
Contents of class									
1: Introduction and Overview									
2–6:Input–Output Analysis at the	National Level								
7-8: Numerical Examples and Cas	e Studies at the Na	ational Level							
9-13:Input-Output Analysis at the	e Regional Level	D · · · · ·							
14-15: Numerical Examples and G	ase Studies at the	Regional Level							
1: Introduction and Overview									
2–6:Input-Output Analysis at the	National Level								
7–8: Numerical Examples and Cas	e Studies at the Na	ational Level							
9–13:Input-Output Analysis at the	e Regional Level								
14-15: Numerical Examples and C	ase Studies at the	Regional Level							
Self Preparation and Review									
Related subjects									
Economics, Policy, Simulation									
Economics, Policy, Simulation									
Notes for textbook									
Papers will be distributed.									
Potoronoo Millor and Plair Input-	Output Applysis(Sc	and Edition) Comb	vidro University	Brood 2000					
Reference. Miller and Blair, Input-		Cond Edition/, Game	onuge University	Fress, 2009					
Papers will be distributed.									
Reference:Miller and Blair, Input-	Output Analysis(Se	econd Edition), Camb	oridge University	Press, 2009					
Notes for reference									
Goals to be achieved									
Advanced Input-Output Analysis									
Advanced Economic Simulation M	lethods								
Advanced Input-Output Analysis									
Advanced Economic Simulation M	lethods								
	lethous								
Evaluation of achievement									
	a ay highay OFF	inte en biel D- l	a than E5						
A: ou Points or higher, B:00 points	s or nigner, C:55 po	ints or nigher, D: Les	ss than 55 points	5					
1 est(30%) + Report(30%) = 100%	o ar highor O.55	into or higher Dul-	oo than EE maint						
A. 60 Points or nigner, B:00 points	s or nigner, 0:00 po	ints or higher, D: Les	ss man bo points	•					
Details of examination									

Other information Room: B-409 Tel:6963 E-mail:hiro-shibu@tut.jp Room: B-409 Tel:6963 E-mail:hiro-shibu@tut.jp **Reference URL** www.pm.ace.tut.ac.jp www.pm.ace.tut.ac.jp Office hours Tuesday 10:00-12:00 Tuesday 10:00-12:00 Relations to attainment objectives of learning and education Key words Industrial Policy, Economics, Simulation Industrial Policy, Economics, Simulation

(M40030040)Culture and Communication II[Culture and Communication II]

Subject name[English]	Culture and Communication II[Culture and Communication II]							
Schedule number	M40030040	Subject area	General	Required or	Elective			
			courses	elective				
Time of starting a course	Fall term	Day of the	Eri 3~3	Credit(c)	2			
		week period	111.0 0	Of Builds/	2			
Faculty	Graduate Progra	Graduate Program for Master's Dagras Subject grade 1-2						
Department Offered		in for Master's Degre	.0	Beggining grade	1 2			
	が良送みのの			208811118 81 440				
Charge teacher name_Roman	世尾 汗介 5A5	AU TOSUKE						
Numbering								
Objectives of class								
This course looks at the role of ve	ocabulary knowled	ge in second language	e learning.					
This course looks at the role of ve	ocabulary knowled	ge in second language	e learning.					
Contents of class								
Students will choose a specific to	opic to research f	rom the topics below	/ and give an or	al presentation abou	t it. They will also			
discuss some important issues re	lating to the topic.							
Students are required to attend	the class on W	aak 1 baaauca +ba	data and tha t	onic for the arel	ecentation will be			
determined there		eek i because the	uate and the t	opic for the oral pr	esentation will be			
determined there.								
Week 1 (October 4): Course intro	duction							
Week 2 (October 18): The goals o	f vocabulary learni	ing						
Week 3 (October 25): Knowing a v	vord							
Week 4 (November 1): Teaching a	nd explaining voca	bulary						
Week 5 (November 8): Vocabulary	and listening and	speaking						
Week 6 (November 15): Vocabular	y and reading							
Week 7 (November 22): Vocabular	y and writing							
Week 8 (December 6): Specialised	l uses of vocabula	rv						
Week 9 (December 13): Vocabular	v learning strategi	es						
Week 10 (January 10): Guessing f	rom context							
Week 11 (January 24): Word study	/strategies:word	narts and dictionary i	ISE					
Week 12 (January 31): Word study	/ strategies: word	cards						
Week 13 (February 7): Chunking a	nd collocation	00100						
Week 10 (February 1/): Ondriking a	na collocation	re and use						
Week 15 (February 21): Review								
Students will choose a specific to	onia ta racaarah f	rom the tonics helow	, and give an or	al presentation about	t it. They will also			
diaguas some important issues re	opic to research i	rolli the topics below	and give an or	al presentation abou	t it. They will also			
discuss some important issues re	lating to the topic.							
Students are required to attend	I the class on W	eek 1 because the	date and the t	opic for the oral pr	esentation will be			
determined there.								
Week 1 (October 4): Course intro	duction							
Week 2 (October 18): The goals o	f vocabulary learni	ing						
Week 3 (October 25): Knowing a v	vord							
Week 4 (November 1): Teaching a	nd explaining voca	bulary						
Week 5 (November 8): Vocabulary	and listening and	speaking						
Week 6 (November 15): Vocabular	v and reading							
Week 7 (November 22): Vocabular	v and writing							
Week 8 (December 6): Specialised	uses of vocabula	rv						
Week 9 (December 13) ⁻ Vocabular	v learning strategi	es						
Week 10 (January 10): Guessing fi	rom context							
Week 11 (January 24): Word study	/ strategies: word	narts and dictionary	ISE					
Week 12 (January 31): Word study	/ strategies: word	cards						
Week 12 (Century 51). Word Study	nd collocation							
Wook 14 (February 1): Unuriking a		ra and usa						
Week 14 (February 14): Testing Vo	beabulary knowled	ge and use						
Week 15 (February 21): Review								
Sen Preparation and Review								

Related subjects
Notes for textbook
All materials for this class will be provided.
All materials for this class will be provided.
Notes for reference
Goals to be achieved
Understanding key issues in second language vocabulary learning
Understanding key issues in second language vocabulary learning
Evaluation of achievement
Oral presentation (20%), classwork (40%), term paper (40%)
Oral presentation (20%), classwork (40%), term paper (40%)
Examination
Details of examination
Other information
Office:B-516-3
Ext:6961
E-mail: ysasao@las.tut.ac.jp
Office:B-516-3
Ext:6961
E-mail: ysasao@las.tut.ac.jp
Reference URL
Office hours
Mon 13:00-14:00
Tue 13:00—14:00
Mon 13:00-14:00
Tue 13:00—14:00
Relations to attainment objectives of learning and education
Key words
vocabulary learning, second language acquisition
vocabulary learning, second language acquisition

(M41610010)Seminar on Mechanical Engineering I[Seminar on Mechanical Engineering I]

Subject name[English]	Seminar on Mech	anical Engineerii	ng I[Seminar on Mechan	ical Engineering I]	
Schedule number	M41610010	Subject area		Advanced	Required or	Required
				Mechanical	elective	
				Engineering		
Time of starting a course	Year	Day of t	:he	Intensive	Credit(s)	4
		week,period				
Faculty	Graduate Progran	n for Master's D	egre	e	Subject grade	1~2
Department Offered	Mechanical Engine	eering			Beggining	
					grade	
Charge teacher name[Roman	S1系教務委員 11	kei kyomu Iin−S				
alphabet mark]						
Numbering						
Objectives of class						
The seminar aims to provide a br	oad understanding	of the mechanic	al e	ngineering available	for the master the	sis research of a
student.						
The seminar aims to provide a br	oad understanding	of the mechanic	cal e	ngineering available	for the master the	sis research of a
student.						
Contents of class						
The class provides both of funda	amental knowledge	of his/her mast	ter t	hesis research worl	and the most ad	vanced results in
the related field by reading rese	earch papers and n	nonographs. The	e co	ntents of the class	depend on the s	upervisor. To be
announced by individual superviso	ors.					
The class provides both of funda	amental knowledge	of his/her mast	ter t	hesis research worl	and the most ad	vanced results in
the related field by reading rese	earch papers and n	nonographs. The	e co	ntents of the class	depend on the s	upervisor. To be
announced by individual supervise	ors.					
Self Preparation and Review						
Related subjects						
Notes for textbook						
Textbook or material will be made	e available from the	supervisors.				
Textbook or material will be made	e available from the	supervisors.				
Notes for reference						
Goals to be achieved						
To acquire fundamental knowledg	e of individual resea	arch fields.				
To acquire the ability to find prob	blems, the ability to	solve the proble	ems,	and the presentation	on skill.	
				·		
To acquire fundamental knowledg	e of individual rese	arch fields				
To acquire the ability to find prob	plems, the ability to	solve the proble	ems.	and the presentation	on skill.	
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Evaluation of achievement						
Coursework presentation and/or	report					
Coursework, presentation and/or	report.					
Examination	· · · · · · · · · · · · · · · · · · ·					
Details of examination						
011 1 6 11						
Other information						
Reference URL						
Office hours						
Relations to attainment objective	s of learning and e	ducation				
	-					

(M41610020)Seminar on Mechanical Engineering II[Seminar on Mechanical Engineering II]

Subject name[English]	Seminar on Mech	anical Eng	ineering II	Seminar on Mecha	nical Engineering II]
Schedule number	M41610020	Subject	area	Advanced	Required or	Required
				Mechanical	elective	
				Engineering		
Time of starting a course	Year	Day o	of the	Intensive	Credit(s)	2
E h.		week,pe	riod		Outlinet much	0.0
Faculty	Graduate Program	n for Mast	er's Degre	e	Subject grade	2~2
Department Offered	Mechanical Engine	eering			grade	
Charge teacher name[Roman	S1系教務委員 11	kei kyomu	Iin-S		0	
alphabet mark]						
Numbering						
Objectives of class						
The seminar aims to provide a br	oad understanding	of the mea	chanical e	ngineering available	for the master the	sis research of a
student.						
The seminar aims to provide a br	oad understanding	of the mee	chanical e	ngineering available	for the master the	esis research of a
student.						
Contents of class						
The class provides both of funda	amental knowledge	of his/her	master t	hesis research wor	k and the most ad	vanced results in
the related field by reading rese	arch papers and n	nonograph	s. The co	ntents of the clas	s aepend on the s	supervisor. To be
The class provides both of funds	ors. mental knowledge	of hic /hor	mactor t	hasis research wor	k and the most ad	vanced recults in
the related field by reading rese	arch papers and n	on nis/ ner	The co	ntents of the clas	s depend on the s	vanceu results in
announced by individual superviso	ors	lonograph	3. THE CO			supervisor. To be
Self Preparation and Review						
Related subjects						
Notes for textback						
Textbook or material will be made	a available from the	superviso	re			
Textbook or material will be made	available from the	superviso	rs.			
Notes for reference		0.000				
Goals to be achieved						
To acquire fundamental knowledg	e of individual resea	arch fields				
To acquire the ability to find prob	lems, the ability to	solve the	problems,	and the presentation	on skill.	
To acquire fundamental knowledg	e of individual resea	arch fields				
To acquire the ability to find prob	lems, the ability to	solve the	problems,	and the presentation	on skill.	
Evaluation of achievement						
Coursework, presentation and/or	report.					
Coursework, presentation and/or	report.					
Examination						
Details of examination						
Other information						
Reference URL						
Office hours						
Relations to attainment objective	s of learning and a	ducation				
		24024011				

(M41610030)Thesis Research on Mechanical Engineering[Thesis Research on Mechanical Engineering]

Subject name[English]	Thesis Research	on Mechanical Engi	neering[Thesis Rese	earch on Mechanic	al Engineering]		
	M41610030	Subject erec	Advanced	Boguirod or	Required		
	10141010030	Subject area	Machanical		Required		
			Engineering	0100040			
Time of starting a same	21/2 01/2	Davi of the	Engineering	One dit(a)	6		
lime of starting a course	ZTears	Day of the	Intensive	Great(s)	0		
Fb		week,period		0.11	1.0		
	Graduate Progra	am for Master's Degr	ee	Subject grade	1~2		
Department Offered				Beggining			
	o15434			grade			
Charge teacher name_Roman	S1杀教務安員,	谷教員 Ikei kyomu I	in-S, KAKUKYOUIN	I Kakukyouin			
alphabet mark							
Numbering							
Objectives of class							
The thesis research aims to p	rovide a practica	experience of rese	earch work. and to	acquire research	skills with deep		
understanding of the relevant kno	wledge.						
The thesis research aims to p	rovide a practical	experience of rese	arch work and to	acquire research	skills with deep		
understanding of the relevant kno	wledge			acquire recoursi.	onno man acop		
Contents of class							
The research subject depende	on the supervise	r and the recearch	group you join Inc	lividual studente v	vill have different		
research subject Discuss with		and the research	group you join. Inc	annual students V	in nave untereft		
The research subjects Discuss with y	our supervisor.	r and the recent	moun you join In-	lividual students	uill have different		
research subject depends		and the research	group you join. Inc	ividual students V	mi nave unterent		
Self Presenting and Parian	our supervisor.						
Serr Preparation and Review							
Related subjects							
Notes for textbook							
Reference and material will be av	ailable from the su	upervisor.					
Reference and material will be av	ailable from the su	upervisor.					
Notes for reference							
Goals to be achieved							
To get something new on individu	al research fields.						
To develop your research skills in	cluding planning a	nd presentation skill	3.				
To get something new on individu	al research fields.						
To develop your research skills ir	cluding planning a	nd presentation skill	3.				
Evaluation of achievement							
Examination							
Details of examination							
Other information							
Reference URL							
Office hours							
Relations to attainment objective	s of learning and	education					
1							
key words							

(M41610030)Thesis Research on Mechanical Engineering[Thesis Research on Mechanical Engineering]

Subject name[English]	Thesis Research	on Mecha	anical Engir	neering[Thesis Res	search on Mechanica	al Engineering]
Schedule number	M41610030	Subject	t area	Advanced	Required or	Required
		-		Mechanical	elective	
				Engineering		
Time of starting a course	2Years	Day	of the	Intensive	Credit(s)	6
		week,p	eriod			
Faculty	Graduate Progran	n for Mas	ster's Degre	ee	Subject grade	1~2
Department Offered	Mechanical Engine	eering			Beggining	M1, M2
	01万批改千号 4				grade	
Charge teacher name_Roman	51 杀软務安員 11	kei kyomi	u lin-5			
Objectives of class						
The thesis research aims to pr understanding of relevant knowle	ovide a practical e dge.	xperienco	e of resea	rch work, and to	acquire research s	kills with a deep
The thesis research aims to pr	ovide a practical e	xperience	e of resea	rch work, and to	acquire research s	kills with a deep
understanding of relevant knowle	dge.					
Contents of class						
The research subject depends	on the supervisor	and the	research	group you join. Ir	ndividual students v	vill have different
research subjects. Discuss with y	our supervisor.					
The research subject depends	on the supervisor	and the	research	group you join. Ir	ndividual students v	vill have different
research subjects. Discuss with y	our supervisor.					
Sen Preparation and Review						
Related subjects						
Notes for textbook						
Reference and material will be av	ailable from the sup	ervisor.				
Reference and material will be av	ailable from the sup	ervisor.				
Notes for reference						
Goals to be achieved						
To get something new on individu	al research fields.					
To develop your research skills in	ncluding planning an	d present	tation skills	S.		
To get something new on individu	al research fields.					
To develop your research skills in	ncluding planning an	d present	tation skills	S.		
Evaluation of achievement						
Examination						
Details of examination						
Other information						
Reference URL						
Office hours						
Relations to attainment objective	s of learning and e	ducation				

(M4161003T)Thesis Research on Mechanical Engineering[Thesis Research on Mechanical Engineering]

Subject name[English]	Thesis Research	on Mecha	nical Engir	neering[Thesis Res	earch on Mechanic	al Engineering]
Schedule number	M4161003T	Subject	area	Advanced	Required or	Required
		-		Mechanical	elective	
				Engineering		
Time of starting a course	Year	Day	of the	Intensive	Credit(s)	6
		week,pe	riod			
Faculty	Graduate Progran	n for Mast	er's Degre	e	Subject grade	2~2
Department Offered	Mechanical Engin	eering			Beggining	
	01万批改千号 4				grade	
Charge teacher name_Roman	51 糸软務安員 1	кеі куоти	lin-5			
Objectives of class						
The thesis research aims to pr understanding of relevant knowle	ovide a practical e dge.	experience	ot resea	rch work, and to	acquire research s	skills with a deep
The thesis research aims to pr	ovide a practical e	xperience	of resea	rch work, and to	acquire research s	skills with a deep
understanding of relevant knowle	dge.					
Contents of class						
The research subject depends	on the supervisor	and the i	research	group you join. In	idividual students v	vill have different
research subjects. Discuss with y	our supervisor.	م الح ام مر			فيتحاد بنغم المتعاملة	
research subject depends	on the supervisor	and the i	research	group you join. In	iaividual students v	viii nave different
Self Prenaration and Paview	our supervisor.					
Related subjects						
Notes for textbook						
Reference and material will be av	ailable from the sur	ervisor.				
Reference and material will be av	ailable from the sup	ervisor.				
Notes for reference						
Goals to be achieved						
To get something new on individu	ial research fields.					
To develop your research skills ir	ncluding planning an	d presenta	ation skills	s.		
To get something new on individu	al research fields.					
To develop your research skills ir	ncluding planning an	d presenta	ation skills	i.		
Evaluation of achievement						
.						
Examination						
Details of examination						
Oth an informati						
Other Information						
Keterence UKL						
Office hours						
Relations to attainment objective	s of learning and e	ducation				

(M41610040)Seminar on Mechanical Engineering[Seminar on Mechanical Engineering]

Subject name[English]	Seminar on Mech	anical Engi	neering[S	eminar on Mechani	cal Engineering]	
Schedule number	M41610040	Subject a	area	Advanced	Required or	Required
				Mechanical	elective	
		_		Engineering		-
Time of starting a course	Year	Day o	f the	Intensive	Credit(s)	6
Feculty	Graduate Program	for Maste	iou r's Degra		Subject grade	2~2
Department Offered	Mechanical Engine	eering	J 3 Dogio		Beggining	
	0	0			grade	
Charge teacher name[Roman	S1系教務委員 11	kei kyomu l	lin-S			
alphabet mark]						
Numbering						
Objectives of class						
The seminar aims to provide a br	oad understanding	of the mec	hanical e	ngineering available	for the master the	esis research of a
student.		6			6	
The seminar aims to provide a br	oad understanding	of the mec	hanıcal e	ngineering available	for the master the	esis research of a
Contents of class						
The class provides both of funda	mental knowledge	of his/her	master t	hesis research wor	k and the most ad	vanced results in
the related field by reading rese	arch papers and n	nonographs	. The co	ntents of the clas	s depend on the s	supervisor. To be
announced by individual supervise	ors.					
The class provides both of funda	mental knowledge	of his/her	master t	hesis research wor	k and the most ad	vanced results in
the related field by reading rese	arch papers and n	nonographs	. The co	ntents of the clas	s depend on the s	supervisor. To be
announced by individual superviso	ors.					
Self Preparation and Review						
Delated as blocks						
Related subjects						
Notes for textbook						
Textbook or material will be made	available from the	supervisor				
Textbook or material will be made	available from the	supervisor	з. 'S			
Notes for reference		- apoi nooi				
Goals to be achieved						
To acquire fundamental knowledg	e of individual resea	arch fields.				
To acquire the ability to find prob	lems, the ability to	solve the p	problems,	and the presentation	on skill.	
To acquire fundamental knowledg	e of individual resea	arch fields.				
To acquire the ability to find prob	lems, the ability to	solve the p	problems,	and the presentation	on skill.	
Coursework, presentation and/or	report.					
Evamination	report.					
Details of examination						
Other information						
Reference URL						
Office hours						
		•				
Relations to attainment objective	s of learning and e	ducation				

(M41630040)Micromachining Engineering[Micromachining Engineering]

Subject name[English]	Micromachining E	ngineering	icroma	chining Engineering]		
Schedule number	M41630040	Subject an	ea	Advanced	Required or	Elective
		-		Mechanical	elective	
				Engineering		
Time of starting a course	Fall2 term	Day of	the	Tue.1~1	Credit(s)	1
		week,perio	d			
Faculty	Graduate Program	n for Master'	s Degre	e	Subject grade	1~2
Department Offered					Beggining	
	此四路行。	ATATI 1			grade	
Charge teacher name_Roman	采田 隆行 SHIB/	ATA Takayuk	1			
Numbering						
Objectives of class			"			
Fundamentals of micromachining	technologies for th	ie developme	nt of "	Micro Electro Mech	anical System (ME	MS) and Micro
Total Analysis System (μ TAS).	toologiaa fay th			Miene Electre Meek	aniaal Sustan (ME	MS)" and "Miana
Total Applysic System (# TAS)"	Lechnologies for th	le developme	nt oi	MICTO Electro Mech	ianical System (ME	ivis) and ivicro
Contents of class						
1 Introduction of MEMS and UT	AS					
2. Photolithography						
3. Wet etching and Drv etching						
4. Physical vapor deposition (PVI) and Chemical var	oor depositio	n (CVD)		
5. Plating and Electroforming	,					
6. Bonding processes						
7. Surface micromachining and B	ulk micromachining					
_	-					
Students are required to prepare	and review each le	sson				
1. Introduction of MEMS and μ T	AS					
2. Photolithography						
3. Wet etching and Drv etching						
4. Physical vapor deposition (PVI) and Chemical var	oor depositio	n (CVD)		
5. Plating and Electroforming						
6. Bonding processes						
7. Surface micromachining and Bu	ulk micromachining					
Students are required to prepare	and review each le	sson.				
Self Preparation and Review						
Related subjects						
A fundamental knowledge of phys	ics and chemistry i	s required.				
A fundamental knowledge of phys	ics and chemistry i	s required.				
Notes for textbook						
No textbook is required for this c	lass.					
Useful information on MEMS tech	nologies can be ob	tained fromth	ne follov	wing website; http:/	/www.memsnet.org	:/mems/
(Reference)						
M.J. Madou, "Fundamentals of Mi	crofabrication, 2nd	ed.", CRC Pi	ress, 20	02.		
S.Franssila, "Introduction to Micr	ofabrication", John	Wiley & Son	s, 2004			
M. Gad-El-Hak, "The Mems Hand	lbook, 2nd ed.", CR	C Pr I Llc, 20	06.			
G.T.A. Kovacs, "Micromachined T	ransducers Source	book", McGr	aw-Hill,	1998.		
No textbook is required for this c	lass.		<i>~</i>			, ,
Usetul intormation on MEMS tech	inologies can be ob	tained fromth	ne tollov	wing website; http:/	/www.memsnet.org	/mems/
/ _						
(Reference)						
M.J. Madou, "Fundamentals of Mi	crofabrication, 2nd	ed.", CRC P	ress, 20	002.		
S.Franssila, "Introduction to Micr	ofabrication", John	Wiley & Son	s, 2004			
M. Gad-El-Hak, "The Mems Hand	lbook, 2nd ed.", CR	C Pr I Llc, 20	006.			
G.T.A. Kovacs, "Micromachined T	ransducers Source	book", McGr	aw-Hill	1998.		

Notes for reference

Goals to be achieved

- To gain an understanding of the fundamentals of micromachining technologies for MEMS and $\,\mu\,{
m TAS}$

- To apply knowledge of micromachining technologies to the design and manufacturing of microdevices

- To gain an understanding of the fundamentals of micromachining technologies for MEMS and $\,\mu\,{\sf TAS}$

- To apply knowledge of micromachining technologies to the design and manufacturing of microdevices

Evaluation of achievement

Presentation (70%) and classroom performance (30%). An oral presentation on micromachining technologies for the fabrication of MEMS and/or μ TAS devices will be imposed during the course of class.

Presentation (70%) and classroom performance (30%). An oral presentation on micromachining technologies for the fabrication of MEMS and/or μ TAS devices will be imposed during the course of class.

Examination

Details of examination

Other information

Takayuki Shibata: room D-605, E-mail: shibata@me.tut.ac.jp Takayuki Shibata: room D-605, E-mail: shibata@me.tut.ac.jp

Reference URL

Office hours

Anytime during regular working hours. Contact me by email before coming if possible. Anytime during regular working hours. Contact me by email before coming if possible.

Relations to attainment objectives of learning and education

Key words

Micromachining, Microfabrication, Photolithography, Wet etching, Dry etching, Physical vapor deposition (PVD), Chemical vapor deposition (CVD), MEMS, μ TAS

Micromachining, Microfabrication, Photolithography, Wet etching, Dry etching, Physical vapor deposition (PVD), Chemical vapor deposition (CVD), MEMS, μ TAS

(M41630050)Biomechanics of Human Locomotion[Biomechanics of Human Locomotion]

The following book is also referred to;

	Diama ahawina af			1	
	Biomechanics of	Human Locomotion	Biomechanics of	Human Locomotion	
Schedule number	M41630050	Subject area	Advanced	Required or	Elective
			Mechanical	elective	
	F 114 -		Engineering		
Time of starting a course	Fall1 term	Day of the	Thu.5~5	Credit(s)	1
		week,period			
Faculty	Graduate Progra	m for Master's Degr	ee	Subject grade	2~2
Department Offered				Beggining	
				grade	
Charge teacher name[Roman	安田 好义 YAS	UDA Yoshifumi			
alphabet mark					
Numbering					
Objectives of class					
Biomechnics of human locomotio	n can be defined a	s describing, analysi	ng and assessing	of human movements	by means of the
methods of mechanics. This lect	ure aims to facilit	ate the understandir	ng on the fundam	ental mechanics of h	uman locomotion
such as walking, running, and cyc	ling based on the s	structure and function	n of muscle, skelt	on and nervous syste	ems.
Biomechnics of human locomotio	n can be defined a	s describing, analysi	ng and assessing	of human movements	by means of the
methods of mechanics. This lect	ure aims to facilit	ate the understandir	ng on the fundam	ental mechanics of h	uman locomotion
such as walking, running, and cyc	ling based on the s	structure and function	n of muscle, skelt	on and nervous syste	ems.
Contents of class				-	
1. Research objectives and metho	odologies in the stu	udv of biomechanics			
2. Fundamentals of skelton, joint.	and ligament syste	ems in the human bo	dv.		
3 The structure and function of s	skeletal muscle		-,-		
4 Motor control and sensory info	rmatics for human	locomotion			
5 Kinematic analyses of human n	novements				
6 Kinetic analyses of human mov	vements				
7 Electromyography: basic princip	ole and its applicat	ions			
1. Research objectives and metho	Jaologies in the sti	idy of biomechanics			
2. Fundamentals of skelton, joint,	and ligament syste	ems in the human bo	dy.		
3. The structure and function of s	skeletal muscle.				
4. Motor control and sensory info	rmatics for human	locomotion.			
5. Kinematic analyses of human n	iovements.				
6. Kinetic analyses of human mov	ements.				
7. Electromyography: basic princip	ple and its applicat	ions.			
Self Preparation and Review					
Related subjects					
1. Advanced Exercise Physiology,	given by Y. Yasud	la in the spring term.			
1. Advanced Exercise Physiology,	given by Y. Yasud	la in the spring term.			
Notes for textbook					
Handouts will be prepared.					
The following book is also referre	d to;				
"Winter D.A.: Biomechanics and M	Notor Control of H	uman Movement, Pu	blished by John W	/iley & Sons, Inc., in 2	2009″
1					
1					
Handouts will be prepared.					

"Winter D.A.: Biomechanics and Motor Control of Human Movement, Published by John Wiley & Sons, Inc., in 2009"

Notes for reference

Goals to be achieved

- 1. To understand the use of mechanical principle and methodologies to human movements.
- 2. To understand the structure and function of muscle, joint and nervous systems in human locomotion.
- 1. To understand the use of mechanical principle and methodologies to human movements.
- $\mathbf{2}.$ To understand the structure and function of muscle, joint and nervous systems in human locomotion.

Evaluation of achievement

The summation of the final report (50%) and short reports regarding the topics covered in the lecture (50%). The summation of the final report (50%) and short reports regarding the topics covered in the lecture (50%). **Examination**

Details of examination

Other information

Room: The 2nd floor in the Research Center for Physical Fitness, Sports and Health. Tel: 0532-44-6631, E-mail: yasuda@las.tut.ac.jp

Room: The 2nd floor in the Research Center for Physical Fitness, Sports and Health. Tel: 0532-44-6631, E-mail: yasuda@las.tut.ac.jp

Reference URL

http//.www.health.tut.ac.jp http//.www.health.tut.ac.jp

Office hours

Monday afternoon (PM3:00-5:00) Monday afternoon (PM3:00-5:00)

Relations to attainment objectives of learning and education

Key words

kinetic, kinematic, locomotion, mechanical efficiency, energy, power, torque kinetic, kinematic, locomotion, mechanical efficiency, energy, power, torque

(M41630110)Engineering Safety[Engineering Safety]

(M41030110)Engineering Safety[r	ingineering Safety	F			
Subject name[English]	Engineering Safe	ty[Engineering Sa	fety		
Schedule number	M41630110	Subject area	Advanced	Required or	Elective
			Mechanical	elective	
Time of starting a second	Fall1 tarma	Davi of th	Engineering	One dit(a)	1
lime of starting a course	Faill term	Day of th		Great(s)	I
Faculty	Graduate Progra	m for Master's De	gree	Subject grade	2~2
Department Offered		in for master's De	giee	Beggining	2.2
				grade	
Charge teacher name[Roman	BATRES PRIETO) RAFAELBATRE	S PRIETO RAFAEL	9	
alphabet mark]					
Numbering					
Objectives of class					
In this course students will leave	n qualitative and q	uantitative meth	ods for analyzing th	e safety of engineer	red artifacts. The
course is based on engineering a	nd science fundam	entals such as th	ermodynamics and s	statistics to analyze	ootential hazards.
risk, reliability, fault logic, and fail	ure modes. This co	ourse is also inten	ded to provide a bac	ckground in managing	an overall safety
program and its application to inc	dustries such as m	anufacturing, oil a	nd chemical, pharm	aceuticals, defense,	aerospace, paper,
and information technology.		0,	* •	, ,	
In this course students will learn	n qualitative and q	uantitative meth	ods for analyzing th	e safety of engineer	red artifacts. The
course is based on engineering a	nd science fundam	entals such as th	ermodynamics and s	statistics to analyze	potential hazards,
risk, reliability, fault logic, and fail	ure modes. This co	ourse is also inten	ded to provide a bac	ckground in managing	an overall safety
program and its application to inc	dustries such as m	anufacturing, oil a	nd chemical, pharm	aceuticals, defense, a	aerospace, paper,
and information technology.					
Contents of class					
1. Introduction to system safety ((week 1)				
2. Hazards Scenarios (week 2)					
3. Hazards and Operability Studie	s (week 3)				
4. Hazards and Operability Studie	s (week 4)				
5. Case study (week 5)	(, <u>,</u> ,				
6. Probabilistic Risk Assessment	(week 6)				
7. Risk Management (week 7)					
1. Introduction to system safety (week 1)				
2. Hazards Scenarios (week 2)	a(waak 2)				
3. Hazards and Operability Studie	s (week 3)				
5 Case study (week 5)	S (WEEK 4)				
6 Probabilistic Risk Assessment	(week 6)				
7 Risk Management (week 7)					
Self Preparation and Review					
•••••••••••••••••••••••••••••••••••••••					
Related subjects					
Engineering fundamentals Statist	ics				
Engineering fundamentals, Statist	ics				
Notes for textbook					
* Clemens, P. L. and R. J. Sim	mons. System Sat	fetv and Risk Ma	nagement - A Guid	de for Engineering E	ducators. (1998).
[Available from the Course Web F	Page]		0	5 5	
* Lee's Loss prevention in the	process industries	: hazard identific	ation, assessment a	nd control.3rd ed. /	[edited by] Sam
Mannan (2005)					
* Clemens, P. L. and R. J. Sim	mons. System Sat	fety and Risk Ma	nagement – A Guie	de for Engineering E	ducators. (1998).
[Available from the Course Web F	Page]				
\ast Lee's Loss prevention in the	process industries	: hazard identific	ation, assessment a	nd control.3rd ed. /	[edited by] Sam
Mannan (2005)					
Notes for reference					
Goals to be achieved					
Student will be able to:					
1. Identify and describe a hazard	scenario				

2. Generate deviations from a given design intent

3. Identify causes of the deviations

3. Identify consequences and their resulting hazards

4. Find and document existing safeguards

5. Propose corrective and preventive actions

6. Determine the amount of risk based on reliability data

7. Describe the risk management process

8. Enumerate the key aspects of social responsibility

Student will be able to:

1. Identify and describe a hazard scenario

- 2. Generate deviations from a given design intent
- 3. Identify causes of the deviations
- 3. Identify consequences and their resulting hazards
- 4. Find and document existing safeguards
- 5. Propose corrective and preventive actions
- 6. Determine the amount of risk based on reliability data
- 7. Describe the risk management process

8. Enumerate the key aspects of social responsibility

Evaluation of achievement

A case study will be assigned in which students will analyze a specific process or artifact using the methods introduced during the course. A final report will be due the last day of the course.

A case study will be assigned in which students will analyze a specific process or artifact using the methods introduced during the course. A final report will be due the last day of the course.

Examination

Details of examination

Other information

Room: D611, Ext: 6716, e-mail: rbp@tut.jp Room: D611, Ext: 6716, e-mail: rbp@tut.jp

Reference URL

http://ise.me.tut.ac.jp/lectures/safety/ http://ise.me.tut.ac.jp/lectures/safety/

Office hours

I will be available immediately following class. Other office hours by appointment (via email).

I will be available immediately following class. Other office hours by appointment (via email).

Relations to attainment objectives of learning and education

Key words

safety, risk analysis, reliability, social responsibility, ethics in engineering safety, risk analysis, reliability, social responsibility, ethics in engineering

(M41630120)Time-frequency Analysis and Wavelet Transform[Time-frequency Analysis and Wavelet Transform]

Subject nemo[Endich]	Time o fue au ono	Analysis and Way	alat Transform	ina fuaruana Anak	usia and Wayalat			
Subject name[English]	Time-Trequency	/ Analysis and wave	elet TransformLin	me-frequency Analy	sis and wavelet			
Sebadula number		Subject eres	Advanced	Paguinad on	Elective			
	M41030120	Subject area	Machanical	cleative	LIECTIVE			
			Engineering	01001140				
Time of starting a course	Fall2 torm	Day of the		Credit(a)	1			
Time of starting a course	Failz Lerm	Day of the	Tue.2~2	Great(s)	1			
Faculty	Graduate Progr	am for Master's Degr		Subject grade	1~2			
Department Offered	Graduate i rogi	an for Master's Degre	50	Beggining	1 2			
				orade				
Charge teacher name[Roman	音 忠 SHO Tag	dashi		Brado				
alphabet mark]	キ 心 いい I duasiii							
Numbering								
Objectives of class								
To obtain advanced knowledge of	time-frequency a	analysis and image pro	ocessing by utilizi	ng wavelet transform				
To obtain advanced knowledge of	time-frequency a	analysis and image pro	ocessing by utilizi	ng wavelet transform				
Contents of class								
1. Basic theory of time-frequency	y analysis method	I will be briefly discus	sed.					
1)Shot-Time Fourier transform								
2)The Wigner-Ville Distribution								
3)Hilbert Transform and instantar	neous frequency a	analysis						
4)Wavelet transform								
2.Application of the wavelet Trans	sform will be brief	fly discussed.						
1) Time series signal analysis								
2) Image processing								
3) Abnormal detection								
4) Surface inspection								
1. Basic theory of time-frequency	y analysis method	will be briefly discuss	sed.					
1)Shot-Time Fourier transform								
2)The Wigner-Ville Distribution								
3)Hilbert Transform and instantar	neous frequency a	analysis						
4)Wavelet transform								
2.Application of the wavelet Trans	sform will be briet	fly discussed.						
1) Time series signal analysis								
2) Image processing								
3) Abnormal detection								
4) Surface inspection								
Self Preparation and Review								
Related subjects								
Basic knowledge of the signal ana	alysis							
Basic knowledge of the signal ana	alysis							
Notes for textbook								
Materials will be perpared by lect	urer.							
(Reference)								
Y. Shimizu, Z. Zhang, R. Batres,	Frontiers in comp	outing technologies for	r Manufacturing a	pplications, Springer,	2007.			
M. Holschneider, "Wavelets and a	nalysis", Oxford l	University Press.						
L. Cohan, "Time-Frequency Analy	ysis", Prentice-H	all PTR.						
R.L. Allen, D.W. Mills, "Signal Anal	lysis", IEEE Press	3.						
Materials will be perpared by lect	urer.							
(Reference)								
Y. Shimizu, Z. Zhang, R. Batres,	Frontiers in comp	outing technologies for	r Manufacturing a	pplications, Springer,	2007.			
M. Holschneider, "Wavelets and a	nalysis", Oxford I	University Press.						
L. Cohan, "Time-Frequency Analy	ysis", Prentice-H	all PTR.						
R.L. Allen, D.W. Mills, "Signal Anal	lysis", IEEE Press	3.						
Notes for reference	-							

1

Goals to be achieved

Understanding the knowledge of the time-frequency analysis method and using them in real application Understanding the knowledge of the time-frequency analysis method and using them in real application

Evaluation of achievement

Interim report (30%) and term-end report (70%) Interim report (30%) and term-end report (70%) **Examination**

Details of examination

Other information

Room: D-610, E-mail: zhang@pse.tut.ac.jp Room: D-610, E-mail: zhang@pse.tut.ac.jp

Reference URL

http://is.pse.tut.ac.jp http://is.pse.tut.ac.jp

Office hours

Relations to attainment objectives of learning and education

Key words

Wavelet transform, Time-frequency analysis Wavelet transform, Time-frequency analysis

(M41630170)Advanced Applied Fluid Engineering[Advanced Applied Fluid Engineering]

Subject name[English]	Advanced Applied	l Fluid En	gineering[/	Advanced Applied F	luid Engineering]			
Schedule number	M41630170	Subject	t area	Advanced	Required or	Elective		
	1			Mechanical	elective			
				Engineering				
Time of starting a course	Fall1 term	Day	of the	Mon.1~1	Credit(s)	1		
		week,pe	əriod					
Faculty	Graduate Progran	n for Mas	ter's Degre	e	Subject grade	1~2		
Department Offered	1				Beggining			
-	grade							
Charge teacher name Roman	柳田 秀記 YANA	DA Hidek	ki					
alphabet markj								
Numbering								
Objectives of class								
The class treats the dynamics of class are to understand transien methods to analyze them.	fluid in a pipe, which it phenomena in a	ch is a ty pipe, the	pical distri theories	buted parameter sy that describe the	vstem. The primary dynamic behaviors	objectives of the of fluid, and the		
The class treats the dynamics of	fluid in a pipe, white	ch is a ty	pical distri	buted parameter sy	stem. The primary	objectives of the		
class are to understand transien	t phenomena in a	pipe, the	theories	that describe the	dynamic behaviors	ot fluid, and the		
methods to analyze them.								
	anuation on 10	lunder i i i	duna de la	n fau lassis - P				
Ist week: One-dimensional wave	equation and its so	lution in t	time domai	n for lossless lines				
2nd week: Water hammer phenom	enon							
3rd week: Solution of wave equation	on in Laplace doma	ain	·					
4th week: Steady friction model a	nd unsteady friction	n model, I	Propagatio	n constant				
oth week: Oscillatory laminar flow								
oth week: Hydraulic impedance, re	itiection coefficient	t, and fred	quency res	ponse analysis				
7th week: Characteristics method								
oth week. Examination								
2nd week: Water hammer phenom 3rd week: Solution of wave equati 4th week: Steady friction model a 5th week: Oscillatory laminar flow 6th week: Hydraulic impedance, re 7th week: Characteristics method 8th week: Examination	enon on in Laplace doma nd unsteady friction in pipe efflection coefficient	ain n model, f t, and frec	Propagatio quency res	n constant ponse analysis				
Self Preparation and Review								
Related subjects								
Fluid mechanics, Mechanics, Lapla	ace transform							
Fluid mechanics, Mechanics, Lapla	ace transform							
Notes for textbook								
Printed materials are given.		-						
Reterenc:Wylie, Streeter, Lisheng	, Fluid Transients in	systems	s, McGraw	-Hil				
Printed materials are given.		o .						
Reterenc:Wylie, Streeter, Lisheng,	, ⊢luid Transients in	Systems	s, McGraw	-Hil				
Notes for reference								
Goals to be achieved								
To understand the transient phen	omena that occur i	n a pipe.						
To understand the fundamental the	neories that describ	be the dyr	namic beha	viors of fluid in a p	ipe.			
To understand the transient phon	omena that occur	n a nine						
To understand the fundamental th	peories that describ	n a pipe. The dur	namic hehr	wiors of fluid in a p	ine			
	isones that testfl	is the uyr	anne perie	and a second of the second of	ipo.			
Evaluation of achievement								

Written reports:50%, Examination:50% Written reports:50%, Examination:50%

Examination

Details of examination

Other information

Room: D309, E-mail: yanada@me.tut.ac.jp Room: D309, E-mail: yanada@me.tut.ac.jp **Reference URL**

Office hours

Basically, every time is OK. The time for discussion can be determined through e-mails when the lecturer is abscent from his office.

Basically, every time is OK. The time for discussion can be determined through e-mails when the lecturer is abscent from his office.

Relations to attainment objectives of learning and education

(M41630190)Applied Combustion Engineering[Applied Combustion Engineering]

Subject name[English]	Applied Combustion Engineering						
Schedule number	M41630190	Subject ar	rea	Advanced	Required or	Elective	
				Mechanical	elective		
				Engineering			
Time of starting a course	Fall1 term	Day of	the	Mon.3~3	Credit(s)	1	
		week,peric	bd				
Faculty	Graduate Program	n for Master	's Degre	e	Subject grade	1~2	
Department Offered					Beggining		
Charge teacher name[Barran		Succession			grade		
sinhahet mark]	та спора	busumu					
Numbering							
Ubjectives of class				· · · · · · · · · · · · · · · · · · ·	allutiona anna fuar	a combustion and	
dianarsa inta the atmosphere. Su	oh phonomono toko	er in our eng	ineering	g activities. Some p	pollutions come from	n compustion and	
of such flows will be lectured in	on prienomena take	on modeling	of turb	lent combustion b	ased on stochastic	matical treatment	
The global environment is a subject	ect we must consid	er in our ene	ineering	activities. Some r	collutions come from	n combustion and	
disperse into the atmosphere Su	ch phenomena take	e place in tur	bulent i	reacting flows. In th	he class the mathe	matical treatment	
of such flows will be lectured. In	paticular, we focus	on modeling	of turb	ulent combustion b	ased on stochastic	methods.	
Contents of class							
1.Introduction							
2.Premixed combustion							
3.Nonpremixed combustion							
4.Turbulent combustion							
5.Statistical description of turbule	ent combustion						
6.Flamelet model							
7.Probability density function(pdf)) model						
8.Examination							
1 his class ought to open in altern 1.Introduction 2.Premixed combustion 3.Nonpremixed combustion 4.Turbulent combustion 5.Statistical description of turbule 6.Flamelet model 7.Probability density function(pdf, 8.Examination	ate years, thus see ent combustion) model	the teachin	g sched	lule.			
This class ought to open in altern	late years, thus see	e the teachin	g sched	lule.			
Son Freparauori anu Review							
Related subjects							
Fundamental knowledge of the f	luid dynamics is re	quired. but	the sta	tistics and the sto	ochastics will be le	ctured with basic	
contents.	,	,					
Fundamental knowledge of the f	luid dynamics is re	quired, but	the sta	tistics and the sto	chastics will be le	ctured with basic	
contents.							
Notes for textbook							
Prints will be distributed.							
(Reference)							
Principles of Combustion, Kuo,K.	K., John Wiley & So	ns					
Prints will be distributed.							
(Reference)							
Principles of Combustion, Kuo,K.k	K., John Wiley & So	ns					
Notes for reference							

Goals to be achieved
Governing equations of turbulent combustion are derivable from fundamental equations.
Governing equations of turbulent combustion are derivable from fundamental equations.
Evaluation of achievement
Evaluation is based on an examination and reports.
Evaluation is based on an examination and reports.
Examination
Details of examination
Other information
Room: D411, Tel.(Ext.): 6681, e-mail: noda@me.tut.ac.jp
Room: D411, Tel.(Ext.): 6681, e-mail: noda@me.tut.ac.jp
Reference URL
http://www.mech.tut.ac.jp/~noda/
http://www.mech.tut.ac.jp/~noda/
Office hours
Any time in afternoon
Any time in afternoon
Relations to attainment objectives of learning and education
Key words

(M41630210)Advanced Mechanical Systems Design I[Advanced Mechanical Systems Design I]

Subject name[English]	Advanced Mecha	nical Systems Desig	n I∫Advanced Mecha	anical Systems Des	sign I]	
Schedule number	M41630210	Subject area	Advanced	Required or	Elective	
		-	Mechanical	elective		
			Engineering			
Time of starting a course	Fall term	Day of the	Mon.4~4	Credit(s)	2	
		week,period				
Faculty	Graduate Program	n for Master's Degr	ee	Subject grade	1~2	
Department Offered				Beggining		
				grade		
Charge teacher name[Roman	S1系教務委員 1kei kyomu Iin-S					
alphabet mark]						
Numbering						
Objectives of class						
This lecture aims to provide a br	oad understanding	of the mechanical s	systems design avail	able for the maste	r thesis research	
work of a student.						
This lecture aims to provide a br	oad understanding	of the mechanical s	systems design avail	able for the maste	r thesis research	
work of a student.						
Contents of class						
The class provides both of funda	amental knowledge	of his/her master t	hesis research worl	k and the most ad	vanced results in	
the related field by reading rese	earch papers and r	monographs. The co	ontents of the class	s depend on the s	upervisor. To be	
announced by individual supervise	ors.					
The class provides both of funda	amental knowledge	of his/her master t	hesis research worl	k and the most ad	vanced results in	
the related field by reading rese	earch papers and r	nonographs. The co	ontents of the class	s depend on the s	upervisor. To be	
announced by individual supervise	ors.					
Self Preparation and Review						
Related subjects						
Notes for textbook						
Textbook or material will be made	e available from the	supervisors.				
Textbook or material will be made	available from the	supervisors.				
Notes for reference		· ·				
Goals to be achieved						
To acquire fundamental knowledg	e of individual rese	arch fields.				
To acquire the ability to find prob	lems, the ability to	solve the problems	and the presentatio	n skill.		
To acquire fundamental knowledg	e of individual rese	arch fields				
To acquire the ability to find prob	lems the ability to	solve the problems	and the presentatio	n skill		
	, usinity to					
Evaluation of achievement						
Coursework presentation and/or	report					
Coursework, presentation and/or	report.					
Examination						
Details of examination						
Other information						
Reference URL						
Office hours						
Relations to attainment objective	s of learning and e	ducation				
<u> </u>	-					

(M41630230)Advanced Materials and Manufacturing Process I[Advanced Materials and Manufacturing Process I]

Subject nemo[English]	Advenced Meteri	olo and Manu	factu	ring Propos I[Ad	unnand Matariala a	d Manufacturing		
Subject name[English]	Advanced Materials and Manufacturing Process ILAdvanced Materials and Manufacturing							
Ochodula annahan	Process IJ	0.41.4	_	A durant a d	Describer of the second	Election		
Schedule number	M41030230	Subject are	a	Advanced	Required or	Elective		
				Mechanical	elective			
	F U .			Engineering	0	0		
lime of starting a course	Fall term	Day of	the	Tue.4~4	Gredit(s)	2		
Feeulty	Graduata Bragran	week,period	Subject mode	1~2				
Pacuity Department Offered	Graduate Program	n for Masters	Degr	ee	Subject grade	1~2		
Department Offered					Deggining			
Charge teacher name[Poman	C1	kei kvomu lin-	2		grauo			
alphabet mark]	JT 示決/加女只 TKEI NYUIIIU IIIT-3							
Numbering								
		C 11 .						
This lecture aims to provide a br	oad understanding	of the materia	iis and	manufacturing pr	ocess available for t	the master thesis		
This lesture sime to provide a br	and understanding	of the motorie	la and	I monufacturing pr	aaaaa ayailahla far t	ha maatar thaaia		
research work of a student	oad understanding		iis and	i manufacturing pr	ocess available for t	ne master thesis		
Contents of class								
The class provides both of funds	mental knowledge	of his/her ma	ctor t	hesis research wo	rk and the most ad	vanced results in		
the related field by reading rese	arch papers and n	nonographs T	he co	ontents of the clar	ss depend on the s	upervisor To be		
announced by individual supervise	ors		110 00					
The class provides both of funda	amental knowledge	of his/her ma	ster t	hesis research wo	rk and the most ad	vanced results in		
the related field by reading rese	earch papers and n	nonographs. T	he co	ontents of the clas	ss depend on the s	upervisor. To be		
announced by individual superviso	ors.	5 .						
Self Preparation and Review								
-								
Related subjects								
Notes for textbook								
Textbook or material will be made	a available from the	supervisors						
Textbook or material will be made	available from the	supervisors.						
Notes for reference								
Goals to be achieved								
To acquire fundamental knowledg	e of individual rese	arch fields						
To acquire the ability to find prob	lems, the ability to	solve the prol	olems	and the presentati	on skill.			
To acquire fundamental knowledg	e of individual rese	arch fields						
To acquire the ability to find prob	lems, the ability to	solve the prol	olems	and the presentati	on skill.			
	·····, ··· ···, ···							
Evaluation of achievement								
Coursework, presentation and/or	report.							
Coursework, presentation and/or	report.							
Examination								
Details of examination								
Other information								
Keterence UKL	Reference URL							
Office hours								
Relations to attainment objective	s of learning and e	ducation						

(M41630250)Advanced System, Control and Robotics I[Advanced System, Control and Robotics I]

Subject name[English]	Advanced System	n, Control and	l Robo	tics I[Advanced Sys	tem, Control and F	lobotics I]	
Schedule number	M41630250	Subject are	a	Advanced	Required or	Elective	
				Mechanical	elective		
				Engineering			
Time of starting a course	Fall term	Day of	the	Thu.4~4	Credit(s)	2	
		week,period	ł				
Faculty	Graduate Program	Graduate Program for Master's Degree			Subject grade	1~2	
Department Offered				Beggining			
	01万批改千号 1				grade		
Charge teacher name[Roman	SI杀教務安員I	ST杀教務安員 Tkei kyomu lin-S					
alphabet mark							
Objectives of class							
This lecture aims to provide a bro	oad understanding o	of the control	and ro	obotics available for	the master thesis	research work of	
		<u>.</u>					
This lecture aims to provide a bro	oad understanding o	of the control	and ro	botics available for	the master thesis	research work of	
The class provides both of funds	montal knowladge	of his /hor m	notor t	hadia radarah war	and the meet ad	unneed regulte in	
the related field by reading rese	amental knowledge	or his/her ha	The co	ntents of the class	c depend on the s	upervisor. To be	
announced by individual superviso	ors.	1011061 aprilo.		sites of the olds:			
The class provides both of funda	amental knowledge	of his/her ma	aster t	hesis research wor	and the most ad	vanced results in	
the related field by reading rese	earch papers and r	nonographs.	The co	ontents of the class	depend on the s	upervisor. To be	
announced by individual supervise	ors.	0.					
Self Preparation and Review							
Related subjects							
· · · · · · · · · · · · · · · · · · ·							
Notes for textbook							
Textbook or material will be made	available from the	supervisors					
Textbook or material will be made	e available from the	supervisors.					
Notes for reference		•					
Goals to be achieved							
To acquire fundamental knowledg	e of individual rese	arch fields.					
To acquire the ability to find prob	lems, the ability to	solve the pro	blems,	and the presentation	on skill.		
To acquire fundamental knowledge of individual research fields.							
To acquire the ability to find problems, the ability to solve the problems, and the presentation skill.							
Evaluation of achievement							
Coursework, presentation and/or	report.						
Coursework, presentation and/or	report.						
Examination							
Details of examination							
Other information							
Reference URL							
Office hours							
Polotione to attainment able attain	o of looming and -	ducation					
	o or learning and e	uucauon					

(M41630270)Advanced Energy and Environmental Engineering I[Advanced Energy and Environmental Engineering I]

Subject nemo[English]	Advensed Enerm	and Environm	ant	L Engineering I	duanaad Enarmy ar	d Environmontal			
Subject name[English]	Advanced Energy	and Environm	ienta	a Engineering ILA	uvanced Energy ar	id Environmental			
Sebedule number	Mule20270 Subject area Advanced			Required or	Flootivo				
	10141030270	Subject area		Machanical	cleative	Liective			
				Engineering	81800148				
Time of starting a course	Fall term	Day of t	he	Fri 4~4	Credit(s)	2			
		week.period		111.4 4	OI OUIC(3)	2			
Faculty	Graduate Progran	n for Master's D)egre	e	Subject grade	1~2			
Department Offered					Beggining				
-					grade				
Charge teacher name[Roman	S1系教務委員 1	S1系教務委員 1kei kyomu lin-S							
alphabet mark]	alphabet mark]								
Numbering									
Objectives of class									
This lecture aims to provide a bro	oad understanding (of the energy an	nd er	vironmental engine	ering available for t	the master thesis			
research work of a student.									
This lecture aims to provide a bro	oad understanding o	of the energy an	nd er	nvironmental engine	ering available for t	the master thesis			
research work of a student.									
Contents of class									
The class provides both of funda	amental knowledge	of his/her mast	ter t	hesis research wor	k and the most ad	vanced results in			
the related field by reading rese	arch papers and n	nonographs. The	e co	ntents of the clas	s depend on the s	supervisor. To be			
announced by individual supervise	ors.	.							
The class provides both of funda	amental knowledge	of his/her mast	ter t	hesis research wor	'k and the most ad	vanced results in			
the related field by reading rese	arch papers and n	nonographs. The	e co	ntents of the clas	s depend on the s	supervisor. To be			
Solf Properation and Paviow	ors.								
Sell Freparation and Review									
Related subjects									
Notes for textbook									
Textbook or material will be made	available from the	supervisors.							
l extbook or material will be made	available from the	supervisors.							
Notes for reference									
Goals to be achieved	C								
To acquire fundamental knowledg	e of individual resea	arch fields.		and the successful:	الناء مد				
To acquire the ability to find prob	nems, the admity to	solve the proble	ems,	and the presentati	on skill.				
-	C								
To acquire fundamental knowledg	e of individual resea	arch fields.							
To acquire the ability to find prob	nems, the admity to	solve the proble	ems,	and the presentati	on skill.				
Frederation of a discourse									
Coursework, presentation and/or	report.								
Examination									
Examination									
Details of exemination									
Others informati									
Uther information									
Reference URL									
Office hours									
Relations to attainment objective	Relations to attainment objectives of learning and education								
(M42610020)Thesis Research on Electrical and Electronic Information Engineering[Thesis Research on Electrical and Electronic Information Engineering]

Subject name[English]	Thesis Research on Electrical and Electronic Information Engineering[Thesis Research						
	Electrical and Ele	ctronic Information	Engineering	r	r		
Schedule number	M42610020	Subject area	Advanced	Required or	Required		
			Electrical and	elective			
			Electronic				
			Information				
			Engineering				
Time of starting a course	2Years	Day of the week.period	Intensive	Credit(s)	6		
Faculty	Graduate Prograr	n for Master's Degre	e	Subject grade	1~2		
Department Offered		Ū.		Beggining			
•				grade			
Charge teacher name[Roman	S2系教務委員, 希	各教員 2kei kyomu I	in-S, KAKUKYOUIN	Kakukyouin	I		
Numbering							
Objectives of class							
The thesis research aims to pro	vide a practical exp	perience of research	n work, and to acqu	uire his∕her researe	ch skill with deep		
understanding of the electrical ar	nd electronic engine	ering.					
The thesis research aims to pro	vide a practical ex	perience of research	n work, and to acqu	uire his/her researd	ch skill with deep		
understanding of the electrical ar	nd electronic engine	ering.					
Contonto of class							
The research subject depends	on the supervisor	and the research	group you join. Ind	ividual students w	ull have different		
research subjects. Contact with	your supervisor.						
The research subject depends	on the supervisor	and the research	group you join. Ind	lividual students w	ill have different		
research subjects. Contact with	your supervisor.						
Self Preparation and Review							
Related subjects							
Notes for textbook							
Reference and material will be av	ailable from the su	pervisor.					
Reference and material will be av	ailable from the sur	pervisor.					
Notes for reference	··						
Goals to be achieved							
To get something new on individu	al research fields						
To develop his/her research skill	including the plann	ing and the present	ation				
To get something new on individu	al research fields						
To develop his/her research skill	including the plann	ing and the present	ation				
Evaluation of achievement	including the pidlin						
Presentation Thesis Courses	and Outcomos	avaluated gaparally	,				
Presentation, Thesis, Coursework	, and Outcomes are	e evaluated generally	·.				
	, and Outcomes are	e evaluated generally	·.				
Examination							
Details of examination							
Other information							
Reference URL							
Office hours							
Relations to attainment objective	s of learning and e	ducation					

(M42610020)Thesis Research on Electrical and Electronic Information Engineering[Thesis Research on Electrical and Electronic Information Engineering]

Subject name[English]	Thesis Research on Electrical and Electronic Information Engineering[Thesis Research on							
	Electrical and Electronic Information Engineering]							
Schedule number	M42610020	M42610020 Subject area Advanced			Required			
			Electrical and	elective				
			Electronic					
			Information					
			Engineering					
Time of starting a course	2Years	Day of the	Intensive	Credit(s)	6			
		week,period						
Faculty	Graduate Program	Graduate Program for Master's Degree Subject grade 1~2						
Department Offered	Electrical and Elec	ctronic Information	Beggining	M1, M2				
				grade				
Charge teacher name[Roman	S2系教務委員 2	kei kyomu Iin−S						
alphabet mark]								
Numbering								

Objectives of class

The thesis research aims to provide a practical experience of research work, and to acquire his/her research skill with deep understanding of the electrical and electronic information engineering.

The thesis research aims to provide a practical experience of research work, and to acquire his/her research skill with deep understanding of the electrical and electronic information engineering.

Contents of class

The research subject depends on the supervisor and the research group you belong to. Every student will have an individual research subject. For more details, please contact with your supervisor.

The research subject depends on the supervisor and the research group you belong to. Every student will have an individual research subject. For more details, please contact with your supervisor.

Self Preparation and Review

Related subjects

Notes for textbook

Reference and material will be available from the supervisor. Reference and material will be available from the supervisor.

Notes for reference

Goals to be achieved

To get something new on individual research fields.

To develop his/her research skill including the planning and the presentation.

To get something new on individual research fields.

To develop his/her research skill including the planning and the presentation.

Evaluation of achievement

Presentation, Thesis, Coursework, and Outcomes are evaluated generally. Presentation, Thesis, Coursework, and Outcomes are evaluated generally.

Examination

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

(M4261002T)Thesis Research on Electrical and Electronic Information Engineering[Thesis Research on Electrical and Electronic Information Engineering]

Subject name[English]	Thesis Research on Electrical and Electronic Information Engineering[Thesis Research on							
	Electrical and Electronic Information Engineering]							
Schedule number	M4261002T	Subject area	Advanced	Required or	Required			
			Electrical and	elective				
			Electronic					
			Information					
			Engineering					
Time of starting a course	Year	Day of the	Intensive	Credit(s)	6			
		week,period						
Faculty	Graduate Program for Master's Degree Subject grade 2~2							
Department Offered	Electrical and Electronic Information Engineering Beggining							
				grade				
Charge teacher name[Roman	S2系教務委員 2I	kei kyomu Iin−S						
alphabet mark]								
Numbering								

Objectives of class

The thesis research aims to provide a practical experience of research work, and to acquire his/her research skill with deep understanding of the electrical and electronic information engineering.

The thesis research aims to provide a practical experience of research work, and to acquire his/her research skill with deep understanding of the electrical and electronic information engineering.

Contents of class

The research subject depends on the supervisor and the research group you belong to. Every student will have an individual research subject. For more details, please contact with your supervisor.

The research subject depends on the supervisor and the research group you belong to. Every student will have an individual research subject. For more details, please contact with your supervisor.

Self Preparation and Review

Related subjects

Notes for textbook

Reference and material will be available from the supervisor. Reference and material will be available from the supervisor.

Notes for reference

Goals to be achieved

To get something new on individual research fields.

To develop his/her research skill including the planning and the presentation.

To get something new on individual research fields.

To develop his/her research skill including the planning and the presentation.

Evaluation of achievement

Presentation, Thesis,Coursework, and Outcomes are evaluated generally. Presentation, Thesis,Coursework, and Outcomes are evaluated generally. **Examination**

Examination

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

(M42610040)Seminar on Electrical and Electronic Information Engineering[Seminar on Electrical and Electronic Information Engineering]

Subject name[English]	Seminar on Electrical and Electronic Information Engineering[Seminar on Electrical and							
	Electronic Inform	Electronic Information Engineering]						
Schedule number	M42610040	Subject area		Advanced Electrical and Electronic Information Engineering	Required or elective	Required		
Time of starting a course	Year	Day of week,perio	the 1	Intensive	Credit(s)	6		
Faculty	Graduate Progra	m for Master's	Subject grade	1~2				
Department Offered	Electrical and Electronic Information Engineering				Beggining grade			
Charge teacher name[Roman alphabet mark]	S2系教務委員 2kei kyomu Iin−S							
Numbering								
Objectives of class The seminar aims to provide a be electronic information engineering The seminar aims to provide a be electronic information engineering	proad understandin g for the research proad understandin g for the research	g of theoretic work of his/he g of theoretic work of his/he	al and er mast al and er mast	experimental appro ter thesis. experimental appro ter thesis	poches related to t poches related to t	the electrical and		

Contents of class

The class provides both of fundamental knowledge on the research work of master thesis and the most advanced results in the related field by reading research papers and monographs. Contents of the class depend on the supervisor. To be announced by individual supervisors.

The class provides both of fundamental knowledge on the research work of master thesis and the most advanced results in the related field by reading research papers and monographs. Contents of the class depend on the supervisor. To be announced by individual supervisors.

Self Preparation and Review

Related subjects

Notes for textbook

Textbook or material will be made available from the supervisor. To be announced by individual supervisors. Textbook or material will be made available from the supervisor. To be announced by individual supervisors.

Notes for reference

Goals to be achieved

To acquire fundamental knowledge on individual research fields.

To acquire the ability of finding a problem, the ability of solving the problem and the presentation skill.

To acquire fundamental knowledge on individual research fields.

To acquire the ability of finding a problem, the ability of solving the problem and the presentation skill.

Evaluation of achievement

 $\label{eq:coursework} Coursework, \ presentation \ and/or \ report.$

Coursework, presentation and/or report.

Examination

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

(M42630010)Material Science for Electronics[Material Science for Electronics]

Subject name[English]	Material Science f	Material Science for Electronics[Material Science for Electronics]						
Schedule number	M42630010	Subject area	Advanced	Required or	Elective			
			Electrical and	elective				
			Electronic					
			Information					
			Engineering					
Time of starting a course	Fall term	Day of the	Mon.5~5	Credit(s)	2			
		week,period						
Faculty	Graduate Program	n for Master's Degre	e	Subject grade	1~2			
Department Offered				Beggining				
				grade				
Charge teacher name[Roman	井上 光輝, 服部 敏明, 武藤 浩行, 石山 武 INOUE Mitsuteru, HATTORI Toshiaki, MUTO							
alphabet mark]	Hiroyuki, ISHIYAMA Takeshi							
Numbering								

Objectives of class

Objectives of this subject are to understand the fundamental aspects on spin electronics, electrochemical sensing, powder processing and photonics and have overall knowledge on the latest technologies on these physical phenomena.

Objectives of this subject are to understand the fundamental aspects on spin electronics, electrochemical sensing, powder processing and photonics and have overall knowledge on the latest technologies on these physical phenomena.

Contents of class

"Material Science for Electronics" is composed of four topics of spin electronics, electrochemical sensing, powder processing and photonics, which will be delivered for three times for each by three professors whose expertise lie on the individual categories.

The category of "spin electronics" covers a wide area from fundamentals to applications of magnetic materials and magnetics. 1) Origin of magnetics, 2) Soft and hard magnetic materials, 3) Major applications of magnetics and magnetic materials, 4) Interaction phenomena among spins and various physical quantities, 5) Micro-magnetic devices and systems, 6) Spintronics and spin photonics

Electrochemical sensor includes electrical, electronic and/or optical devices. In particular, the lecture aims for the understanding of sensing and determination of compounds in aqueous solution. 1) Electrochemistry. 2) Solution chemistry. 3) Application of electrochemical sensing.

The category of "powder processing" covers a wide area of fabrication techniques for electronic devices. 1) sintering, 2) microstructute of ceramics and 3) nanocomposite.

The course of photonics is devoted to the survey of optoelectronic materials based on semiconductor physics and also to industrial applications of photonic devices. 1) Optoelectronic devices, 2) optical processes in semiconductors and exciton, 3) nanomaterial.

"Material Science for Electronics" is composed of four topics of spin electronics, electrochemical sensing, powder processing and photonics, which will be delivered for three times for each by three professors whose expertise lie on the individual categories.

The category of "spin electronics" covers a wide area from fundamentals to applications of magnetic materials and magnetics. 1) Origin of magnetics, 2) Soft and hard magnetic materials, 3) Major applications of magnetics and magnetic materials, 4) Interaction phenomena among spins and various physical quantities, 5) Micro-magnetic devices and systems, 6) Spintronics and spin photonics

Electrochemical sensor includes electrical, electronic and/or optical devices. In particular, the lecture aims for the understanding of sensing and determination of compounds in aqueous solution. 1) Electrochemistry. 2) Solution chemistry. 3) Application of electrochemical sensing.

The category of "powder processing" covers a wide area of fabrication techniques for electronic devices. 1) sintering, 2) microstructute of ceramics and 3) nanocomposite.

The course of photonics is devoted to the survey of optoelectronic materials based on semiconductor physics and also to industrial applications of photonic devices. 1) Optoelectronic devices, 2) optical processes in semiconductors and exciton, 3)

nanomaterial.	
Self Preparation and Review	
Related subjects	
Notes for textbook	
None	
None	
Notes for reference	
Goals to be achieved	
(1) To understand fundamental aspects on spin electronics, electrochemical sensing, powder processing and photonics.	
(2) To get the knowledge on the latest technologies on these physical phenomena.	
(1) To understand fundamental aspects on spin electronics, electrochemical sensing, powder processing and photonics.	
(2) To get the knowledge on the latest technologies on these physical phenomena.	
Evaluation of achievement	
Examination results 20% for each categories (spin electronics, electrochemical sensing, powder processing and photon	ics) and
20% report, then the final evaluation will be the sum of these marks.	
Examination results 20% for each categories (spin electronics, electrochemical sensing, powder processing and photon	ics) and
20% report, then the final evaluation will be the sum of these marks.	
Examination	
Details of examination	
Other information	
Spin electronics; Mitsuteru Inoue: inoue@ee.tut.ac.jp	
Electrochemical sensing: Toshiaki Hattori: thattori@ee.tut.ac.jp	
Powder processing: Hiroyuki Muto: muto@ee.tut.ac.jp	
Photonics; Takeshi Ishiyama: ishiyama@ee.tut.ac.jp	
Spin electronics; Mitsuteru Inoue: inoue@ee.tut.ac.jp	
Electrochemical sensing: Toshiaki Hattori: thattori@ee.tut.ac.jp	
Powder processing: Hiroyuki Muto: muto@ee.tut.ac.jp	
Photonics; Takeshi Ishiyama: ishiyama@ee.tut.ac.jp	
Reference URL	
Office hours	
one hour after every classes	
one hour after every classes	
Relations to attainment objectives of learning and education	
Key words	
spin electronics, electrochemical sensing, powder processing and photonics	
spin electronics, electrochemical sensing, powder processing and photonics	

(M42630030)Electrical Energy Systems[Electrical Energy Systems]

Subject name[English]	Electrical Energy	Electrical Energy Systems[Electrical Energy Systems]						
Schedule number	M42630030	Subject area	Advanced	Required or	Elective			
			Electrical and	elective				
			Electronic					
			Information					
			Engineering					
Time of starting a course	Fall term	Day of the	Mon.3~3	Credit(s)	2			
		week,period						
Faculty	Graduate Program	n for Master's Degre	e	Subject grade	1~2			
Department Offered	Beggining							
	grade							
Charge teacher name[Roman	長尾 雅行, 滝川 浩史, 櫻井 庸司, 穗積 直裕 NAGAO Masayuki, TAKIKAWA Hirofumi,							
alphabet mark]	SAKURAI Yoji, HOZUMI Naohiro							
Numbering								

Objectives of class

This lecture is implemented as an introduction to electrical energy systems. In order to utilize electric energy in various fields, lectrues on the generation, transmission, distribution and control of electric energy, high voltage engineering, secondary batteries and fuel cells, discharge plasma are given. It is being useful as reference and self-study guide for the professional dealing with this important area. There are four sub courses to choose from.

This lecture is implemented as an introduction to electrical energy systems. In order to utilize electric energy in various fields, lectrues on the generation, transmission, distribution and control of electric energy, high voltage engineering, secondary batteries and fuel cells, discharge plasma are given. It is being useful as reference and self-study guide for the professional dealing with this important area. There are four sub courses to choose from.

Contents of class

Sub Course 1

- 1. Introduction of Electric Energy Systems
- 2. High Voltage Engineering and Electrical Insulation
- 3. Fundamental Properties of Dielectrics and Electrical Insulating Materials.
- Sub Course 2
- 1. Introduction to Electrochemical Energy Conversion Devices
- 2. Lithium Secondary Batteries and Fuel Cells
- 3. Recent Trend in Electrochemical Energy Conversion Devices
- Sub Course 3
- 1. Generation and control of discharge plasma
- 2. Characteristics and diagnostics of discharge plasma
- 3. Plasma applications
- Sub Course 4
- 1. Ultrasonic techniques for medical use.
- 2. Diagnosing techniques for industrial use.
- 3. Assessment for high voltage insulation system.

Sub Course 1

- 1. Introduction of Electric Energy Systems
- 2. High Voltage Engineering and Electrical Insulation
- 3. Fundamental Properties of Dielectrics and Electrical Insulating Materials.
- Sub Course 2
- 1. Introduction to Electrochemical Energy Conversion Devices
- 2. Lithium Secondary Batteries and Fuel Cells
- 3. Recent Trend in Electrochemical Energy Conversion Devices
- Sub Course 3
- 1. Generation and control of discharge plasma
- 2. Characteristics and diagnostics of discharge plasma
- 3. Plasma applications
- Sub Course 4
- 1. Ultrasonic techniques for medical use.
- 2. Diagnosing techniques for industrial use.
- 3. Assessment for high voltage insulation system.

Self Preparation and Review

Related subjects	
Flectric Power Syste	ms Dielectrics and Electrical Insulation Energy Conversion Plasma Science
Electric Power Syste	ms, Dielectrics and Electrical Insulation, Energy Conversion, Plasma Science
Notes for textbook	
Materials will be pren	ared by the lecturer
Materials will be prep	ared by the lecturer.
Notes for reference	
Goals to be achieved	
To understand the ba	sic knowledge of electric enrgy systems and related fields.
To understand the ba	sic knowledge of electric enrgy systems and related fields.
Evaluation of achieve	ment
Marks are based on t	he final examination or report (100%).
Marks are based on t	he final examination or report (100%).
Examination	
Details of examinatio	n
Other information	
Office: C-309, TEL: C	532-44-6725, E-mail: nagao@tut.jp
Office: C-309, TEL: C	532-44-6725, E-mail: nagao@tut.jp
Reference URL	
Office hours	
Before and/or after t	he lecture and at any time after making the appointment based on e-mail.
Before and/or after t	he lecture and at any time after making the appointment based on e-mail.
Relations to attainme	nt objectives of learning and education

Electric Energy, Electric Power. High Voltage, Secondary Battery, Fuel Cell, Plasma, Electrical Insulation

(M42630060)LSI Process[LSI Process]

Subject name[English]	LSI Process[LSI F	Process]				
Schedule number	M42630060	Subject ar	ea	Advanced	Required or	Elective
			Electrical and	elective		
				Electronic		
				Information		
				Engineering		
Time of starting a course	Fall term	Day of week.perio	the d	Tue.1~1	Credit(s)	2
Faculty	Graduate Program	n for Master'	- s Degro	ee	Subject grade	1~2
Department Offered	,		Ū		Beggining	
-					grade	
Charge teacher name[Roman alphabet mark]	石田 誠,澤田 MURAKAMI Yuji S	和明,村 SEKIGUCHI	[·] 上 裕 Hiroto	二, 関口 寛人 1	ISHIDA Makoto, S	AWADA Kazuaki,
Numbering	more to the regi,		moto			
of latest device will be lestured	rstanding of LSI pro	ocesses, sen	liconal	ictors devices inclu	iding material desgi	n and an example
From the viewpoint of deep under	rstanding of I SI pr		nicondi	ictors devices inclu	ding material decai	n and an example
of latest device will be lectured	rstantung of Lot pro	JUESSES, SEII	ncond		ung material desgi	n and an example
Contents of class						
Integrated circuits						
Device processing						
MEMS/NEMS						
Latest MOS FETs						
Current topics in IC/MEMS						
Integrated circuits						
Device processing						
MEMS/NEMS						
Latest MOS FETs						
Current topics in IC/MEMS						
Self Preparation and Review						
Related subjects						
The basic knowledge on the quan	tum mechanics, the	rmodynamic	s, and e	electronics are desi	rable.	
Semiconductor Physics, Master c	ourse					
The basic knowledge on the quan	tum mechanics, the	rmodynamic	s, and e	electronics are desi	rable.	
Semiconductor Physics, Master o	ourse					
Notes for textbook						
Physics of Semiconducotr Device	s					
S.M.Sze, Willy						
Physics of Semiconducotr Device	s					
S.M.Sze, Willy						
Notes for reference						
Goals to be achieved						
(1) To understand fundamental as	pects on LSI proce	ss, and semi	conduc	tor devices includi	ng material design.	
(2) To get the knowledge on the I	atest technologies	on LSI proce	SS.		-	
(1) To understand fundamental as	pects on LSI proce	ss, and semi	conduc	tor devices includi	ng material design.	
(2) To get the knowledge on the I	atest technologies (on LSI proce	SS.			
Evaluation of achievement						
Reports (50%) and Final examinati	on (50%)					
Reports (50%) and Final examinati	on (50%)					
Examination						
Details of examination						

Other information
M.Ishida (C-606)
ishida@ee.tut.ac.jp
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ymurakami@ee.tut.ac.jp
M.Ishida (C-606)
ishida@ee.tut.ac.jp
ext. 6741
K.Sawada (C-605)
sawada@ee.tut.ac.jp
T.Kawano (C-603)
kawano@ee.tut.ac.jp
Yu.Murakami (C−606)
ymurakami@ee.tut.ac.jp
Reference URL
http://www.tut.ac.jp/english/introduction/02EE.pdf
(department)
http://www.int.ee.tut.ac.jp/
(devision)
http://www.tut.ac.jp/english/research/research_highlights.html
(research activities)
http://www.tut.ac.jp/english/introduction/02EE.pdf
(department)
http://www.int.ee.tut.ac.ip/
(devision)
http://www.tut.ac.ip/opglich/research/research.highlights.html
(recent activities)
had a application of the second
book an apopintment by e-mail phone etc.
Balations to strainment objet mail, profile, etc.
Kev words

(M42630080)Advanced Electronic Information System[Advanced Electronic Information System]

Subject name[English]	Advanced Electro	Advanced Electronic Information System[Advanced Electronic Information System]					
Schedule number	M42630080	Subject area		Advanced	Required or	Elective	
				Electrical and	elective		
				Electronic			
				Information			
				Engineering			
Time of starting a course	Fall term	Day of t	he	Mon.4~4	Credit(s)	2	
		week,period					
Faculty	Graduate Program for Master's Degree				Subject grade	1~2	
Department Offered					Beggining		
					grade		
Charge teacher name[Roman	市川 周一 ICHIKAWA Shuichi						
alphabet mark]							
Numbering							
Objectives of class							

The aims of this lecture:

(1) To understand various hardware algorithms for computer arithmetic,

(2) To understand various designs for computer arithmetic units.

The aims of this lecture:

(1) To understand various hardware algorithms for computer arithmetic,

(2) To understand various designs for computer arithmetic units.

Contents of class

Algorithm is a procedure for solving a mathematical problem in a finite number of steps. The required calculation time and memory space depend on the algorithm, even for the same problem. Thus, it is essential to select the best algorithm for a given set of conditions.

In digital hardware, an algorithm is realized as a logic design. This lecture aims to understand various hardware algorithms for computer arithmetic, together with the corresponding designs of arithmetic hardware.

Week 1: Introduction
Week 2, 3: Algorithms for addition
Week 4,5,6: Algorithms for multiplication
Week 7,8,9: Algorithms for division and square root
Week 10,11: Algorithms for elementary functions
Week 12: Floating-point arithmetic
Week 13: Pipelining
Week 14, 15: Custom computing hardware

Algorithm is a procedure for solving a mathematical problem in a finite number of steps. The required calculation time and memory space depend on the algorithm, even for the same problem. Thus, it is essential to select the best algorithm for a given set of conditions.

In digital hardware, an algorithm is realized as a logic design. This lecture aims to understand various hardware algorithms for computer arithmetic, together with the corresponding designs of arithmetic hardware.

Week 1: Introduction
Week 2, 3: Algorithms for addition
Week 4,5,6: Algorithms for multiplication
Week 7,8,9: Algorithms for division and square root
Week 10,11: Algorithms for elementary functions
Week 12: Floating-point arithmetic
Week 13: Pipelining
Week 14, 15: Custom computing hardware

Self Preparation and Review

Related subjects

Prerequisite: Fundamental knowledge and skills of logic design, algorithms, and computer structure.

Prerequisite:

Fundamental knowledge and skills of logic design, algorithms, and computer structure.

Notes for textbook

The lecturer will provide the handouts of slides. References are given for each topic whenever necessary.

The lecturer will provide the handouts of slides. References are given for each topic whenever necessary.

Notes for reference

Goals to be achieved

(1) To understand various hardware algorithms for computer arithmetic,

(2) To understand various designs for computer arithmetic units.

To understand various hardware algorithms for computer arithmetic,
 To understand various designs for computer arithmetic units.

Evaluation of achievement

Reports on specific items given in the lecture (50%). Term examination on general items shown in the lecture (50%).

Reports on specific items given in the lecture (50%). Term examination on general items shown in the lecture (50%).

Examination

Details of examination

Other information

Room C-404 ext. 6897 E-mail: ichikawa@tut.jp

Room C-404 ext. 6897 E-mail: ichikawa@tut.jp

Reference URL

http://www.ccs.ee.tut.ac.jp/~ichikawa/lecture/ http://www.ccs.ee.tut.ac.jp/~ichikawa/lecture/

Office hours

Please make an appointment for consultation with the lecturer via e-mail or direct communication in classroom. Please make an appointment for consultation with the lecturer via e-mail or direct communication in classroom.

Relations to attainment objectives of learning and education

(M42630100)Methodology of R & D 1[Methodology of R & D 1]

Subject name[English]							
	M42630100	Subject or			Pequired or	Flective	
Schedule Hulliber	WI72030100	Subject ar	Ja	Fleatrical	noquireu or	LICCLIVE	
			Electrical and	elective			
			Electronic				
	Informatio		Information				
				Engineering	a w ()		
lime of starting a course	Fall term	Day of	the .	Tue.3~3	Gredit(s)	2	
		week,perio	d				
Faculty	Graduate Progran	n for Master	s Degre	e	Subject grade	1~2	
Department Offered					Beggining		
A	~~ 北 亦 千 日 ~				grade		
Charge teacher name <u>l</u> Roman	S2糸教務委員2	kei kyomu Iin	-S				
alphabet mark							
Numbering							
Objectives of class							
The class aims to provide a bas	sic understanding c	of R&D meth	odolog	y related to the e	electrical and electr	onic information	
engineering for the research work	of his/her master	thesis.					
The class aims to provide a bas	sic understanding c	of R&D meth	odolog	y related to the e	electrical and electr	onic information	
engineering for the research work	of his/her master	thesis.					
Contents of class							
The class provides some fundam	ental tips to condu	ict R&D work	effect	ively. Contents of	the class depend c	on the supervisor.	
To be announced by individual su	pervisors			•	·		
The class provides some fundam	ental tips to condu	ict R&D work	effect	ively. Contents of	the class depend o	on the supervisor.	
To be announced by individual su	pervisors				•		
Self Preparation and Review							
Pelated subjects							
Related subjects							
Notes for textbook							
Reference and material will be available	ailable from the sup	pervisor.					
Reference and material will be ava	ailable from the sup	pervisor.					
Notes for reference							
Goals to be achieved							
To acquire the ability of identify	ying and formulatir	ng research	probler	n, planning and ir	nplementing specific	research tasks,	
troubleshooting and communicating	ng outcomes.						
To acquire the ability of identify	ying and formulatir	ng research	probler	n, planning and ir	nplementing specific	research tasks,	
troubleshooting and communicating	ng outcomes.						
Evaluation of achievement							
Coursework and presentation are	evaluated generally	y.					
Coursework and presentation are	evaluated generally	v.					
·		•					
Examination							
Examination							
Datalla of sounds attac							
Details of examination							
Other information							
Reference URL							
Office hours							
Deletione to attainment abiention	• • • • • • • • • • • • • • •	ducation					
Nelations to attainment objective	s or learning and 6	ucation					

(M43610010)Seminar on Computer Science and Engineering I[Seminar on Computer Science and Engineering I]

Subject name[English]	Seminar on Com	mputer Science and	d Engineering I[Se	eminar on Compu	ter Science and
	Engineering I]				
Schedule number	M43610010	Subject area	Advanced	Required or	Required
			Computer	elective	
			Science and		
			Engineering		
Time of starting a course	Year	Day of the	Intensive	Credit(s)	4
		week,period			
Faculty	Graduate Program	n for Master's Degre	Subject grade	1~2	
Department Offered	Electrical and Elec	Electrical and Electronic Information Engineering			
				grade	
Charge teacher name[Roman	S3系教務委員 3	kei kyomu Iin−S			
alphabet mark]					
Numbering					

Objectives of class

The course is intended for students to study basic materials in depth, related to his/her research subjects in computer science and engineering.

It is also aimed for students to acquire various skills, required in general research work, such as those for oral presentation, and technical discussion and writing.

The course is intended for students to study basic materials in depth, related to his/her research subjects in computer science and engineering.

It is also aimed for students to acquire various skills, required in general research work, such as those for oral presentation, and technical discussion and writing.

Contents of class

While specific contents depend on the research areas students are involved in, it is usually the case for students to read relevant textbooks/research papers and report on them, as well as to present and discuss on the research work of their own. While specific contents depend on the research areas students are involved in, it is usually the case for students to read relevant textbooks/research papers and report on them, as well as to present and discuss on the research work of their own. **Self Preparation and Review**

Related subjects

Consult with your advisor.

Consult with your advisor.

Notes for textbook

Consult with your advisor. Consult with your advisor.

Notes for reference

Goals to be achieved

To acquire abilities for technical readings in English, logical thinking/explanation, and clear presentation.

To acquire abilities for technical readings in English, logical thinking/explanation, and clear presentation.

Evaluation of achievement

Will be evaluated by taking into accout various factors overall, such as technical explanation, question answering, discussion involvements and so on.

Will be evaluated by taking into accout various factors overall, such as technical explanation, question answering, discussion involvements and so on.

Examination

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

(M43610020)Seminar on Computer Science and Engineering II[Seminar on Computer Science and Engineering II]

Subject name[English]	Seminar on Con	nputer Science and	d Engineering II[Se	eminar on Compu	ter Science and
	Engineering II]				
Schedule number	M43610020	Subject area	Advanced Computer Science and Engineering	Required or elective	Required
Time of starting a course	Year	Day of the week,period	Intensive	Credit(s)	2
Faculty	Graduate Progran	n for Master's Degre	e	Subject grade	2~2
Department Offered	Electrical and Ele	ctronic Information I	Engineering	Beggining grade	
Charge teacher name[Roman alphabet mark]	S3系教務委員 3I	kei kyomu Iin−S			
Numbering					
Objectives of class					

The seminar aims to provide a broad understanding of the computer science and engineering available for the research work of his/her master thesis.

The seminar aims to provide a broad understanding of the computer science and engineering available for the research work of his/her master thesis.

Contents of class

The class provides both of fundamental knowledge on the research work of master thesis and the most advanced results in the related field by reading research papers and monographs. Contents of the class depend on the supervisor. To be announced by individual supervisors.

The class provides both of fundamental knowledge on the research work of master thesis and the most advanced results in the related field by reading research papers and monographs. Contents of the class depend on the supervisor. To be announced by individual supervisors.

Self Preparation and Review

Related subjects

Notes for textbook

Textbook or material will be made available from the supervisor. To be announced by individual supervisors.

Textbook or material will be made available from the supervisor. To be announced by individual supervisors.

Notes for reference

Goals to be achieved

To acquire fundamental knowledge on individual research fields, to acquire the ability of finding a problem, the ability of solving the problem and the presentation skill.

To acquire fundamental knowledge on individual research fields, to acquire the ability of finding a problem, the ability of solving the problem and the presentation skill.

Evaluation of achievement

Coursework, presentation and/or report.

Coursework, presentation and/or report.

Examination

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

(M43610030)Thesis Research on Computer Science and Engineering[Thesis Research on Computer Science and Engineering]

Subject name[English]	Thesis Research on Computer Science and Engineering[Thesis Research on Computer							
	Science and Engir	Science and Engineering]						
Schedule number	M43610030	M43610030 Subject area Advanced		Required or	Required			
			Computer	elective				
			Science and					
			Engineering					
Time of starting a course	2Years	Day of the	Intensive	Credit(s)	6			
		week,period						
Faculty	Graduate Program	n for Master's Degre	Subject grade	1~2				
Department Offered				Beggining				
				grade				
Charge teacher name[Roman	S3系教務委員, 谷	各教員 3kei kyomu Ii	in-S, KAKUKYOUIN	Kakukyouin				
alphabet mark]								
Numbering								

Objectives of class

The course is intended for students to foster their interests in research problems on computer science and engineering and to acquire ability for independent studies.

It is also aimed for students to acquire, through thesis research, cooperativeness, a sense of responsibility, abilities for problem solving, research planning, decision making, outcome presentation and subject investigation, and to enhance their creativity and persistency, among others.

The course is intended for students to foster their interests in research problems on computer science and engineering and to acquire ability for independent studies.

It is also aimed for students to acquire, through thesis research, cooperativeness, a sense of responsibility, abilities for problem solving, research planning, decision making, outcome presentation and subject investigation, and to enhance their creativity and persistency, among others.

Contents of class

It is usually the case that thesis research is carried out on individual bases with specific contents differing from one student to another.

Consult with your advisor for any further details.

It is usually the case that thesis research is carried out on individual bases with specific contents differing from one student to another.

Consult with your advisor for any further details.

Self Preparation and Review

Related subjects

Consult with your advisor for them. Consult with your advisor for them.

Notes for textbook

Consult with your advisor for them.

Consult with your advisor for them.

Notes for reference

Goals to be achieved

To acquire abilities for doing research and development at technically high level, sophisticated decision making, and leading large scale research projects.

To acquire abilities for doing research and development at technically high level, sophisticated decision making, and leading large scale research projects.

Evaluation of achievement

Three faculty members will be assigned to prepare the evaluation for your thesis research, based on publication records,
master thesis, and oral presentation. It will be then finalized by the faculty meeting.
Three faculty members will be assigned to prepare the evaluation for your thesis research, based on publication records,
master thesis, and oral presentation. It will be then finalized by the faculty meeting.
Examination
Details of examination
Other information
Reference URL
Office hours
Relations to attainment objectives of learning and education
Key words

l

(M43610030)Thesis Research on Computer Science and Engineering[Thesis Research on Computer Science and Engineering]

Subject name[English]	Thesis Research on Computer Science and Engineering[Thesis Research on Computer							
	Science and Engir	Science and Engineering]						
Schedule number	M43610030	Subject area	Advanced	Required or	Required			
			Computer	elective				
			Science and					
			Engineering					
Time of starting a course	2Years	Day of the	Intensive	Credit(s)	6			
		week,period						
Faculty	Graduate Program for Master's Degree Subject grade 1~2							
Department Offered	Computer Science	e and Engineering		Beggining	M1, M2			
				grade				
Charge teacher name[Roman	S3系教務委員 3kei kyomu Iin−S							
alphabet mark]								
Numbering								

Objectives of class

The course is intended for students to foster their interests in research problems on computer science and engineering and to acquire ability for independent studies.

It is also aimed for students to acquire, through thesis research, cooperativeness, a sense of responsibility, abilities for problem solving, research planning, decision making, outcome presentation and subject investigation, and to enhance their creativity and persistency, among others.

The course is intended for students to foster their interests in research problems on computer science and engineering and to acquire ability for independent studies.

It is also aimed for students to acquire, through thesis research, cooperativeness, a sense of responsibility, abilities for problem solving, research planning, decision making, outcome presentation and subject investigation, and to enhance their creativity and persistency, among others.

Contents of class

It is usually the case that thesis research is carried out on individual bases with specific contents differing from one student to another.

Consult with your advisor for any further details.

It is usually the case that thesis research is carried out on individual bases with specific contents differing from one student to another.

Consult with your advisor for any further details.

Self Preparation and Review

Related subjects

Consult with your advisor for them. Consult with your advisor for them.

Notes for textbook

Consult with your advisor for them.

Consult with your advisor for them.

Notes for reference

Goals to be achieved

To acquire abilities for doing research and development at technically high level, sophisticated decision making, and leading large scale research projects.

To acquire abilities for doing research and development at technically high level, sophisticated decision making, and leading large scale research projects.

Evaluation of achievement

Three faculty members will be assigned to prepare the evaluation for your thesis research, based on publication records,
master thesis, and oral presentation. It will be then finalized by the faculty meeting.
Three faculty members will be assigned to prepare the evaluation for your thesis research, based on publication records,
master thesis, and oral presentation. It will be then finalized by the faculty meeting.
Examination
Details of examination
Other information
Reference URL
Office hours
Relations to attainment objectives of learning and education
Key words

(M4361003T)Thesis Research on Computer Science and Engineering[Thesis Research on Computer Science and Engineering]

Subject name[English]	Thesis Research on Computer Science and Engineering[Thesis Research on Computer							
	Science and Engir	Science and Engineering]						
Schedule number	M4361003T	Subject area	Advanced	Required or	Required			
			Computer	elective				
			Science and					
			Engineering					
Time of starting a course	Year	Day of the	Intensive	Credit(s)	6			
		week,period						
Faculty	Graduate Program	Graduate Program for Master's Degree Subject grade 2~2						
Department Offered	Computer Science	e and Engineering	Beggining					
				grade				
Charge teacher name[Roman	S3系教務委員 3kei kyomu Iin−S							
alphabet mark]								
Numbering								

Objectives of class

The course is intended for students to foster their interests in research problems on computer science and engineering and to acquire ability for independent studies.

It is also aimed for students to acquire, through thesis research, cooperativeness, a sense of responsibility, abilities for problem solving, research planning, decision making, outcome presentation and subject investigation, and to enhance their creativity and persistency, among others.

The course is intended for students to foster their interests in research problems on computer science and engineering and to acquire ability for independent studies.

It is also aimed for students to acquire, through thesis research, cooperativeness, a sense of responsibility, abilities for problem solving, research planning, decision making, outcome presentation and subject investigation, and to enhance their creativity and persistency, among others.

Contents of class

It is usually the case that thesis research is carried out on individual bases with specific contents differing from one student to another.

Consult with your advisor for any further details.

It is usually the case that thesis research is carried out on individual bases with specific contents differing from one student to another.

Consult with your advisor for any further details.

Self Preparation and Review

Related subjects

Consult with your advisor for them. Consult with your advisor for them.

Notes for textbook

Consult with your advisor for them.

Consult with your advisor for them.

Notes for reference

Goals to be achieved

To acquire abilities for doing research and development at technically high level, sophisticated decision making, and leading large scale research projects.

To acquire abilities for doing research and development at technically high level, sophisticated decision making, and leading large scale research projects.

Evaluation of achievement

Three faculty members will be assigned to prepare the evaluation for your thesis research, based on publication records,
master thesis, and oral presentation. It will be then finalized by the faculty meeting.
Three faculty members will be assigned to prepare the evaluation for your thesis research, based on publication records,
master thesis, and oral presentation. It will be then finalized by the faculty meeting.
Examination
Details of examination
Other information
Reference URL
Office hours
Relations to attainment objectives of learning and education
Key words

(M43610040)Seminar on Computer Science and Engineering[Seminar on Computer Science and Engineering]

Subject name[English]	Seminar on Cor Engineering]	mputer Science ar	nd Engineering[Ser	minar on Comput	er Science and
Schedule number	M43610040	Subject area	Advanced Computer Science and Engineering	Required or elective	Required
Time of starting a course	Year	Day of the week,period	Intensive	Credit(s)	6
Faculty	Graduate Program	n for Master's Degre	Subject grade	2~2	
Department Offered	Computer Science	e and Engineering	Beggining grade		
Charge teacher name[Roman alphabet mark]	S3系教務委員 3I	kei kyomu Iin−S			
Numbering					

Objectives of class

The course is intended for students to study basic materials in depth, related to his/her research subjects in computer science and engineering.

It is also aimed for students to acquire various skills, required in general research work, such as those for oral presentation, and technical discussion and writing.

The course is intended for students to study basic materials in depth, related to his/her research subjects in computer science and engineering.

It is also aimed for students to acquire various skills, required in general research work, such as those for oral presentation, and technical discussion and writing.

Contents of class

While specific contents depend on the research areas students are involved in, it is usually the case for students to read relevant textbooks/research papers and report on them, as well as to present and discuss on the research work of their own. While specific contents depend on the research areas students are involved in, it is usually the case for students to read relevant textbooks/research papers and report on them, as well as to present and discuss on the research work of their own. **Self Preparation and Review**

Related subjects

Consult with your advisor.

Consult with your advisor.

Notes for textbook

Consult with your advisor. Consult with your advisor.

Notes for reference Goals to be achieved

To acquire abilities for technical readings in English, logical thinking/explanation, and clear presentation.

To acquire abilities for technical readings in English, logical thinking/explanation, and clear presentation.

Evaluation of achievement

Will be evaluated by taking into accout various factors overall, such as technical explanation, question answering, discussion involvements and so on.

Will be evaluated by taking into accout various factors overall, such as technical explanation, question answering, discussion involvements and so on.

Examination

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

(M43630100)Image Processing, Advanced[Image Processing, Advanced]

				a		
Subject name[English]	Image Processing	g, Advanced[Image I	Processing, Advance	d]		
Schedule number	M43630100	Subject area	Advanced	Required or	Elective	
			Computer	elective		
			Science and			
			Engineering			
Time of starting a course	Fall term	Day of the	Tue.2~2	Credit(s)	2	
		week,period				
Faculty	Graduate Program	m for Master's Degr	ee	Subject grade	1~2	
Department Offered				Beggining		
				grade		
Charge teacher name[Roman	金澤 靖,菅谷 (呆之 KANAZAWA Ya	asushi, SUGAYA Yas	uyuki		
alphabet mark]						
Numbering						
Objectives of class						
This course involves fundamental	s and advanced iss	sues on image proce	essing and computer	vision.		
This course involves fundamental	s and advanced iss	ues on image proce	ssing and computer	vision.		
			o .			
Contents of class						
I-2: Fundamentals on projective	geometry					
3-4: Camera model						
5–7: Epipolar geometry						
8–10: 3–D reconstruction from tw	<i>i</i> o views					
11-13: 3-D reconstruction from r	nany views					
14–15: Advanced issues						
1-2: Fundamentals on projective	geometry					
3-4: Camera model						
5–7: Epipolar geometry						
8-10: 3-D reconstruction from tw	<i>i</i> o views					
11-13: 3-D reconstruction from r	nany views					
14–15: Advanced issues						
Self Preparation and Review						
-						
Palatad subjects						
Geometry, Linear Algebra, Statist	ics.					
Geometry, Linear Algebra, Statist	ICS.					
Notes for textbook						
Handouts will be prepared.						
(References)						
– RI Hartley and A Zisserman M	Aultiple View Geom	etry in Computer				
Vision Cambridge University Pres						
- D A Forsyth and I Ponce Con	nouter Vision A	Modern Approach -	_			
Prentice Hall 2003			,			
Handouts will be prepared.						
(References)						
- DI Hartley and A Ziacorman A	Aultinla View Geem	atry in Computer				
Vision Cambridge University Pre-		eay in computer				
Vision, Gampridge University Press, 2000.						
D.A. Forsym and J. Porice, Con	iputer vision A	modern Approach -	,			
Frenuce Hall, 2003.						
Notes for reference						

Goals to be achieved
Understanding of the fundamentals and advanced issues on image processing and computer vision including
- 3-D reconstruction from images
Understanding of the fundamentals and advanced issues on image processing and computer vision including
- camera model
- 3-D reconstruction from images
Evaluation of achievement
Grade will be determined by some reports for each area.
Grade will be determined by some reports for each area.
Examination
Details of examination
Other information
Room F−404, Ext. 6888, Email: kanazawa@cs.tut.ac.jp (Yasushi Kanazawa)
Room C-507, Ext. 6760, Email: sugaya@iim.cs.tut.ac.jp (Yasuyuki Sugaya)
Room F-404, Ext. 6888, Email: kanazawa@cs.tut.ac.jp (Yasushi Kanazawa)
Room C-507, Ext. 6760, Email: sugaya@iim.cs.tut.ac.jp (Yasuyuki Sugaya)
Reference URL
http://www.img.cs.tut.ac.jp/
http://www.iim.cs.tut.ac.jp/
http://www.img.cs.tut.ac.jp/
http://www.iim.cs.tut.ac.jp/
Office hours
Relations to attainment objectives of learning and education
Key words
image processing, computer vision
image processing, computer vision

(M43630150)Computer Systems, Advanced[Computer Systems, Advanced]

Subject name[English]	Computer System	ns Advance	dComp	uter Systems Adva	nced]		
	MA2620150	ns, Auvarice		Advonced	Demined on Flashing		
Schequie number	10143030130	Subject a	irea	Advanced	rtequired or	Elective	
				Computer	616CTIV6		
				Science and			
The state of the s	F U .			Engineering	0	0	
i ime of starting a course	⊢all term	Day o	the	Tue.1~1	Gredit(s)	Z	
Faarthy	Graduata Dragon	week,per			Subject much	1~2	
	Graduate Program	n for Maste	r s Degr	66	Subject grade	1~2	
Department Offered					ooggining		
Charge teacher name[Roman	小林 良大郎 КО	RAVASHIR	Notaro		grauo		
sinhshet mark]	JAR RXADIO	DATAONI	yotaro				
Trainbering							
Objectives of class							
This lecture introduces some adv	anced topics on de	signing adv	anced co	omputer systems.			
This lecture introduces some adv	anced topics on de	signing adv	anced co	omputer systems.			
Contents of class							
10/8, 10/15: Difference between	wire delay and gate	e delay					
10/22: Limitation of large scale co	omponets						
10/29, 11/5: Data dependences, o	control dependence	es, and reso	urce coi	nstraints in pipeline			
11/12: Complexity-effective com	puter architecture						
11/19: Clustered VLIW							
12/3, 12/10: Penalty reduction by	/ using value predic	tion					
12/17: Specialized register read/	write mechanism						
1/14,1/21: Communication-Parall	elism Trace−off in	multi proce	ssors				
1/28: Flexible shared buffer mana	ged by compiler						
2/4, 2/18: Instruction level paralle	elism and thread lev	vel paralleli	m				
10/8, 10/15: Difference between	wire delay and gate	e delay					
10/22: Limitation of large scale co	omponets						
10/29, 11/5: Data dependences, o	control dependence	es, and reso	urce coi	nstraints in pipeline			
11/12: Complexity-effective com	puter architecture						
11/19: Clustered VLIW							
12/3. 12/10: Penalty reduction by	using value predic	tion					
12/17: Specialized register read/	write mechanism						
1/14.1/21: Communication-Parall	elism Trace-off in	multi proce	ssors				
1/28: Flexible shared buffer mana	ged by compiler						
2/4. 2/18: Instruction level paralle	elism and thread lev	vel parallelis	m				
Self Preparation and Review							
Related subjects							
Notes for textbook							
Course materials and references	will be given by the	e lecturer.					
Course materials and references	will be given by the	e lecturer.					
Notes for reference							
Goals to be achieved							
Students are required to obtain the	he knowledge on th	ie above-m	entioned	items.			
Students are required to obtain the	he knowledge on th	ie above-m	entioned	items.			
Evaluation of achievement							
There will be some assignments.	There will also be	an examina	tion. At	tendance to all clas	ses is compulsory.	Absence without	
reasonable excuses will result in s	some penalty.						
There will be some assignments.	There will also be	an examina	tion. At	tendance to all clas	ses is compulsory.	Absence without	
reasonable excuses will result in s	some penalty.						
Examination							
Details of examination							

Other information

Ryotaro Kobayashi Room: C-403 Tel: 6752 email: kobayashi@cs.tut.ac.jp

Ryotaro Kobayashi Room: C-403 Tel: 6752 email: kobayashi@cs.tut.ac.jp

Reference URL

Office hours

Students are to make an appointment via e-mail if they want to see the lecturer. Students are to make an appointment via e-mail if they want to see the lecturer.

Relations to attainment objectives of learning and education

Key words

Computer architecture, digital circuits, embedded systems, design automation Computer architecture, digital circuits, embedded systems, design automation
(M43630240)Networking, Advanced 1[Networking, Advanced 1]

Subject name[English]	Networking, Adva	Networking, Advanced 1[Networking, Advanced 1]						
Schedule number	M43630240	Subject area	Advanced Computer Science and Engineering	Required or elective	Elective			
Time of starting a course	Fall1 term	Day of the week,period	Wed.1~1	Credit(s)	1			
Faculty	Graduate Program	n for Master's Degre	Subject grade	1~2				
Department Offered		Beggining grade						
Charge teacher name[Roman alphabet mark]	梅村 恭司 UMEMURA Kyoji							
Numbering								

Objectives of class

The objective of this class is mastering both profound and advanced networking technologies. Precise protocols are lectured to enhance the knowledge of Internet.

The objective of this class is mastering both profound and advanced networking technologies. Precise protocols are lectured to enhance the knowledge of Internet.

Contents of class

- 1. Link Layer
- 2. Internet Protocol
- 3. Address Resolution Protocol
- 4. Internet Control Message Protocol
- 5. IP routing and Dynamic Routing Protocol
- 6. Transmission Control Protocol
- 7. TCP interactive and bulk data flow

1. Link Layer

- 2. Internet Protocol
- 3. Address Resolution Protocol
- 4. Internet Control Message Protocol
- 5. IP routing and Dynamic Routing Protocol
- 6. Transmission Control Protocol
- 7. TCP interactive and bulk data flow

Self Preparation and Review

Related subjects

The ability to write simple client/server programs are required.

The ability to write simple client/server programs are required.

Notes for textbook

TCP/IP Illustrated Volume. 1, The Protocols, W. Richard Stevens, Addison-wesley

TCP/IP Illustrated Volume. 1, The Protocols, W. Richard Stevens, Addison-wesley

Notes for reference

Goals to be achieved

The goal is to understand the way that computer network works precisely. The goal is to understand the way that computer network works precisely.

Evaluation of achievement

Examination will be held in the last class.

Examination will be held in the last class.

Examination

Details of examination

Other information

C-304 umemura@tut.jp

C-304 umemura@tut.jp

Reference URL

http://www.ss.cs.tut.ac.jp/ http://www.ss.cs.tut.ac.jp/

Office hours From 10:00AM to 13:00, Tue to Fri (Appointment are strongly recommended)

From 10:00AM to 13:00, Tue to Fri (Appointment are strongly recommended)

Relations to attainment objectives of learning and education

Key words

Computer Network, Distributed Systems Computer Network, Distributed Systems

(M43630260)Advanced Robotics and Informatics 1[Advanced Robotics and Informatics 1]

Subject name[English]	Advanced Robotic	cs and Inform	atics 1	Advanced Robotic	s and Informatics 1	1	
Schedule number	M43630260	Subject are	acios	Advanced	Required or	Flective	
	1110000200		-	Computer	elective	Liootivo	
				Science and	olocavo		
				Engineering			
Time of starting a course	Fall1 term	Dav of	the	Tue.3~3	Credit(s)	1	
		week,period	1				
Faculty	Graduate Progran	n for Master's	Degr	e	Subject grade	1~2	
Department Offered					Beggining		
					grade		
Charge teacher name[Roman	三浦 純 MIURA、	Jun					
alphabet mark]							
Numbering							
Objectives of class							
Fundamental and advanced issue	s in next-generation	n robotics will	be				
discussed. This part (part 1) deal	s with						
scene recognition by sensor fusio	on, mobile robot loca	alization and r	nappir	ıg, and action planni	ng.		
Fundamental and advanced issue	s in next-generation	n robotics will	be		0		
discussed. This part (part 1) deals	s with						
scene recognition by sensor fusio	on, mobile robot loca	alization and 1	nappir	ng, and action planni	ng.		
Contents of class							
Weeks 1-8:(Miura)							
- Scene recognition and action p	lanning.						
- Bayes filters and decision theor	ry						
- Mobile robot localization and ma	apping						
- Action planning under uncertair	nty						
Weeks 1-8:(Miura)							
- Scene recognition and action p	lanning.						
- Bayes filters and decision theor	ry						
- Mobile robot localization and ma	apping						
- Action planning under uncertair	nty						
Self Preparation and Review							
Related subjects							
Fundamentals of linear algebra an	nd probability theory	1					
Fundamentals of linear algebra an	nd probability theory	,. /.					
Notes for textbook							
Handouts will be prepared.							
(Reference)							
- S Thrup W Burgard D Fox P	robabilistic Robotics	MIT Press	2005				
e. Thrun, M. Burgaru, B. Fox, Fr		, M 1 1 1 000 ,	2000.				
Handouto will be propored							
Handouts will be prepared.							
			0005				
- S. Thrun, W. Burgard, D. Fox, Pi	robabilistic Robotics	s, MIT Press,	2005.				
Notes for reference							
Goals to be achieved							
Understanding of the fundamenta	ls of robotics includ	ding:					
- sensing mechanisms and algorit	hms for scene reco	ognition.					
Understanding of the fundamenta	ls of robotics includ	ding:					
- sensing mechanisms and algorit	hms for scene reco	ognition.					
Evaluation of achievement							

Grade will be determined by the report for each area.

Grade will be determined by the report for each area.

Examination

Details of examination

Other information

Room C-604, Ext. 6773, Email: jun.miura@tut.jp (Jun Miura)

Room C-604, Ext. 6773, Email: jun.miura@tut.jp (Jun Miura)

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

(M43630270)Advanced Robotics and Informatics 2[Advanced Robotics and Informatics 2]

Subject name[English]	Advanced Roboti	cs and Inform	atics 2	- P[Advanced Robotic	s and Informatics 2	7	
Schedule number	M43630270	Subject are	a	Advanced	Required or	Elective	
			-	Computer	elective		
				Science and	0.000.00		
				Engineering			
Time of starting a course	Fall2 term	Day of week.period	the	Tue.3~3	Credit(s)	1	
Faculty	Graduate Program	n for Master's	Degre	e	Subject grade	1~2	
Department Offered					Beggining grade		
Charge teacher name[Roman	岡田 美智男 OK	ADA Michio			9		
Numbering							
Objectives of class							
Eurodemontal and advanced issue	a in novt-renevation	n veheties will	ha				
discussed such as social interact	ion and communica	tion of robots	be				
Fundamental and advanced issue	s in next-generation	n robotics will	be				
discussed such as social interact	ion and communica	tion of rodots					
Contents of class							
- Situated cognition and biologica	al-inspired robots						
 Embodiment and social embedd 	ledness						
- Organizing social interaction in	social robots						
- Socially assistive robotics							
- Situated cognition and biologica	al-inspired robots						
- Embodiment and social embedd	ledness						
- Organizing social interaction in	social robots						
- Socially assistive robotics							
Self Preparation and Review							
Related subjects							
Fundamentals of cognitive science	ce.						
Fundamentals of cognitive science	ce.						
Notes for textbook							
Handouts will be prepared.							
(References)							
- R. Pfeifer, C. Scheier, Understa	nding Intelligence, N	MIT Press, 200	01.				
Handouts will be prepared.							
(References)							
- R. Pfeifer, C. Scheier, Understanding Intelligence, MIT Press, 2001.							
Notes for reference							
Goals to be achieved		P.					
Understanding of the fundamenta	is of robotics includ	ding:					
- cognitive science for biological	y-inspired robots ai	na social robo	tS.				
Understanding of the fundamenta	Is of robotics includ	ding:					
 cognitive science for biological 	y-inspired robots ai	nd social robo	ts.				

-				-
Eval	uation	of a	chieve	ment

Grade will be determined by the report for each area.

Grade will be determined by the report for each area.

Examination

Details of examination

Other information

Room F-402, Ext, 6886, Email: okada@tut.jp (Michio Okada)

Room F-402, Ext, 6886, Email: okada@tut.jp (Michio Okada)

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

(M43630300)Complex Systems and Intelligent Informatics 1[Complex Systems and Intelligent Informatics 1]

Subject name[English]	Complex Systems and Intelligent Informatics 1[Complex Systems and Intelligent Informatics						
Schedule number	M43630300	Subject area	Advanced Computer Science and	Required or elective	Elective		
Time of starting a course	Fall1 term	Day of the week,period	Engineering Wed.3~3	Credit(s)	1		
Faculty	Graduate Program	n for Master's Degr	ee	Subject grade	1~2		
Department Offered				Beggining grade			
Charge teacher name[Roman	村越 一支 MURA	AKOSHI Kazushi					
alphabet mark]							
Numbering							
Objectives of class							
The aim of this class is to unders	tand complex and i	ntelligent systems.					
To achieve the aim, this class off	ers knowledge and	skills for mathemati	cal modeling and sin	nulation methods.			
The aim of this class is to unders	tand complex and i	ntelligent systems.					
To achieve the aim, this class off	ers knowledge and	skills for mathemati	cal modeling and sin	nulation methods.			
A. Introduction	vatama? Qutling of	the busin sustan					
B Computational Neuroscience	nd Application-ori	the brain system.	Models				
What is computational Neuroscier	nce and artificial ne	ural networks?	Wodels				
C. Model Neurons							
Structure of neurons, synapse, m	odel neurons.						
D. Learning at connected part of	neurons (synapse)						
Synaptic plasticity, spike-timing-	dependent plasticit	y (STDP).					
E. Simulation Methods							
Numerical calculation methods fo	r single neuron, neu	ural network from si	ngle neuron.				
F. Simulation Environments							
Explanation and demonstration of	simulation environ	ments such as NEU	RON and GENESIS.				
G. Self-organizing							
What is self-organizing? Winner I	akes All, Self-orgai	nizing map (SOM)					
What is reinforcement learning	reinforcement lear	ning in the brain d	emonstration of re	inforcement learni	ng for controlling		
robot							
I. Summary							
1st week: A							
2nd week: B							
3rd week: C							
4th week: D							
5th week: E F							
6th week: G							
7th week: H I							
A. Introduction		4h - h					
B Computational Neuroscience	nd Application-ori	the brain system.	Models				
What is computational Neuroscier	nce and artificial ne	ural networks?	Wodels				
C. Model Neurons							
Structure of neurons, synapse, m	odel neurons.						
D. Learning at connected part of	neurons (synapse)						
Synaptic plasticity, spike-timing-	dependent plasticit	y (STDP).					
E. Simulation Methods							
Numerical calculation methods fo	r single neuron, nei	ural network from si	ngle neuron.				
F. Simulation Environments							
Explanation and demonstration of	simulation environ	ments such as NEU	RON and GENESIS.				
G. Self-organizing							

What is self-organizing? Winner Takes All, Self-organizing map (SOM)

H. Reinforcement Learning

What is reinforcement learning, reinforcement learning in the brain, demonstration of reinforcement learning for controlling robot

I. Summary

1st week: A 2nd week: B 3rd week: C 4th week: D 5th week: E F 6th week: G 7th week: H I

Self Preparation and Review

Related subjects

Notes for textbook

Handouts are distributed.

Handouts are distributed.

Notes for reference

Goals to be achieved

- Know complex and intelligent mathematical models, and understand them at the degree which you can simulte them by your programming or by using simulation environment.

- Can explain technical terms of complex and intelligent mathematical models.

- Master numerical calculation methods that are used in complex and intelligent mathematical models.

- Know complex and intelligent mathematical models, and understand them at the degree which you can simulte them by your programming or by using simulation environment.

- Can explain technical terms of complex and intelligent mathematical models.

- Master numerical calculation methods that are used in complex and intelligent mathematical models.

Evaluation of achievement

Examination 100% + alpha (Consideration, comment, and opinion in each content (A–H)) Examination 100% + alpha (Consideration, comment, and opinion in each content (A–H)) **Examination**

Details of examination

Other information

Even school year: Murakoshi, F-507, ext. 6899, mura [at] tut.jp

Even school year: Murakoshi, F-507, ext. 6899, mura [at] tut.jp

Reference URL

http://www.ci.cs.tut.ac.jp/~mura/ http://www.ci.cs.tut.ac.jp/~mura/

Office hours

After this class

After this class

Relations to attainment objectives of learning and education

Key words

(M43630310)Complex Systems and Intelligent Informatics 2[Complex Systems and Intelligent Informatics 2]

Subject name[English]	Complex Systems and Intelligent Informatics 2[Complex Systems and Intelligent Informatics						
Schedule number	2J M43630310	Subject area	Advanced	Required or Elective			
	11110000010		Computer	elective	LICOLIVE		
			Science and				
			Engineering				
Time of starting a course	Fall2 term	Day of the week.period	Wed.3~3	Credit(s)	1		
Faculty	Graduate Progran	n for Master's Degre	e	Subject grade	1~2		
Department Offered				Beggining			
				grade			
Charge teacher name[Roman	石田 好輝 ISHID	A Yoshiteru					
alphabet mark							
Numbering							
Objectives of class							
This course provides opportunitie	s to learn the follow	wings:					
* Modeling and analysis on compl	ex systems and lea	rning systems,					
* System theoretic analysis on co	omplex systems and	d learning systems ,					
* Computer simulations and impli-	cations, and						
↑ Implementation of complex syst Recent topics on complex system	erris and learning sy	ystems.	oucced in the course	2			
Recent topics on complex system	is and learning syst	ems will be also dis	cussed in the cours	e.			
This serves are video ana estuaitia	a ta laawa tha falla.						
* Modeling and analysis on compl	ex systems and lear	wings:					
* Notening and analysis on complex * System theoretic analysis on co	omplex systems and lea	learning systems,					
* Computer simulations and impli	cations. and	, iourning oyoconio					
* Implementation of complex syst	ems and learning s	ystems.					
Recent topics on complex system	ns and learning syst	ems will be also dis	cussed in the cours	e.			
Contents of class							
1. Introduction on complex dynam	iical systems						
2. Dynamical systems							
3. Complex networks and interact	ions						
4. Cellular automata and neural ne	etworks						
5. Information Processing by com							
7 Learning algorithms for agents	atonomous agents						
8 Evolutionary algorithms for age	nts						
9. Biological systems and informa	tion processing						
1. Introduction on complex dynam	ical systems						
2. Dynamical systems							
3. Complex networks and interact	ions						
4. Cellular automata and neural ne	etworks						
5. Information Processing by com	plex systems						
6. Emergence of cooperation in al	utonomous agents						
7. Learning algorithms for agents							
9 Biological systems and information	tion processing						
Self Preparation and Review							
-							
Related subjects							
Notes for textbook							
No textbook. References other th	an below will be su	ggested at the first	class.				
Ishida, Y.: Immunity-Based Svster	ms, Springer (2004)	;					
Barabasi, A.L.: Linked, Perseus, (2	2002)						
Strogatz, S. H. Sync, Hyperion (2	.003)						
No textbook. References other than below will be suggested at the first class.							

Ishida, Y.: Immunity-Based Systems, Springer (2004);
Barabasi, A.L.: Linked, Perseus, (2002)
Strogatz, S. H. Sync, Hyperion (2003)
Notes for reference
Goals to be achieved
Evaluation of achievement
Class performance (50%) and term−end report (50%)
Class performance (50%) and term−end report (50%)
Examination
Details of examination
Other information
Room F-504, Ext. 6895
Room F-504, Ext. 6895
Reference URL
Office hours
Wednesday 16:30-17:00
Wednesday 16:30-17:00
Relations to attainment objectives of learning and education
Key words
complex systems, cellular automaton, artificial life, immuno intelligence, neural networks, evolutionary game theory

complex systems, cellular automaton, artificial life, immuno intelligence, neural networks, evolutionary game theory complex systems, cellular automaton, artificial life, immuno intelligence, neural networks, evolutionary game theory

(M44610010)Seminar on Environmental and Life Science I[Seminar on Environmental and Life Science I]

Subject name[English]	Seminar on Environmental and Life Science I[Seminar on Environmental and Life Science						Life Science I]
Schedule number	M44610010	Subject area	a	Advanced	Required	or	Required
				Environmental	elective		
				and Life			
		l		Sciences			
Time of starting a course	Year	Day of	the	Intensive	Credit(s)		3
Faculty	Graduate Program	n for Master's	Degr	20	Subject mo	de	1~2
Department Offered	Environmental an	d Life Science	S	50	Beggining	00	1.52
		2 2110 30101100	5		grade		
Charge teacher name[Roman	S4系教務委員 4	kei kyomu Iin-	S				1
alphabet mark]							
Numbering							
Objectives of class							
This course will provide the stu	idents with opport	tunities to stu	ıdy or	his/her research	subjects on (enviro	onmental and life
sciences by reading textbooks a	nd scientific paper	s under the g	uidano	e of his/her superv	isor. The aim	of tl	ne lessen for the
students is to learn knowledge ar	nd presentation skil	lls required for	his/ł	er research in the s	eminar as we	l as t	o deepen his/her
understanding of environmental a	nd life sciences.						
This course will provide the stu	idents with opport	tunities to stu	ıdy or	his/her research	subjects on	enviro	onmental and life
sciences by reading textbooks a	nd scientific paper	s under the g	uidano	e of his/her superv	isor. The aim	of tl	ne lessen for the
students is to learn knowledge ar	nd presentation skil	lls required for	∙ his/ł	er research in the s	eminar as we	l as t	o deepen his/her
understanding of environmental a	nd lite sciences.						
	الحديثة المحمد			a k lana (an ar	lan au		lly English which
The students will be required to	read textbooks and	a papers writte	en by	other language than	Japanese, es	pecia	illy English, which
The students will be as mined	sor, and to report a	and discuss de	eply o	on nis/ner research s	subject in the	semi	nar. Illy English which
are suggested by his /her suggested	read textbooks and	a papers writte	en by	other language than	uapanese, es	pecia	ny English, which
Self Preparation and Paview	sor, and to report a	and discuss de	epiy (minis/ner research s	Subject in the	semi	nar.
Son Freparauon and Review							
Related subjects							
Seminar on Environmental and Li	fe Science II						
Thesis Research on Environment	al and Life Science)					
All other relevant subjects in Adv	anced Environmen	tal and Life So	ience	s			
Seminar on Environmental and Li	fe Science II						
Thesis Research on Environment	al and Life Science)					
All other relevant subjects in Adv	vanced Environmen	tal and Life So	ience	S			
Notes for textbook							
Supervisor will recommend textbe	ooks, papers, and r	esearch mater	ials to	o students.			
Supervisor will recommend textbo	ooks, papers, and r	esearch mater	ials to	o students.			
Notes for reference							
Coole to be achieve i							
To acquire basic knowledge or a	wiropmontal and li	fa salanasa					
To understand the contents of s	vientific papers in a	a given field of	envir	onmental and life col	ences		
To be able to make oral and post	er presentations re	elevant to nane	ers he	/she has read	01003		
To acquire basic knowledge on er	vironmental and lif	fe sciences					
To understand the contents of so	cientific papers in a	given field of	envir	onmental and life sci	ences		
To be able to make oral and post	er presentations re	elevant to pape	ers he	/she has read.			
Evaluation of achievement							
The evaluation is based on the	scores of reading	textbooks and	l scie	ntific papers, discus	sions, reports	and	presentations of
his/her research in the seminar.	His/her supervisor	evaluates the	score	es.			
The evaluation is based on the	scores of reading	textbooks and	l scie	ntific papers, discus	sions, reports	and	presentations of
his/her research in the seminar.	His/her supervisor	evaluates the	score	es.			
Examination							
Details of examination							
Other information							

Supervisor(s)	
Supervisor(s)	
Reference URL	
http://ens.tut.ac.jp/en/	
http://ens.tut.ac.jp/en/	
Office hours	
Students are encouraged visiting by appointment.	
Students are encouraged visiting by appointment.	
Relations to attainment objectives of learning and education	

Key words

Environmental science and technology, life science, materials science and engineering, applied chemistry Environmental science and technology, life science, materials science and engineering, applied chemistry

(M44610020)Seminar on Environmental and Life Science II[Seminar on Environmental and Life Science II]

Subject name[English]	Seminar on Environmental and Life Science II[Seminar or				n Environmental and Life Science II]			
Schedule number	M44610020	Subje	ct are	a	Advanced	Required or	Required	
				Environmental	elective			
					and Life			
					Sciences			
Time of starting a course	Year	Day	of neriod	the	Intensive	Credit(s)	3	
Faculty	Graduate Progr	am for Ma	ster's	Degr	ee	Subject grade	2~2	
Department Offered	Environmental a	and Life So	cience	es		Beggining		
						grade		
Charge teacher name[Roman	S4系教務委員	4keikyom	nu Iin-	-S				
alphabet mark]								
Numbering								
Objectives of class								
Based on the Seminar on Enviro	nmental and Life	Science I	I, this	cours	e will further provid	e the students wit	h the opportunity	
to study on his/her research sub	ject in environme	ental and li	ife sci	iences	by reading textboo	ks and papers unde	er the guidance of	
his/her supervisor. The student	s will learn the I	knowledge	e and	the p	resentation skills re	equired for his/he	r research in the	
seminar.								
Based on the Seminar on Enviro	nmental and Life	Science I	I, this	cours	e will further provid	e the students wit	h the opportunity	
to study on his/her research sub	ject in environme	ental and li	ite sci	iences	by reading textbool	ks and papers unde	er the guidance of	
his/her supervisor. The student	s will learn the l	knowledge	e and	the p	resentation skills re	equired for his/he	r research in the	
Seminar.								
The students will be required to	read textbooks a	nd nanara	writt	on hv	other language than	lananaca acnadi	ally English which	
are suggested by his /her supervi	sor and to report	t and discu	use de		other language than	subject in the sem	inar	
The students will be required to	read textbooks a	nd naners	writte	en hv	other language than	Jananese especia	ally English which	
are suggested by his/her supervi	sor, and to report	t and discu	uss de	eeply a	on his/her research	subject in the sem	inar.	
Self Preparation and Review								
Related subjects								
Seminar on Environmental and Li	fe Science I							
Thesis Research on Environment	al and Life Scien	ce						
All other relevant subjects in Adv	/anced Environme	ental and L	Life So	cience	S			
Seminar on Environmental and Li	fe Science I							
Thesis Research on Environment	al and Life Scien	ce						
All other relevant subjects in Adv	anced Environme	ental and L	Life So	cience	S			
Notes for textbook								
Supervisor will recommend textbe	ooks, papers, and	research	mater	rials to	o students.			
Supervisor will recommend textbe	ooks, papers, and	research	mater	rials to	o students.			
Goals to be achieved								
To acquire basic knowledge on e	nvironmental and	life scienc	ses					
To understand the contents of so	cientific papers in	n a given fi	ield of	envir	onmental and life sc	iences		
To be able to make oral and post	er presentations	relevant t	o pap	ers he	/she has read.			
To acquire basic knowledge on environmental and life sciences								
To understand the contents of scientific papers in a given field of environmental and life sciences								
To be able to make oral and post	er presentations	relevant t	o pape	ers he	∕she has read.			
Evaluation of achievement								
The evaluation is based on the	scores of reading	g textbool	ks and	d scie	ntific papers, discus	ssions, reports and	l presentations of	
his/her research in the seminar.	His/her superviso	or evaluate	es the	score	es.			
The evaluation is based on the	scores of reading	g textbool	ks and	d scie	ntific papers, discus	ssions, reports and	l presentations of	
his/her research in the seminar.	His/her supervise	or evaluate	es the	score	es.			
Details of examination								

Other information

Supervisor(s)	
Supervisor(s)	
Reference URL	
http://ens.tut.ac.jp/en/	
http://ens.tut.ac.jp/en/	
Office hours	
Students are encouraged visiting by appointment.	
Students are encouraged visiting by appointment.	
Relations to attainment objectives of learning and education	

Key words

Environmental science and technology, life science, materials science and engineering, applied chemistry Environmental science and technology, life science, materials science and engineering, applied chemistry

(M44610030)Thesis Research on Environmental and Life Science[Thesis Research on Environmental and Life Science]

Subject name[English]	Thesis Research on Environmental and Life Science[Thesis Research on Environmental and Life Science]							
Schedule number	M44610030	Subject area	Advanced Environmental and Life Sciences	Required or elective	Required			
Time of starting a course	2Years	Day of the week,period	Intensive	Credit(s)	6			
Faculty	Graduate Program	n for Master's Degre	Subject grade	1~2				
Department Offered			Beggining grade					
Charge teacher name[Roman alphabet mark]	S4系教務委員, 各教員 4kei kyomu Iin−S, KAKUKYOUIN Kakukyouin							
Numbering								

Objectives of class

In the course, the students will perform advanced researches on the environmental and life science under the direction of his/her supervisor in the laboratory. The aims of this lessen are to acquire the knowledge and experimental and analytical skills required for his/her research subject, to learn the scientific and social importance of his/her subject by researching for related studies by others, and to write a Master's Thesis. The students will acquire the skills and capacities of presentation by discussing in the final review of his/her Master's Thesis.

In the course, the students will perform advanced researches on the environmental and life science under the direction of his/her supervisor in the laboratory. The aims of this lessen are to acquire the knowledge and experimental and analytical skills required for his/her research subject, to learn the scientific and social importance of his/her subject by researching for related studies by others, and to write a Master's Thesis. The students will acquire the skills and capacities of presentation by discussing in the final review of his/her Master's Thesis.

Contents of class

The students are required to have his/her research subject under the direction of his/her supervisor and perform his/her research by acquiring the experimental and analytical skills in the laboratory. The students will be expected to learn the scientific and social background of his/her research subject by collecting and reading the references relating to his/her research. The results from his/her research must be described as a Master's Thesis. The students must also present the results from his/her research, discuss, and answer the questions with the reviewers in the final master's dissertation defense. The students are required to have his/her research subject under the direction of his/her supervisor and perform his/her research by acquiring the experimental and analytical skills in the laboratory. The students will be expected to learn the scientific and social background of his/her research subject by collecting and reading the references relating to his/her research. The results from his/her research subject stills in the laboratory. The students will be expected to learn the scientific and social background of his/her research subject by collecting and reading the references relating to his/her research. The results from his/her research must be described as a Master's Thesis. The students must also present the results from his/her research must be described as a Master's Thesis. The students must also present the results from his/her research must be described as a Master's Thesis. The students must also present the results from his/her research, discuss, and answer the questions with the reviewers in the final master's dissertation defense. **Self Preparation and Review**

Related subjects

Seminar on Environmental and Life Science I

Seminar on Environmental and Life Science II

All other relevant subjects in Advanced Environmental and Life Sciences

Seminar on Environmental and Life Science I

Seminar on Environmental and Life Science ${\rm I\!I}$

All other relevant subjects in Advanced Environmental and Life Sciences

Notes for textbook

Supervisor will recommend textbooks, papers, and research materials to students.

Supervisor will recommend textbooks, papers, and research materials to students.

Notes for reference

Goals to be achieved

To acquire basic knowledge on environmental and life sciences

To master experimental techniques and analytical skills required for research on a given field of environmental and life sciences To be able to present and discuss on the results of his/her research

To be able to make safety control in experimental work

To acquire basic knowledge on environmental and life sciences

To master experimental techniques and analytical skills required for research on a given field of environmental and life sciences To be able to present and discuss on the results of his/her research To be able to make safety control in experimental work

Evaluation of achievement

The score of the course is based on his/her Master's Thesis and the presentation in the final review of his/her Master's Thesis (the quality of his/her research, presentation skills, discussions and answering the questions on his/her presentation etc).

The score of the course is based on his/her Master's Thesis and the presentation in the final review of his/her Master's Thesis (the quality of his/her research, presentation skills, discussions and answering the questions on his/her presentation

etc). Examination

Details of examination

Other information

Supervisor(s)

Supervisor(s) Reference URL

http://ens.tut.ac.jp/en/

http://ens.tut.ac.jp/en/

Office hours

Students are encouraged visiting by appointment.

Students are encouraged visiting by appointment.

Relations to attainment objectives of learning and education

Key words

Environmental science and technology, life science, materials science, applied chemistry Environmental science and technology, life science, materials science, applied chemistry

(M44610030)Thesis Research on Environmental and Life Science[Thesis Research on Environmental and Life Science]

Subject name[English]	Thesis Research on Environmental and Life Science[Thesis Research on Environmental and Life Science]								
Schedule number	M44610030	Subject area	Advanced Environmental and Life Sciences	Required or elective	Required				
Time of starting a course	2Years	Day of the week,period	Intensive	Credit(s)	6				
Faculty	Graduate Program	n for Master's Degre	ee	Subject grade	1~2				
Department Offered	Environmental and	d Life Sciences	Beggining grade	M1, M2					
Charge teacher name[Roman alphabet mark]	S4系教務委員 4I	34系教務委員 4kei kyomu Iin−S							
Numbering									

Objectives of class

In the course, the students will perform advanced researches on the environmental and life science under the direction of his/her supervisor in the laboratory. The aims of this lessen are to acquire the knowledge and experimental and analytical skills required for his/her research subject, to learn the scientific and social importance of his/her subject by researching for related studies by others, and to write a Master's Thesis. The students will acquire the skills and capacities of presentation by discussing in the final review of his/her Master's Thesis.

In the course, the students will perform advanced researches on the environmental and life science under the direction of his/her supervisor in the laboratory. The aims of this lessen are to acquire the knowledge and experimental and analytical skills required for his/her research subject, to learn the scientific and social importance of his/her subject by researching for related studies by others, and to write a Master's Thesis. The students will acquire the skills and capacities of presentation by discussing in the final review of his/her Master's Thesis.

Contents of class

The students are required to have his/her research subject under the direction of his/her supervisor and perform his/her research by acquiring the experimental and analytical skills in the laboratory. The students will be expected to learn the scientific and social background of his/her research subject by collecting and reading the references relating to his/her research. The results from his/her research must be described as a Master's Thesis. The students must also present the results from his/her research, discuss, and answer the questions with the reviewers in the final master's dissertation defense. The students are required to have his/her research subject under the direction of his/her supervisor and perform his/her research by acquiring the experimental and analytical skills in the laboratory. The students will be expected to learn the scientific and social background of his/her research subject by collecting and reading the references relating to his/her research. The results from his/her research subject stills in the laboratory. The students will be expected to learn the scientific and social background of his/her research subject by collecting and reading the references relating to his/her research. The results from his/her research must be described as a Master's Thesis. The students must also present the results from his/her research must be described as a Master's Thesis. The students must also present the results from his/her research must be described as a Master's Thesis. The students must also present the results from his/her research, discuss, and answer the questions with the reviewers in the final master's dissertation defense. **Self Preparation and Review**

Related subjects

Seminar on Environmental and Life Science I Seminar on Environmental and Life Science II Seminar on Environmental and Life Science I Seminar on Environmental and Life Science II

Notes for textbook

Supervisor will recommend textbooks, papers, and research materials to students. Supervisor will recommend textbooks, papers, and research materials to students.

Notes for reference

Goals to be achieved

To acquire basic knowledge on environmental and life sciences

To master experimental techniques and analytical skills required for research on a given field of environmental and life sciences To be able to present and discuss on the results of his/her research

To be able to make safety control in experimental work

To acquire basic knowledge on environmental and life sciences

To master experimental techniques and analytical skills required for research on a given field of environmental and life sciences To be able to present and discuss on the results of his/her research

To be able to make safety control in experimental work

Evaluation of achievement

The score of the course is based on his/her Master's Thesis and the presentation in the final review of his/her Master's Thesis (the quality of his/her research, presentation skills, discussions and answering the questions on his/her presentation etc).

The score of the course is based on his/her Master's Thesis and the presentation in the final review of his/her Master's Thesis (the quality of his/her research, presentation skills, discussions and answering the questions on his/her presentation etc).

Examination

Details of examination

Other information

Supervisor

Supervisor

Reference URL

http://ens.tut.ac.jp/en/ http://ens.tut.ac.jp/en/

Office hours

Students are encouraged visiting by appointment.

Students are encouraged visiting by appointment.

Relations to attainment objectives of learning and education

Key words

Environmental science and technology, life science, materials science and engineering, applied chemistry Environmental science and technology, life science, materials science and engineering, applied chemistry

(M4461003T)Thesis Research on Environmental and Life Science[Thesis Research on Environmental and Life Science]

Subject name[English]	Thesis Research on Environmental and Life Science[Thesis Research on Environmental and Life Science]							
Schedule number	M4461003T	Subject area	Advanced Environmental and Life Sciences	Required or elective	Required			
Time of starting a course	Year	Day of the week,period	Intensive	Credit(s)	6			
Faculty	Graduate Program	n for Master's Degre	ee	Subject grade	2~2			
Department Offered	Environmental and	d Life Sciences	Beggining grade					
Charge teacher name[Roman alphabet mark]	S4系教務委員 4	S4系教務委員 4kei kyomu Iin−S						
Numbering								

Objectives of class

In the course, the students will perform advanced researches on the environmental and life science under the direction of his/her supervisor in the laboratory. The aims of this lessen are to acquire the knowledge and experimental and analytical skills required for his/her research subject, to learn the scientific and social importance of his/her subject by researching for related studies by others, and to write a Master's Thesis. The students will acquire the skills and capacities of presentation by discussing in the final review of his/her Master's Thesis.

In the course, the students will perform advanced researches on the environmental and life science under the direction of his/her supervisor in the laboratory. The aims of this lessen are to acquire the knowledge and experimental and analytical skills required for his/her research subject, to learn the scientific and social importance of his/her subject by researching for related studies by others, and to write a Master's Thesis. The students will acquire the skills and capacities of presentation by discussing in the final review of his/her Master's Thesis.

Contents of class

The students are required to have his/her research subject under the direction of his/her supervisor and perform his/her research by acquiring the experimental and analytical skills in the laboratory. The students will be expected to learn the scientific and social background of his/her research subject by collecting and reading the references relating to his/her research. The results from his/her research must be described as a Master's Thesis. The students must also present the results from his/her research, discuss, and answer the questions with the reviewers in the final master's dissertation defense. The students are required to have his/her research subject under the direction of his/her supervisor and perform his/her research by acquiring the experimental and analytical skills in the laboratory. The students will be expected to learn the scientific and social background of his/her research subject by collecting and reading the references relating to his/her research. The results from his/her research subject stills in the laboratory. The students will be expected to learn the scientific and social background of his/her research subject by collecting and reading the references relating to his/her research. The results from his/her research must be described as a Master's Thesis. The students must also present the results from his/her research must be described as a Master's Thesis. The students must also present the results from his/her research must be described as a Master's Thesis. The students must also present the results from his/her research, discuss, and answer the questions with the reviewers in the final master's dissertation defense. **Self Preparation and Review**

Related subjects

Seminar on Environmental and Life Science I Seminar on Environmental and Life Science II Seminar on Environmental and Life Science I Seminar on Environmental and Life Science II

Notes for textbook

Supervisor will recommend textbooks, papers, and research materials to students. Supervisor will recommend textbooks, papers, and research materials to students.

Notes for reference

Goals to be achieved

To acquire basic knowledge on environmental and life sciences

To master experimental techniques and analytical skills required for research on a given field of environmental and life sciences To be able to present and discuss on the results of his/her research

To be able to make safety control in experimental work

To acquire basic knowledge on environmental and life sciences

To master experimental techniques and analytical skills required for research on a given field of environmental and life sciences To be able to present and discuss on the results of his/her research

To be able to make safety control in experimental work

Evaluation of achievement

The score of the course is based on his/her Master's Thesis and the presentation in the final review of his/her Master's Thesis (the quality of his/her research, presentation skills, discussions and answering the questions on his/her presentation etc).

The score of the course is based on his/her Master's Thesis and the presentation in the final review of his/her Master's Thesis (the quality of his/her research, presentation skills, discussions and answering the questions on his/her presentation etc).

Examination

Details of examination

Other information

Supervisor(s)

Supervisor(s) Reference URL

http://ens.tut.ac.jp/en/ http://ens.tut.ac.jp/en/

Office hours

Students are encouraged visiting by appointment.

Students are encouraged visiting by appointment.

Relations to attainment objectives of learning and education

Key words

Environmental science and technology, life science, materials science and engineering, applied chemistry Environmental science and technology, life science, materials science and engineering, applied chemistry

(M44610040)Seminar on Environmental and Life Science[Seminar on Environmental and Life Science]

Subject name[English]	Seminar on Environmental and Life Science[Seminar on Environmental and Life Scienc							
Schedule number	M44610040	Subject are	a	Advanced	Required or	Required		
				Environmental	elective			
				and Life				
				Sciences				
Time of starting a course	Year	Day of week.period	the	Intensive	Credit(s)	6		
Faculty	Graduate Progr	am for Master's	Degre	e	Subject grade	2~2		
Department Offered	Environmental a	and Life Science	es		Beggining			
•					grade			
Charge teacher name[Roman	S4系教務委員	4kei kyomu Iin-	-S					
alphabet mark]								
Numbering								
Objectives of class								
This course will provide the sti	udents with oppo	ortunities to sti	uay or	nis/ner research	subjects on enviro	bollocop for the		
sciences by reading textbooks a	nd scientific pape	ers under the g	uluano	e of his/her superv	and a second second second	ne lessen for the		
students is to learn knowledge an	in presentation si	kills required for	r nis/ r	ier research in the s	eminar as well as i	to deepen his/her		
This service will provide the sta	ind life sciences.		بمار مر	hia/hay yaaaayah	aubiasta an amin	www.awtal.awd.life		
This course will provide the su	udents with oppo	ortunities to stu	udy or	i nis/ner research	subjects on enviro	be lessen for the		
sciences by reading textbooks a	nd scientific pape	ers under the g	uidano	ce of his/her superv	lisor. The aim of t	ne lessen for the		
students is to learn knowledge an	nd presentation s	kills required for	r nis/r	ier research in the s	eminar as well as t	to deepen his/her		
	and life sciences.							
The students of class			h		1	u . En alta ha anh ta h		
The students will be required to	read textbooks a	nd papers writte	en by	other language than	Japanese, especia	ally English, which		
are suggested by his/her supervi	sor, and to report	t and discuss de	eply o	on his/her research	subject in the sem	inar.		
The students will be required to	read textbooks a	nd papers writte	en by	other language than	Japanese, especia	ally English, which		
are suggested by his/her supervi	sor, and to report	t and discuss de	eply o	on his/her research	subject in the sem	inar.		
Self Preparation and Review								
Related subjects								
Notes for textbook								
Supervisor will recommend textb	ooks, papers, and	research mater	rials to	students.				
Supervisor will recommend textb	ooks, papers, and	research mater	rials to	students.				
Notes for reference								
Goals to be achieved								
To acquire basic knowledge on e	nvironmental and	life sciences						
To understand the contents of se	cientific papers in	a given field of	envir	onmental and life sci	ences			
To be able to make oral and post	er presentations	relevant to pape	ers he	/she has read.				
To acquire basic knowledge on e	nvironmental and	life sciences						
To understand the contents of se	cientific papers in	a given field of	envir	onmental and life sci	ences			
To be able to make oral and post	er presentations	relevant to pape	ers he	∕she has read.				
Evaluation of achievement								
The evaluation is based on the	scores of reading	g textbooks and	d scie	ntific papers, discus	sions, reports and	presentations of		
his/her research in the seminar.	His/her supervise	or evaluates the	score	S.				
The evaluation is based on the	scores of reading	g textbooks and	d scier	ntific papers. discus	sions. reports and	presentations of		
his/her research in the seminar.	nis the access in the seminar. His her supervisor evaluates the scores							
Examination								
Dataila of avamination								
Details of examination								
Other information								
Supervisor(s)								
Supervisor(s)								
Reference URL								
http://ens.tut.ac.jp/en/								

http://ens.tut.ac.jp/en/

Office hours Students are encouraged visiting by appointment.

Students are encouraged visiting by appointment.

Relations to attainment objectives of learning and education

Key words

Environmental science and technology, life science, materials science and engineering, applied chemistry Environmental science and technology, life science, materials science and engineering, applied chemistry

(M44630010)Advanced Separation Chemistry I[Advanced Separation Chemistry I]

Subject name[English]	Advanced Separa	Advanced Separation Chemistry I[Advanced Separation Chemistry I]							
Schedule number	M44630010	Subject area	Advanced	Required or	Elective				
			Environmental	elective					
			and Life						
			Sciences						
Time of starting a course	Fall1 term	Day of the	Mon.3~3	Credit(s)	1				
		week,period							
Faculty	Graduate Program	n for Master's Degre	e	Subject grade	1~2				
Department Offered				Beggining					
				grade					
Charge teacher name[Roman	齊戸 美弘 SAIT	齊戸 美弘 SAITO Yoshihiro							
alphabet mark]									
Numbering									

Objectives of class

Due to the recent requirements for stationary phases in chromatography such as higher selectivity, various novel stationary phases have been developed by the systematic analysis of the retention behavior of sample solutes. Miniaturization and automation of the whole separation instruments have been regarded as additional important projects in separation science, because of the increasing requirements for recent separation systems, such as selective/specific detection with high sensitivities, high throughput processing, as well as an environmentally-friendly feature of the systems. In this course, novel technologies of sample preparation and chromatographic separations will be provided along with the miniaturization of the hyphenated analytical systems.

Due to the recent requirements for stationary phases in chromatography such as higher selectivity, various novel stationary phases have been developed by the systematic analysis of the retention behavior of sample solutes. Miniaturization and automation of the whole separation instruments have been regarded as additional important projects in separation science, because of the increasing requirements for recent separation systems, such as selective/specific detection with high sensitivities, high throughput processing, as well as an environmentally-friendly feature of the systems. In this course, novel technologies of sample preparation and chromatographic separations will be provided along with the miniaturization of the hyphenated analytical systems.

Contents of class

1. Development of novel stationary phases in liquid chromatography based on the systematic analysis of retention behavior.

2. Development of novel sample preparation media and the applications to real sample analysis in various chromatographic methods.

3. Miniaturization of analytical systems and the hyphenation.

1. Development of novel stationary phases in liquid chromatography based on the systematic analysis of retention behavior.

2. Development of novel sample preparation media and the applications to real sample analysis in various chromatographic methods.

3. Miniaturization of analytical systems and the hyphenation.

Self Preparation and Review

Related subjects

Advanced Separation Chemistry II.

Advanced Separation Chemistry II.

Notes for textbook

No text book is required, however, basic knowledge of chromatography is desirable.

No text book is required, however, basic knowledge of chromatography is desirable.

Notes for reference

Goals to be achieved

Evaluation of achievement

The evaluation will be made based on the score of the report and presentation. The evaluation will be made based on the score of the report and presentation. **Examination**

Details of examination

Other information

Y. Saito; Room# B-404; Phone 6803; E-mail: saito@ens.tut.ac.jp Y. Saito; Room# B-404; Phone 6803; E-mail: saito@ens.tut.ac.jp **Reference URL**

Office hours

Anytime if available, however, an appointment by e-mail is strongly recommended. Anytime if available, however, an appointment by e-mail is strongly recommended. **Relations to attainment objectives of learning and education**

Key words

(M44630020)Advanced Separation Chemistry II[Advanced Separation Chemistry II]

Subject name[English]	Advanced Separa	Advanced Separation Chemistry II[Advanced Separation Chemistry II]							
Schedule number	M44630020	Subject area	Advanced	Required or	Elective				
			Environmental	elective					
			and Life						
			Sciences						
Time of starting a course	Fall2 term	Day of the	Mon.3~3	Credit(s)	1				
		week,period							
Faculty	Graduate Progran	n for Master's Degre	e	Subject grade	1~2				
Department Offered				Beggining					
		grade							
Charge teacher name[Roman	平田 幸夫 HIRAT	TA Yukio							
alphabet mark]									
Numbering									

Objectives of class

Chromatography is one of the most widely applied methods for the analysis of mixtures, because of its high resolving power. Purpose of this course is to learn the basic theory of chromatography. To obtain the in-depth understanding, the emphasis is also placed on practice and reports on the related topics.

Chromatography is one of the most widely applied methods for the analysis of mixtures, because of its high resolving power. Purpose of this course is to learn the basic theory of chromatography. To obtain the in-depth understanding, the emphasis is also placed on practice and reports on the related topics.

Contents of class

1. Basic theory of chromatography

- distribution equilibrium
- plate theory
- rate theory
- resolution
- mobile and stationary phases
- 2. Practice and Repots for various simulation using Excel and Excel-VBA
- chromatographic separation process
- effect of various parameters on the separation efficiency
- effect of temperature in GC
- effect of mobile phase composition in LC
- analysis of chromatographic data
- 1. Basic theory of chromatography
- distribution equilibrium
- plate theory
- rate theory
- resolution
- mobile and stationary phases
- 2. Practice and Repots for various simulation using Excel and Excel-VBA
- chromatographic separation process
- effect of various parameters on the separation efficiency
- effect of temperature in GC
- effect of mobile phase composition in $\ensuremath{\mathsf{LC}}$

- analysis of chromatographic data

Self Preparation and Review

Related subjects

Notes for textbook

Textbook

No textbook is required. Related materials will be provided. Elementary knowledge of Basic Language is required to use Excel-VBA.

Reference

1) "Chromatography: Concepts and Contrasts", J. M. Miller, John Wiley & Sons"

Textbook

No textbook is required. Related materials will be provided. Elementary knowledge of Basic Language is required to use Excel-VBA.

Reference

1) "Chromatography: Concepts and Contrasts", J. M. Miller, John Wiley & Sons"

Notes for reference

Goals to be achieved

To undersatnd the principle of chromatography.

To undersatnd the principle of chromatography.

Evaluation of achievement

Based on reports requested on individual chromatographic topic of interest during the course of class.

Based on reports requested on individual chromatographic topic of interest during the course of class.

Examination

Details of examination

Other information

Yukio Hirata: room (B-402), e-mail (hirata@ens.tut.ac.jp), phone: 6804

Yukio Hirata: room (B-402), e-mail (hirata@ens.tut.ac.jp), phone: 6804

Reference URL

Office hours

As needed.

As needed.

Relations to attainment objectives of learning and education

Key words

(M44630070)Advanced Polymer Chemistry[Advanced Polymer Chemistry]

Subject name[English]	Advanced Polymer Chemistry Advanced Polymer Chemistry						
Schedule number	M44630070	Subject ar	ea	Advanced	Required or Elective		
		Gasjovi al	Ju	Environmental	elective		
				and Life	0.000110		
				Sciences			
Time of starting a course	Fall1 term	Day of	the	Tue.3~3	Credit(s)	1	
		week,perio	d				
Faculty	Graduate Progra	m for Master	's Degr	ee	Subject grade	1~2	
Department Offered					Beggining		
Charma tasahar nama[Daman	伊津熙 百一 四	SUNO Shiniak			grade		
onarge teacher name_Roman		SONO SHINC	11				
Numbering							
Objectives of class							
This course focuses on the synth	netic aspects of p	olvmer-sunno	rted ch	emistry Several and	lications of solid-s	upported organic	
chemistry will be discussed.		Signici Suppo					
This course focuses on the sunt	hetic aspects of p	lymer-suppo	rted of	emistry Several and	lications of solid-s	upported organic	
chemistry will be discussed	aspects of po	siyindi suppo	r teu Gr	ionnioù y. Oeverai app	Solutions of Solid-S	apported organic	
Contents of class							
(1) Preparation of functionalized	monomers						
(2) Preparation method of polyme	er-support						
(3) Preparation of functional poly	mers by polymer r	eaction meth	od				
(4) Preparation of functional poly	mers by polymeriz	ation method					
(5) Nucleophilic reactions on the	functional polymer						
(6) Electrophhilic reactions on th	e functional polym	ers					
(7) Polymer-supported reagents							
(8) Polymer-supported catalysts							
(9) Asymmetric reaction using po	lymer-supported c	atalyst					
(10) Solid phase peptide synthe	esis						
(1) Dreportion of functionalized							
(1) Preparation of functionalized	monomers						
(2) Preparation interned of polyme	mers by polymer r	eaction meth	od				
(4) Preparation of functional poly	mers by polymeriz	ation method	ou				
(5) Nucleophilic reactions on the	functional polymer						
(6) Electrophhilic reactions on th	e functional polym	ers					
(7) Polymer-supported reagents							
(8) Polymer-supported catalysts							
(9) Asymmetric reaction using po	lymer-supported o	atalyst					
(10) Solid phase peptide synthe	esis						
Self Preparation and Review							
Palated subjects							
Organic Chemistry							
Polymer chemistry							
Organic Chemistry							
Polymer chemistry							
Notes for textbook							
No textbook will be used.							
No textbook will be used.							
Notes for reference							
Goals to be achieved							
1) To understand radical polymer	ization of vinyl mo	nomers					

- 2)To understand reactions of polymers
- 3)To understand the synthesis of optically active polymers
- 4)To understand the structure formation of peptides and proteins
- 1) To understand radical polymerization of vinyl monomers
- 2)To understand reactions of polymers
- 3) To understand the synthesis of optically active polymers
- 4) To understand the structure formation of peptides and proteins

Evaluation of achievement

The report on selected topics will be imposed.

The report on selected topics will be imposed.

Examination

Details of examination

Other information

B-502 6813 itsuno@ens.tut.ac.jp

B-502 6813 itsuno@ens.tut.ac.jp

Reference URL

http://ens.tut.ac.jp/chiral/index.html http://ens.tut.ac.jp/chiral/index.html

Office hours

Any time

Any time

Relations to attainment objectives of learning and education

Key words

Polymer reaction, Optically active polymers, Polymeric catalyst, Asymmetric reactions, Peptide Polymer reaction, Optically active polymers, Polymeric catalyst, Asymmetric reactions, Peptide

(M44630080)Advanced Polymer Engineering[Advanced Polymer Engineering]

Schedule number M44630080 Subject area bisciences Advanced Environmental and Life Advanced environmental and Life Elective or Time of starting a course Fall2 term Day of the veskpoid Ture 2~2 Oredit(a) 1 Faculty Graduate Program for Master's Degree Subject grade 1~2 Department Offered Ture 2~2 Oredit(a) 1 Faculty Graduate Program for Master's Degree Subject grade 1~2 Department Offered Ture 2~2 Oredit(a) 1 2 Objectives of class 1 1 2 <td< th=""><th>Subject name[English]</th><th colspan="7">Advanced Polymer Engineering[Advanced Polymer Engineering]</th></td<>	Subject name[English]	Advanced Polymer Engineering[Advanced Polymer Engineering]						
Image Image <t< th=""><th>Schedule number</th><th>M44630080</th><th>Subject a</th><th>rea</th><th>Advanced</th><th>Required or</th><th>Elective</th></t<>	Schedule number	M44630080	Subject a	rea	Advanced	Required or	Elective	
Image:			Er		Environmental	elective		
Time of starting a course Fall2 term Day of the Tue 2~2 Credit(a) 1 Fearly Graduate Program for Master's Degree Subject grade 1~2 Department Offered Begining 1~2 Orarge teacher name(Roman alphabet mark) EB 能量 YOSHIDA Eri Begining 1~2 Objectives of class 1.70 acquire knowledge of advanced polymer syntheses including well-controlled polymerizations and heterogeneous polymerizations in supercritical fluid. 2.10 understand molecular self-assembly in vivo and in vitro. 1.70 acquire knowledge of advanced polymer syntheses including well-controlled polymerizations and heterogeneous polymerizations in supercritical fluid. 2.10 understand molecular self-assembly in vivo and in vitro. 2.10 understand molecular self-assembly in vivo and in vitro. Controlled radical polymerization 1 2.10 understand molecular self-assembly in vivo and in vitro. 2.10 understand molecular self-assembly 1: Surfactnat 3.10 election polymerization 2 3.10 election polymerization 2 3.10 Heterogeneous polymerization 1 2.10 controlled radical polymerization 3 3.10 election alphabeter polymerization 4 3.11 Heterogeneous polymerization 2 3.11 tiltisuse 3 3.11 tiltisuse 3 3.12 Controlled radical polymerization 3 3.11 tiltisuse 3 3.11 tiltisus					and Life			
Time of starting a course Fall 2 term Day of the veskperiod Tue 2~2 Credit(s) 1 Faculty Graduate Program for Master's Degree Subject grade 1~2 Department Offered Begghing Begghing 1 Otherge teacher name[Roman aiphabet name] Bit ME YOSHIDA Eri aiphabet name] Numbering 1 Objectives of clase 1.70 acquire knowledge of advanced polymer syntheses including well-controlled polymerizations and heterogeneous polymerizations in supercritical fluid. 2.10 understand molecular self-assembly in vivo and in vitro. 1.70 acquire knowledge of advanced polymer syntheses including well-controlled polymerizations and heterogeneous polymerizations in supercritical fluid. 2.10 understand molecular self-assembly in vivo and in vitro. 2.10 understand molecular self-assembly in vivo and in vitro. Contents of clase 3.10 1.40 descale polymerization 1 2.10 controlled radical polymerization 1 3.10 2.10 controlled radical polymerization 2 3.10 3.10 3.10 3.10 descular design throngli living radical polymerization 3 4.14 4.14 4.14 2.10 controlled radical polymerization 4 5.14 5.14 5.14 3.10 descular design throngli living radical p					Sciences			
Faculty Graduate Program for Master's Degree Subject grade 1~2 Department Offored Beggining grade I <t< th=""><th>Time of starting a course</th><th>Fall2 term</th><th>Day of week,perio</th><th>the od</th><th>Tue.2~2</th><th>Credit(s)</th><th>1</th></t<>	Time of starting a course	Fall2 term	Day of week,perio	the od	Tue.2~2	Credit(s)	1	
Department Offered Begginng grade Charge teacher name[Roman alphabet mark] 吉田 絵里 YOSHIDA Eri alphabet mark] ····································	Faculty	Graduate Program	m for Master	's Degr	ee	Subject grade	1~2	
Charge teacher name[Roman 古田 絵里 YOSHIDA Eri alphabet mark] Numbering Objectives of class 1.To acquire knowledge of advanced polymer syntheses including well-controlled polymerizations and heterogeneous polymerizations in supercritical fluid. 2.To understand molecular self-assembly in vivo and in vitro. 1.To acquire knowledge of advanced polymer syntheses including well-controlled polymerizations and heterogeneous polymerizations in supercritical fluid. 2.To understand molecular self-assembly in vivo and in vitro. Outnetrat of class 1. Advanced polymerization 1 2) Controlled radical polymerization 2 3) Molecular design through hiving radical polymerization 4) Heterogeneous polymerizations 5) Polymerization in supercritical carbon dioxide 2. Molecular self-assembly 1) Theory of molecular self-assembly 2: Vital tissue 3) Artificial supramolecules 1. Advanced polymer syntheses 1) Controlled radical polymerization 1 2) Controlled radical polymerization 2 3) Molecular self-assembly 2: Vital tissue 3) Artificial supramolecules 1. Advanced polymer syntheses 1) Controlled radical polymerization 1 2) Controlled radical polymerization 3	Department Offered					Beggining grade		
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Goals to be achieved
To understand cutting-edge technology based on well-defined polymers.
To understand cutting-edge technology based on well-defined polymers.
Evaluation of achievement
An examination and term-end report
An examination and term-end report
Examination
Details of examination
Other information
Eri Yoshida; room: B-503, Tel: 6814, e-mail: eyoshida@ens.tut.ac.jp
Eri Yoshida; room: B-503, Tel: 6814, e-mail: eyoshida@ens.tut.ac.jp
Reference URL
http://www.ens.tut.ac.jp/~eyoshida
http://www.ens.tut.ac.jp/~eyoshida
Office hours
Anytime
Anytime
Relations to attainment objectives of learning and education
Key words
Free-radical polymerization, Living radical polymerization, Molecular self-assembly
Free-radical polymerization, Living radical polymerization, Molecular self-assembly

(M44630090)Advanced Composite Science[Advanced Composite Science]

Subject name[English]	Advanced Compo	site Scie	nce[/	Advan	ced Composite Scie	nce]	
Schedule number	M44630090	Subjec	t are	a	Advanced	Required or	Elective
		_			Environmental	elective	
					and Life		
					Sciences		
Time of starting a course	Fall1 term	Day week.p	of eriod	the	Fri.2~2	Credit(s)	1
Faculty	Graduate Program	n for Mas	ster's	Degre	ee	Subject grade	1~2
Department Offered						Beggining	
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Numbering							
Objectives of class							
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viewpoint of materials chemistry,	synthetic chemistr	y, polyme	er che	emistr	y, physical chemistr	y, and inorganic ch	emistry.
The objective of this course i	s to obtain basic	understar	nding	of va	arious composite ma	aterials by studyin	g them from the
viewpoint of materials chemistry,	synthetic chemistr	y, polyme	er che	emistr	y, physical chemistr	y, and inorganic ch	emistry.
	ad Advanced EPD						
- Characteristics and Application							
(2) Reinforcing Fibers							
- Various Types and Characteris	tics –						
(3) Fabrication of composite mate	erials						
(4) Matrix Resin							
- Various Types and Characteris	tics –						
(5) Molecular Composites							
- Concept and Possibility as Nov	el Composite Mate	rials –					
(6) C/C composites							
(7) Organic-Inorganic Hybrid Nan	ocomposites						
- Concept, Characteristics, and F	Possibility as Novel	Material	s –				
(8) Polymer alloys and polymer bl	lends						
(1) EPD: Conoral Durnaca EPD at	ad Advanced EPD						
- Characteristics and Application							
(2) Reinforcing Fibers	1						
- Various Types and Characteris	tics –						
(3) Fabrication of composite mate	erials						
(4) Matrix Resin							
- Various Types and Characteris	tics –						
(5) Molecular Composites							
- Concept and Possibility as Nov	el Composite Mate	rials –					
(6) C/C composites							
(7) Organic-Inorganic Hybrid Nan	ocomposites	Matadal	_				
 Concept, Characteristics, and F (2) Polymer alloys and polymer block 	Possibility as Novel	Materials	s –				
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Self Preparation and Review							
Related subjects	all a star and the st			·			
Basic knowledge of polymer syr	itnesis and polymei	ric materi	iais is	aesir	able.		
Basic knowledge of polymer synthesis and polymeric materials is desirable.							
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Goals to be achieved

The goals to be achieved is to obtain basic understanding of various composite materials from the viewpoint of materials chemistry, synthetic chemistry, polymer chemistry, physical chemistry, and inorganic chemistry.

The goals to be achieved is to obtain basic understanding of various composite materials from the viewpoint of materials chemistry, synthetic chemistry, polymer chemistry, physical chemistry, and inorganic chemistry.

Evaluation of achievement

The report on selected topics will be imposed.

The report on selected topics will be imposed.

Examination

Details of examination

Other information

Tsutomu Takeichi: room (B-504), e-mail: takeichi@tutms.tut.ac.jp Tsutomu Takeichi: room (B-504), e-mail: takeichi@tutms.tut.ac.jp

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http://www.tutms.tut.ac.jp/

Office hours

Relations to attainment objectives of learning and education

Key words

Polymer, Composites, FRP, Thermal and Physical Properties Polymer, Composites, FRP, Thermal and Physical Properties

(M44630120)Advanced Molecular Life Science[Advanced Molecular Life Science]

Subject name[English]	Advanced Molecular Life Science[Advanced Molecular Life Science]							
Schedule number	M44630120	Subjec	t are	a	Advanced	Required or	Elective	
					Environmental	elective		
					and Life			
					Sciences			
Time of starting a course	Fall1 term	Day week.p	of eriod	the	Thu.2~2	Credit(s)	1	
Faculty	Graduate Program	n for Mas	ster's	Degre	e	Subject grade	1~2	
Department Offered				_		Beggining		
						grade		
Charge teacher name[Roman	田中 照通 TANA	KA Teru	michi					
alphabet mark]								
Numbering								
Objectives of class								
This course will provide students	with the opportun	ity to rea	ad ex	cellent	t research papers o	n molecular life sci	ence. Therefore,	
the knowledge of basic biochemis	stry and molecular	biology is	s abso	olutely	necessary. If you	have not complete	d these subjects,	
you are not qualified for this cou	rse.							
The papers used in the Class are	e important papers	from tha	t curi	rent m	nolecular life science	e were originated.	The students will	
be required to read, summarize a	nd present two or r	more rese	earch	рарен	rs.			
This course will provide students	with the opportun	ity to rea	ad ex	cellent	t research papers o	n molecular life sci	ence. Therefore,	
the knowledge of basic biochemis	stry and molecular	biology is	s abso	olutely	necessary. If you	have not complete	d these subjects,	
you are not qualified for this cour	rse.							
The papers used in the Class are	e important papers	from tha	t curi	rent m	nolecular life science	e were originated.	The students will	
be required to read, summarize a	nd present two or i	more rese	earch	paper	rS.			
	- D				"			
This Class goes with the Origina	al Papers of the I	Nobel Pri	ze La	ureate	es.			
At first, students must access th	e HP of Nobel Priz	e Organiz	zation	: http:	//nobelprize.org//	· ″ ″ol · ·	<i>″</i>	
Next, choose two Nobel Prize	Awards after 197	0 in the	field	of P	hysiology and Medi	cine or Chemisti	ry, and Get and	
Read carefully original papers	of the Laureates.		Prize	Awar	as must be strong	gly related to biolo	gy if you choose	
from Chemistry)								
			" •	."	,			
After that, every student will hav	e presentation for	the chose	en A	ward				
In the presentation, student mus	t explain plainly the	e backgro	ound	or the	research, the cont	ent of the research	i, and the effects	
of the research.	Deneve" of the "I							
At first students must access the	a HD of Nobel Driz		ze La	ureau bttp:	es . ://nobelprize.org//			
Next choose two "Nobel Prize	Awarda" after 197	e Organiz 0 in the	field	of "D	// hobelphize.org/ /	oine" or "Chemist	n/" and Gat and	
Read carefully "original papers"	of the Loureater	("Nobel	Drizo		de" must be strong	du related to biolo	my if you choose	
from "Chemistry")	of the Laureaces.		1 1120	Awai			gy il you choose	
nom onemstry /								
After that every student will have	a proportation for t	the cheer	on "A	word"	,			
In the presentation student will have	t evolain plainly the			of the	research the cont	ant of the research	and the effects	
of the research		5 Datingit	Junu			she of the research		
Self Preparation and Review								
Related subjects								
Advanced Applied Biochemistry	and Biotechnology							
Advanced Applied Biochemistry and Biotechnology								
Notes for textbook								
see the HP of "Nobel Prize" Or	ganization: http://n	obelprize	.org/					
you can get the (list of) Original I	Papers in the Web s	site.						
see the HP of "Nobel Prize" Org	ganization: http://n	anization: http://nobelprize.org/						
you can get the (list of) Original I	Papers in the Web s	site.						
Notes for reference								
Goals to be achieved								
The goal is to be able to deeply u	inderstand exceller	t papers	and r	noder	n history of molecul	ar life science.		
The goal is to be able to deeply understand excellent papers and modern history of molecular life science.								

Evaluation of achievement

Grades for the course will be based on the test score or the report and presentation score. Grades for the course will be based on the test score or the report and presentation score. **Examination**

Details of examination

Other information

Terumichi TANAKA: Room: G-506, Phone: 6920, E-mail: terumichi-tanaka@tut.jp

Terumichi TANAKA: Room: G-506, Phone: 6920, E-mail: terumichi-tanaka@tut.jp

Reference URL

none

none

Office hours

Any time, but e-mail is required in advance.

Any time, but e-mail is required in advance.

Relations to attainment objectives of learning and education

Key words

Molecular Biology, RNA, DNA, gene Molecular Biology, RNA, DNA, gene

(M44630130)Advanced Applied Biochemistry and Biotechnology[Advanced Applied Biochemistry and Biotechnology]

Subject name[English]	Advanced Applied Biochemistry and Biotechnology[Advanced Applied Biochemistry and							
	Biotechnology]	1			I			
Schedule number	M44630130	Subject	t area	Advanced Environmental and Life	Required or elective	Elective		
				Sciences				
Time of starting a course	Fall2 term	Day week,pe	of the priod	Thu.2~2	Credit(s)	1		
Faculty	Graduate Progra	m for Mast	ter's Degr	ee	Subject grade	1~2		
Department Offered					Beggining grade			
Charge teacher name[Roman	平石 明,浴 俊	彦 HIRAISH	HI Akira, E	KI Toshihiko				
alphabet markj Numbering								
 Applied Microbiology and B fermentation technology and Genomic Applied Microbiology and Genomic Applied Microbiology and Genomic Contents of class Applied Microbiology and Bioch Introduction of microbiology - Fundamentals of bioenergetics Molecular Biology and Genomic Industrial microbiology and Genomic Molecular Biology and Genomic Industrial microbiology and Genomic Introduction of genome resear Mapping and Sequencing techn Functional genomics Applied Microbiology and Bioch Introduction of microbiology - Yundamentals of bioenergetics Moles of microbiology and Genomic Introduction of genome resear Mapping and Sequencing techn Functional genomics Applied Microbiology and Bioch Introduction of microbiology - Fundamentals of bioenergetics Modes of microbial energy-yie Introduction of microbiology and Bioch Introduction of microbial energy-yie Industrial microbiology and Genomic Industrial microbiology and Genomic Introduction of genome resear Molecular Biology and Genomic 	iochemistry: Fund ironmental biotech so: Principle and co iochemistry: Fund ironmental biotech so: Principle and co nemistry Biodiversity, taxor i Iding systems ch nology nemistry Biodiversity, taxor i Iding systems ch nology nemistry Biodiversity, taxor i Iding systems ch sology	damentals nology urrent prog damentals nology urrent prog nomy and p nnology	of micro gress in ge of micro gress in ge ohysiology	biology and bioene nome sciences will b biology and bioene <u>nome sciences will b</u> of microorganisms	rgetics and their ne discussed. rgetics and their ne discussed.	applications to		
 Mapping and Sequencing technics Functional genomics 	lology							
Self Preparation and Review								
Related subjects The knowledge of basic microbiol The knowledge of basic microbiol Notes for textbook For Applied Microbiology and Bio M. T. Madigan et al."Brock Biolog For Molecular Biology and Genon S. B. Primrose and R. M. Twyman For Applied Microbiology and Bio M. T. Madigan et al."Brock Biolog	ogy, biochemistry ogy, biochemistry chemistry: cy of Microorganism nics "Principles of Ge chemistry: cy of Microorganism	and molect and molect ns" Prentit nome Anal ns" Prentit	ular biolog ular biolog ce Hall lysis and (ce Hall	y is absolutely requin y is absolutely requin Aenomics" 3rd Ed. B	red. red. lackwell Science			
For Molecular Biology and Genom	nics							
S. B. Primrose and R. M. Twyman	"Principles of Ge	nome Anal	lysis and (enomics" 3rd Ed. B	lackwell Science			
Notes for reference								
Goals to be achieved								
The aims of the lesson are to ge	t basic knowledge	of applied	d microbio	ogy, genomics and r	nolecular biology a	nd to understand		
the current technology in the field of these researches.								

The aims of the lesson are to get basic knowledge of applied microbiology, genomics and molecular biology and to understand								
the current technology in the field of these researches.								
Evaluation of achievement								
Grades for the course will be based on the average of the subjects score (Hiraishi and Eki).								
Interim report (30%) and term-end report (70%) for Applied Microbiology and Biochemistry (Hiraishi).								
Presentation (30%) and term-end report (70%) for Molecular Biology and Genomics (Eki).								
Grades for the course will be based on the average of the subjects score (Hiraishi and Eki).								
Interim report (30%) and term-end report (70%) for Applied Microbiology and Biochemistry (Hiraishi).								
Presentation (30%) and term-end report (70%) for Molecular Biology and Genomics (Eki).								
Examination								
Details of examination								
Other information								
Prof. Akira Hiraishi (G503) Tel: 6913, e-mail: hiraishi@ens.tut.ac.jp								
Prof. Toshihiko Eki (G505) Tel: 6907, e-mail: eki@ens.tut.ac.jp								
Prof. Akira Hiraishi (G503) Tel: 6913, e-mail: hiraishi@ens.tut.ac.jp								
Prof. Toshihiko Eki (G505) Tel: 6907, e-mail: eki@ens.tut.ac.jp								
Reference URL								
Office hours								
Please make an appointment.								
Please make an appointment.								
Relations to attainment objectives of learning and education								
Key words								
microbiology, applied biochemistry, molecular biology, genomics								
microbiology, applied biochemistry, molecular biology, genomics								

(M44630210)Advanced Life Science and Biotechnology I[Advanced Life Science and Biotechnology I]

Subject name[English]	Advanced Life Science and Biotechnology I[Advanced Life Science and Biotechnology I]						
Schedule number	M44630210	Subject an	a	Advanced	Required or	Elective	
				Environmental	elective		
			and Life				
				Sciences			
Time of starting a course	Fall term	Day of week,perio	the d	Intensive	Credit(s)	2	
Faculty	Graduate Progr	am for Master'	s Degr	ee	Subject grade	1~2	
Department Offered					Beggining		
					grade		
Charge teacher name[Roman	S4系教務委員	4kei kyomu Iin	-S		-		
alphabet mark]							
Numbering							
Objectives of class							
I his course will provide the stud	ents with the opp	portunity to sti	idy on	selected subjects in	the realm of adva	nced life science	
and biotechnology.							
This course will provide the stud	ents with the opp	portunity to stu	udy on	selected subjects in	the realm of adva	nced life science	
and biotechnology.							
Contents of class							
The classes will be given by his/	her supervisor. 7	The students w	ill be r	equired to read text	books and papers	but the type and	
contents of this course depend of	on his/her supervi	isor.					
The classes will be given by his	her supervisor T	The students w	ill he r	equired to read text	hooks and napers	but the type and	
contents of this course depend of	n his/her supervi	isor				but the type and	
Salf Drag creation and Devices							
Self Preparation and Review							
Related subjects							
Advanced Life Science and Biote	chnology II						
Advanced Life Science and Biote	chnology II						
Notes for textbook							
Supervisor will recommend textb	ooks and papers t	to students.					
Supervisor will recommend textb	ooks and papers t	to students.					
Notes for reference							
Goals to be achieved							
To acquire advanced knowledge	on life science an	d biotechnolog	y				
To be able to report and discuss	the contents of t	textbooks and p	papers	he∕she has read.			
To acquire advanced knowledge	on life science an	d biotechnolog	y				
To be able to report and discuss	the contents of t	textbooks and p	papers	he/she has read.			
Evaluation of achievement							
The evaluation is based on the se	cores of reports.	presentations.	and ex	amination.			
The evaluation is based on the se	cores of reports.	presentations.	and ex	amination.			
Examination	,,						
Details of examination							
Other information							
Supervisor							
Supervisor							

Reference URL

Office hours

Students are encouraged visiting by appointment.

Students are encouraged visiting by appointment.

Relations to attainment objectives of learning and education

Key words

Life science, biotechnology, bioengineering, molecular biology, microbiology, genomics Life science, biotechnology, bioengineering, molecular biology, microbiology, genomics

(M44630230)Advanced Environmental Technology I[Advanced Environmental Technology I]

Subject name[English]	Advanced Environmental Technology I[Advanced Environmental Technology I]					
Schedule number	M44630230	Subject are	38	Advanced	Required or	Elective
		,		Environmental	elective	
				and Life	01000110	
				Sciences		
Time of starting a course	Fall term	Day of	the	Intensive	Credit(s)	2
		week.perio	d	Inconcivo		-
Faculty	Graduate Program	n for Master's	- s Degr	ee	Subject grade	1~2
Department Offered			8		Beggining	
					grade	
Charge teacher name[Roman	S4系教務委員 4	kei kvomu Iin	-S		9	
alphabet mark]		-				
Numbering						
Objectives of class						
This serves will provide the st	مماط ماطنين مغمرمانين		امىنىغە م	امعامما معامه	aubiant in the wa	almo of advanced
This course will provide the st	alam	opportunity to	o stud	y on the selected	subject in the rea	aim of advanced
This second will second the st	ology.					.
This course will provide the st	udents with the t	opportunity to	o stud	y on the selected	subject in the rea	aim of advanced
Operation of alage	ology.					
	/ · · ·					
The classes will be given by his/	ner supervisor. Th	e students w	ill be r	equired to read text	books and papers	but the type and
contents of this course depend of	n his/her supervise	or.				
The classes will be given by his/	her supervisor. Th	e students w	ill be r	equired to read text	books and papers	but the type and
contents of this course depend c	on his/her supervise	or.				
Self Preparation and Review						
Related subjects						
Advanced Environmental Techno	logy II					
Advanced Environmental Techno	logy II					
Notes for textbook						
Supervisor will recommend textb	ooks and papers to	students.				
Supervisor will recommend textb	ooks and papers to	students.				
Notes for reference						
Goals to be achieved						
To acquire advanced knowledge	on environmental s	cience and te	chnolo	øv		
To be able to report and discuss	the contents of te	xthooks and r	aners	be/she has read		
			aporo			
To populize advanced knowledge	an anvironmental a	aianaa and ta	ohnolo	<i></i>		
To be able to report and discuss			Chinolo	gy ha /aha haa yaad		
To be able to report and discuss	the contents of te	xtbooks and p	apers	ne/ sne nas reau.		
F 1 11 F 11 1						
	c .					
The evaluation is based on the se	cores of reports, pr	resentations, a	and ex	amination.		
The evaluation is based on the se	cores of reports, pr	resentations, a	and ex	amination.		
Examination						
Details of examination						
Other information						
Supervisor						
Supervisor						
Reference URL						
Office hours						
Students are encouraged visiting	hy appointment					
Students are encouraged visiting	by appointment					
Relations to attainment objective	s of learning and a	ducation				
	o or ioarning and e	auvauvii				

Key words

Environmental science, environmental technology, eco-technology, environmental engineering Environmental science, environmental technology, eco-technology, environmental engineering

(M44630250)Advanced Environmental and Ecological Systems I[Advanced Environmental and Ecological Systems I]

Subject name[English]							
	Systems 1]					ai anu Ecologicai	
Schedule number	M44630250	Subjec	t are	a	Advanced Environmental and Life	Required or elective	Elective
Time of starting a course	Fall term	Day	of	the	Intensive	Credit(s)	2
Feeulty	Graduata Pragra	week,p		Dogr		Subject mode	1~2
Paculty Department Offered	Graduate Frogra		sters	Degr	56	Beggining	12
						grade	
Charge teacher name[Roman	S4系教務委員4	lkei kyom	u Iin-	-S		8.000	
alphabet mark]							
Numbering							
Objectives of class							
This course will provide the st environmental and ecological syst This course will provide the st environmental and ecological syst Contents of class The classes will be given by his/ contents of this course depend of The classes will be given by his/ contents of this course depend of Self Preparation and Review Related subjects Notes for textbook Supervisor will recommend textbox Notes for reference	udents with the o tems. udents with the o tems. 'her supervisor. Th n his/her supervis 'her supervisor. Th n his/her supervis pooks and papers to pooks and papers to	opportunit opportunit or. ne student or.	ty to ty to ts wi ts wi	• stud	y on the selected y on the selected equired to read text equired to read text	subject in the re subject in the re books and papers books and papers	alm of advanced alm of advanced but the type and but the type and
Goals to be achieved To acquire advanced knowledge of To be able to report and discuss To acquire advanced knowledge of To be able to report and discuss	on environmental s the contents of te on environmental s the contents of te	cience an extbook ar cience an extbook ar	nd teo nd pa nd teo nd pa	chnolo pers h chnolo pers h	gy and ecological sys e/she has read. gy and ecological sys e/she has read.	stems	
Evaluation of achievement	oroo of reserves	rooortet!-	-	nd av	mination		
The evaluation is based on the so	cores of reports, pl	resentatio	nns, a ons a	ind exa	amination.		
Examination			, u				
Details of examination Other information Supervisor Supervisor Reference URL							
Office hours Students are encouraged visiting Students are encouraged visiting	by appointment.						
Relations to attainment objective	os of learning and e	education					

Key words

Ecological systems, industrial ecology, environmental technology, materials flows Ecological systems, industrial ecology, environmental technology, materials flows

(M44630270)Special Topics in Inorganic Chemistry[Special Topics in Inorganic Chemistry]

Subject name[English]	Special Topics in	Inorganic Chei	mistry	/[Special Topics in I	norganic Chemistry	']	
Schedule number	M44630270	Subject area	1	Advanced	Required or	Elective	
				Environmental	elective		
				and Life			
				Sciences			
Time of starting a course	Fall2 term	Day of	the	Fri.2~2	Credit(s)	1	
		week,period					
Faculty	Graduate Program	n for Master's	Degre	e	Subject grade	1~2	
Department Offered					Beggining		
Charma tasahar nama[Baman	 毎日 節美 K ∧ K I				grade		
onarge teacher name_Roman	月山 軋我 (A(C	TA Noriyoshi					
Numbering							
Objectives of class							
The chemistry and physics of su	urfaces is an increa	asingly importa	nt su	bject. Because of th	his, there is a need	for chemists to	
become familiar with the basic	concepts and prin	ciples governin	ig int	erfacial phenomena	for understanding	Heterogeneous	
Catalysis .							
The chemistry and physics of su	annaces is an increa	asingiy importa	nt su	Dject. Because of tr	for understanding	"Hotorogonoouo	
Catalysis"	concepts and prin	cipies governin	ig int	erraciai prierioriteria	Tor understanding	Tieterogeneous	
Contents of class							
I. What is catalysis?							
The reactive interface							
II. What is catalyst?							
Catalytic materials and their prer	paration						
Catalytic activity and selectivity							
Measurement of catalytic proper	ties						
III. Catalysis for benefit of human	IS						
Raw materials and their conversi	on						
Catalysis for environmental prote	ection						
Catalysis in everyday life							
Catalysis for the future							
I. What is catalysis?							
The reactive interface							
II. What is catalyst?							
Catalytic materials and their prep	paration						
Catalytic activity and selectivity							
Measurement of catalytic proper	ties						
III. Catalysis for benefit of human	IS						
Raw materials and their conversion	on						
Catalysis for environmental prote	ection						
Catalysis in everyday life							
Catalysis for the future							
Self Preparation and Review							
Related subjects							
Basic knowledges of physical che	mistry and inorgan	ic chemistry ar	e rea	uired			
Basic knowledges of physical che	emistry and inorgan	ic chemistry ar	e ren	uired.			
Notes for textbook	,						

No official textbook is used.	
Hand out materials accordingly.	
No official textbook is used.	
Hand out materials accordingly.	
Notes for reference	
Goals to be achieved	
To understand basics of heterogeneous catalysis and catalyst	
To understand basics of heterogeneous catalysis and catalyst	
Evaluation of achievement	
30% Homework report, 70% Final examination or report	
30% Homework report, 70% Final examination or report	
Examination	
Details of examination	
Other information	
Room # B-302, E-mail: kakuta@ens.tut.ac.jp,	
Room # B-302, E-mail: kakuta@ens.tut.ac.jp,	
Reference URL	
Office hours	
Anytime when I will be.	
Anytime when I will be.	
Relations to attainment objectives of learning and education	
Key words	
adsorption, solid surface, heterogeneous catalysis	
adsorption, solid surface, heterogeneous catalysis	

(M45610010)Seminar on Architecture and Civil Engineering I[Seminar on Architecture and Civil Engineering I]

Subject name[English]	Seminar on Architecture and Civil Engineering I[Seminar on Architecture and Civil						
Schedule number	M45610010	Subject area	Advanced	Required or	Required		
			Architecture	elective			
			and Civil				
Time of starting a summer	Varia	Davis of the	Engineering		2		
lime of starting a course	Year	Day of the week period	Intensive	Grean(s)	3		
Faculty	Graduate Program	n for Master's Degre	e	Subject grade	1~2		
Department Offered	Architecture and	Civil Engineering		Beggining			
				grade			
Charge teacher name[Roman	S5系教務委員 5	kei kyomu Iin−S					
alphabet mark]							
Numbering							
All the students are required to	attend all the sem	inars, which is arrar the laboratory. The	iged by the laborate	ory supervisor for	the special study		
supervisor at the guidance of the	seminar.	the laboratory. The	scheduled program		announced by the		
All the students are required to	attend all the sem	inars, which is arrar	nged by the laborate	ory supervisor for	the special study		
subjects related to the current re	esearch activity of	the laboratory. The	scheduled program	of the seminars is a	announced by the		
supervisor at the guidance of the	seminar.						
Contents of class							
In each seminar, students purs	sue several resear	rch topics and/or	undertake projects	collectively and	solely under the		
In each seminar students pure	s of the departments of the several research	rch topics and/or u	ther departments.	collectively and	solely under the		
instruction of the faculty member	rs of the department	nt and/or those of o	ther departments	concervery and	solely under the		
Self Preparation and Review							
Related subjects							
Notes for textbook							
Notes for reference							
Goals to be achieved							
Evaluation of achievement							
Examination							
Details of examination							
Other information							
Reference URL							
Office hours							
Relations to attainment objective	s of learning and e	ducation					
Key words							

(M45610020)Seminar on Architecture and Civil Engineering II[Seminar on Architecture and Civil Engineering II]

Subject name[English]	Seminar on Architecture and Civil Engineering II[Seminar on Architecture and Civil Engineering II]						
Schedule number	M45610020	Subject area	Advanced Architecture	Required or elective	Required		
			Engineering				
Time of starting a course	Year	Day of the week,period	Intensive	Credit(s)	3		
Faculty	Graduate Progra	m for Master's Degre	e	Subject grade	2~2		
Department Offered	Architecture and	Civil Engineering		Beggining grade			
Charge teacher name[Roman alphabet mark]	S5系教務委員 5	ikei kyomu Iin−S					
Numbering							
Objectives of class							
All the students are required to	attend all the sem	ninars, which is arrar	nged by the laborate	orv supervisor for	the special study		
subjects related to the current re	esearch activity of	the laboratory. The	scheduled program	of the seminars is a	announced by the		
supervisor at the guidance of the	seminar.	-			-		
All the students are required to	attend all the sem	ninars, which is arrar	nged by the laborate	ory supervisor for	the special study		
subjects related to the current re	search activity of	the laboratory. The	scheduled program	of the seminars is a	announced by the		
supervisor at the guidance of the	seminar.						
Contents of class							
In each seminar, students purs	ue several resea	rch topics and/or	undertake projects	collectively and	solely under the		
instruction of the faculty member	's of the departme	nt and/or those of o	ther departments.				
In each seminar, students purs	ue several reseau	rch topics and/or	undertake projects	collectively and	solely under the		
Solf Proportion and Poview	's of the department	nt and/or those of o	ther departments.				
Related subjects							
Notes for textbook							
Notes for reference							
Goals to be achieved							
Evaluation of achievement							
Examination							
Details of examination							
Other information							
Reference URL							
Office hours							
Pelations to attainment alignation	o of learning and a	ducation					
RELATIONS TO ATTAINMENT ODJECTIVE	is of learning and e	Jucation					
Key words							

(M45610030)Thesis Research on Architecture and Civil Engineering[Thesis Research on Architecture and Civil Engineering]

Subject name[English]	Thesis Research on Architecture and Civil Engineering[Thesis Research on Architecture						Architecture and	
	Civil Engineering]				-			
Schedule number	M45610030	Subject	area	Advanced Architecture and Civil	Required elective	or	Required	
Time of starting a course	2Years	Day o	f the riod	Intensive	Credit(s)		6	
Faculty	Graduate Progra	am for Maste	er's Degr	ee	Subject gra	de	1~2	
Department Offered					Beggining			
•					grade			
Charge teacher name[Roman alphabet mark]	S5系教務委員,	各教員 5ke	i kyomu I	in-S, KAKUKYOUIN	Kakukyouin			
Numbering								
Objectives of class Research on architecture and civi Research on architecture and civi Contents of class It depends on the laboratory. All the thesis, as a requirement for the the guidance of the supervisor. It depends on the laboratory. All the thesis, as a requirement for the the guidance of the supervisor. Self Preparation and Review Related subjects It depends on the laboratory It depends on the laboratory Notes for textbook It depends on the laboratory It depends on the laboratory It depends on the laboratory Notes for reference	I engineering I engineering students must p he graduation of students must p he graduation of	resent their the master of resent their the master of	thesis at course. T thesis at course. T	the end of the cou he study for the the the end of the cou he study for the the	urse and take esis is planned urse and take esis is planned	a fin I and I and	al examination on conducted under al examination on conducted under	
Goals to be achieved								
Evaluation of achievement This credit is assigned for all the This credit is assigned for all the Examination	process for the p process for the p	reparation a reparation a	nd prese nd prese	ntation of the thesis ntation of the thesis				
Details of examination								
Other information It depends on the laboratory. It depends on the laboratory. Reference URL It depends on the laboratory. It depends on the laboratory.								

(M45610030)Thesis Research on Architecture and Civil Engineering[Thesis Research on Architecture and Civil Engineering]

Subject name[English]	Thesis Research on Architecture and Civil Engineering[Thesis Research on Architecture and							
	Civil Engineering]							
Schedule number	M45610030	Subject area	Advanced	Required or	Required			
			Architecture	elective				
			Engineering					
Time of starting a course	2Years	Day of the	Intensive	Credit(s)	6			
		week,period						
Faculty	Graduate Program	n for Master's Degre	e	Subject grade	1~2			
Department Offered	Architecture and	Civil Engineering		Beggining	M1, M2			
				grade				
Charge teacher name[Roman	S5系教務委員 5kei kyomu Iin-S							
alphabet mark]								
Numbering								

Objectives of class

This thesis research on architecture and civil engineering is designated to deepen the knowledge and enhance the skills of the students in their research fields through the self-oriented endeavour with the instruction of his/her supervisor(s).

This thesis research on architecture and civil engineering is designated to deepen the knowledge and enhance the skills of the students in their research fields through the self-oriented endeavour with the instruction of his/her supervisor(s).

Contents of class

The subjects and the contents of the thesis vary depending on the laboratory. All students must present their thesis at the end of the course and take a final examination on the thesis, as a requirement for the graduation of the master course. The study for the thesis is planned and conducted under the guidance of the supervisor(s).

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Self Preparation and Review

Related subjects

TBD by the laboratory

TBD by the laboratory

Notes for textbook TBD by the laboratory TBD by the laboratory

Notes for reference

Goals to be achieved

Evaluation of achievement

This credit is assigned for all the process for the preparation and presentation of the thesis. This credit is assigned for all the process for the preparation and presentation of the thesis. **Examination**

Details of examination

Other information

Refer to administration office. Refer to administration office.

Reference URL

Refer to the URL of each laboratory Refer to the URL of each laboratory

Office hours

Refer to administration office.

Refer to administration office.

Relations to attainment objectives of learning and education

(M4561003T)Thesis Research on Architecture and Civil Engineering[Thesis Research on Architecture and Civil Engineering]

Subject name[English]	Thesis Research on Architecture and Civil Engineering[Thesis Research on Architecture and								
	Civil Engineering]	Civil Engineering]							
Schedule number	M4561003T	Subject area	Advanced Architecture and Civil Engineering	Required or elective	Required				
Time of starting a course	Year	Day of the week,period	Intensive	Credit(s)	6				
Faculty	Graduate Progran	n for Master's Degre	ee	Subject grade	2~2				
Department Offered	Architecture and	Civil Engineering	Beggining grade						
Charge teacher name[Roman alphabet mark]	S5系教務委員 5	S5系教務委員 5kei kyomu lin−S							
Numbering									

Objectives of class

This thesis research on architecture and civil engineering is designated to deepen the knowledge and enhance the skills of the students in their research fields through the self-oriented endeavour with the instruction of his/her supervisor(s).

This thesis research on architecture and civil engineering is designated to deepen the knowledge and enhance the skills of the students in their research fields through the self-oriented endeavour with the instruction of his/her supervisor(s).

Contents of class

The subjects and the contents of the thesis vary depending on the laboratory. All students must present their thesis at the end of the course and take a final examination on the thesis, as a requirement for the graduation of the master course. The study for the thesis is planned and conducted under the guidance of the supervisor(s).

The subjects and the contents of the thesis vary depending on the laboratory. All students must present their thesis at the end of the course and take a final examination on the thesis, as a requirement for the graduation of the master course. The study for the thesis is planned and conducted under the guidance of the supervisor(s).

Self Preparation and Review

Related subjects

TBD by the laboratory

TBD by the laboratory

Notes for textbook TBD by the laboratory TBD by the laboratory

Notes for reference

Goals to be achieved

Evaluation of achievement

This credit is assigned for all the process for the preparation and presentation of the thesis. This credit is assigned for all the process for the preparation and presentation of the thesis. **Examination**

Details of examination

Other information

Refer to administration office. Refer to administration office.

Reference URL

Refer to the URL of each laboratory Refer to the URL of each laboratory

Office hours

Refer to administration office.

Refer to administration office.

Relations to attainment objectives of learning and education

(M45610040)Seminar on Architecture and Civil Engineering[Seminar on Architecture and Civil Engineering]

Subject name[English]	Seminar on Architecture and Civil Engineering[Seminar on Architecture and Civil Engineering]						
Schedule number	M45610040	Subject area	Advanced Architecture and Civil Engineering	Required or elective	Required		
Time of starting a course	Year	Day of the week,period	Intensive	Credit(s)	6		
Faculty	Graduate Progra	m for Master's Degre	ee	Subject grade	2~2		
Department Offered	Architecture and	Civil Engineering		Beggining grade			
Charge teacher name[Roman alphabet mark]	S5系教務委員	5kei kyomu Iin−S		5			
Numbering							
All the students are required to	attend all the sen	ninars, which is arrar	nged by the laborate	bry supervisor for	the special study		
subjects related to the current re	esearch activity of	the laboratory. The	scheduled program	of the seminars is a	announced by the		
supervisor at the guidance of the	seminar.						
All the students are required to	attend all the sen	ninars, which is arrar	iged by the laborato	bry supervisor for	the special study		
subjects related to the current re	search activity of	the laboratory. The	scrieduled program	or the seminars is a	announced by the		
Supervisor at the guidance of the	seminar.						
		whether and/an					
In each seminar, students purs	sue several resea	rch topics and/or	undertake projects	collectively and	solely under the		
Instruction of the faculty member	s of the departme	and and/or those of o	uner departments.		ممامات بسطمير المم		
In each seminar, students purs	sue several resea	rch topics and/or	undertake projects	collectively and	solely under the		
Solf Drop protion and Deview	rs of the departme	ent and/or those of o	ther departments.				
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Related subjects							
Notes for textbook							
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Goals to be achieved							
Evaluation of achievement							
Examination							
Details of examination							
Other information							
Reference URL							
Office hours							
Relations to attainment objective	s of learning and	education					
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Key words							

(M45630010)Elasticity and Stability[Elasticity and Stability]

Subject name[English]	Elasticity and Sta	ability[Elasticit	ty and	Stability]		
Schedule number	M45630010	Subject are	a	Advanced	Required or	Elective
				Architecture	elective	
				and Civil		
				Engineering		
Time of starting a course	Fall term	Day of week.perior	the 1	Tue.3~3	Credit(s)	2
Faculty	Graduate Program	m for Master's	Degr	e	Subject grade	1~2
Department Offered					Beggining	
					grade	
Charge teacher name[Roman	齊藤 大樹 SAIT	OH Taiki				
alphabet mark]						
Numbering						
Objectives of class						
This lecture is concerned with	the static continu	um mechanics	of el	astic 2-dimensional	bodies. The prima	ary purpose is to
encourage students to gain th	e fundamental co	ncept and to	o raise	their potential ab	oilities for advanc	ed and practical
applications in the future.						
This lecture is concerned with	the static continu	um mechanics	of el	astic 2-dimensional	bodies. The prima	ary purpose is to
encourage students to gain th	e fundamental co	ncept and to	o raise	e their potential ab	oilities for advanc	ed and practical
applications in the future.						
Contents of class						
1. Introduction						
2. Tensor Analysis in Cartesian C	oordinates					
2.1 Summation Convention						
2.2 Translation of coordinate						
2.3 Scalar, Vector and Tensor 2.4 Quotient Rule						
3 Stresses and Equilibrium						
31 Stress						
3.2 Equilibrium of Stresses						
3.3 Cauchy's Relation						
3.4 Principal Stress and Stress In	ivariant					
4. Strain-Displacement Relations	in Two-Dimension	al Bodies				
4.1 Deflection						
4.2 Strain						
5. Constitutive Equations in Isotr	opic Elastic Materia	als				
5.1 Stress-strain Relations of Lin	ear Elastic Bodies					
5.2 Isotropic Material						
6. Finite Element Method using Is	oparametric Eleme	nt				
5.1 Basic theory of FEM						
5.2 FIACUCE USING FEW program						
1 Introduction						
2 Tensor Analysis in Cartesian C	oordinates					
2.1 Summation Convention						
2.2 Translation of coordinate						
2.3 Scalar, Vector and Tensor						
2.4 Quotient Rule						
3. Stresses and Equilibrium						
3.1 Stress						
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5.1 Stress-strain Relations of Lin	iear Elastic Bodies					
5.2 Isotropic Material						

6. Finite Element Method	using Isoparametric Element
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5.1 Basic theory of FEM

5.2 Practice using FEM program

Self Preparation and Review

Related subjects

Notes for textbook

Notes for reference

Goals to be achieved

The primary purpose is to encourage students to gain the fundamental concept and to raise their potential abilities for advanced and practical applications in the future.

The p	orimary	purpose	is to	encourage	students	to	gain	the	fundamental	concept	and	to	raise	their	potential	abilities	for
advan	ced and	l practica	l appl	ications in tl	ne future.												

Evaluation of achievement

Report

Report

Examination

Details of examination

Other information

Professor Taiki Saito (D805), e-mail: tsaito@ace.tut.ac.jp (Room: D-805) Professor Taiki Saito (D805), e-mail: tsaito@ace.tut.ac.jp (Room: D-805)

Reference URL

http://www.rc.ace.tut.ac.jp/saito/index-e.html http://www.rc.ace.tut.ac.jp/saito/index-e.html

Office hours

Relations to attainment objectives of learning and education

(M45630030)Seismic Evaluation of Existing Buildings[Seismic Evaluation of Existing Buildings]

Schedule number M45830030 Subject area (M4503003) Advanced (M4504004) Required (M450404) Circuit (M450404) Elective (M450404) Elective (M45040404) Elective (M45040404) Elective (M4504040404) Elective (M4504040404040404040040040040040040040040	Subject name[English]	Seismic Evaluation of Existing Buildings Seismic Evaluation of Existing Buildings					
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Industry Disparation of Market P Up to Market P Up to Under Type of Control of Co	Faculty	Graduate Program	m for Master'	s Degri	20	Subject grade	1~2
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First Level Screening Procedure -Basic Seismic Index of Structure: E0- 7: Second Level Screening Procedure -Ductility Index: F- 8: Judgment on Seismic Safety 10: Recent Earthquake Disasters 11: Introduction of Seismic Retrofit 12: Observation of Structure! E0 12: Observation of Structure! Testing 14: Explanation on Assignments 1: Introduction of Seismic Structure: E0 12: Second Level Screening Procedure -Ductility Index: F- 12: Observation of Structure! Testing 14: Explanation on Assignments 11: Introduction 12: Procedure of Seismic Evaluation 13: Observation of Structure! IS 14: Explanation on Assignments 11: Introduction 12: Procedure of Seismic Evaluation 13: Seismic Index of Structure: IS 14: Irregularity and Time Indexes: SD and T 15: First Level Screening Procedure -Basic Seismic Index of Structure: E0- 17: Second Level Screening Procedure -Ductility Index: F- 9: Judgment on Seismic Safety 10: Recent Earthquake Disasters 11: Introduction of Seismic Frequence -Ductility Index: F- 9: Judgment on Seismic Safety 10: Recent Earthquake Disasters 11: Introduction of Seismic Retrofit 12: Observation of Structural Testing 14: Explanation on Assignments 14: Explanation on Saismic Safety 10: Recent Earthquake Disasters 11: Introduction of Seismic Retrofit 12: Observation of Retrofitted Buildings 13: Observation of Structural Testing 14: Explanation on Assignments 56f Preparation and Review 56f Preparation and Review 56f Preparation and Review 56f Preparation and Review 56f Preparation of Existing Reinforced Concrete Buildings, 2001 5001	4: Irregularity and Time Indexes: 5	SD and T					
	5: First Level Screening Procedu	re					
7: Second Level Screening Procedure -Strength Index: C- 8: Second Level Screening Procedure -Ductility Index: F- 9: Judgment on Seismic Safety 10: Recent Earthquake Disasters 11: Introduction of Seismic Retrofit 12: Observation of Retrofitted Buildings 13: Observation of Retrofitted Buildings 14: Explanation on Assignments 11: Introduction 2: Procedure of Seismic Evaluation 3: Seismic Index of Structure: IS 4: Irregularity and Time Indexes: SD and T 5: First Level Screening Procedure -Basic Seismic Index of Structure: E0- 7: Second Level Screening Procedure -Strength Index: C- 8: Seismic Earthquake Disasters 11: Introduction of Seismic Retrofit 9: Judgment on Seismic Safety 10: Recent Earthquake Disasters 11: Introduction of Seismic Retrofit 12: Observation of Retrofitted Buildings 13: Observation of Retrofitted Buildings 14: Explanation on Assignments 15: Introduction of Seismic Retrofit 16: Observation of Retrofitted Buildings 17: Observation of Retrofitted Buildings 18: Observation of Retrofitted Buildings 19: Observation of Structural Testing 14: Explanation and Review	6: Second Level Screening Proce	dure -Basic Seism	ic Index of St	ructur	e: E0-		
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10: Recent Earthquake Disasters 11: Introduction of Seismic Retrofit 12: Observation of Retrofited Buildings 13: Observation of Structural Testing 14: Explanation on Assignments 1: Introduction 2: Procedure of Seismic Evaluation 3: Seismic Index of Structure: IS 4: Irregularity and Time Indexes: SD and T 5: First Level Screening Procedure 6: Second Level Screening Procedure -Basic Seismic Index of Structure: E0- 7: Second Level Screening Procedure -Ductility Index: C- 8: Second Level Screening Procedure -Ductility Index: F- 9: Judgment on Seismic Retrofit 11: Introduction of Seismic Retrofit 12: Observation of Structural Testing 14: Explanation on Assignments 15: First Lavel Screening Procedure -Ductility Index: F- 9: Judgment on Seismic Safety 10: Recent Earthquake Disasters 11: Introduction of Seismic Retrofit 12: Observation of Structural Testing 14: Explanation on Assignments Self Preparation and Review Related subjects Notes for textbook Standard for Seismic Evaluation of Existing Reinforced Concrete Buildings, 2001 Notes for reference	9: Judgment on Seismic Safety	,					
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12: Observation of Retrofitted Buildings 13: Observation of Structural Testing 14: Explanation on Assignments 1: Introduction 2: Procedure of Seismic Evaluation 3: Seismic Index of Structure: IS 4: Irregularity and Time Indexes: SD and T 5: First Level Screening Procedure -Basic Seismic Index of Structure: E0- 7: Second Level Screening Procedure -Basic Seismic Index: C- 8: Second Level Screening Procedure -Ductility Index: F- 9: Judgment on Seismic Safety 10: Recent Earthquake Disasters 11: Introduction of Structural Testing 12: Observation of Retrofitt 13: Observation of Structural Testing 14: Explanation on Assignments Self Preparation and Review Related subjects Notes for textbook Standard for Seismic Evaluation of Existing Reinforced Concrete Buildings, 2001 Notes for reference	11: Introduction of Seismic Retro	fit					
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2: Procedure of Seismic Evaluation 3: Seismic Index of Structure: IS 4: Irregularity and Time Indexes: SD and T 5: First Level Screening Procedure 6: Second Level Screening Procedure -Basic Seismic Index of Structure: E0- 7: Second Level Screening Procedure -Strength Index: C- 8: Second Level Screening Procedure -Ductility Index: F- 9: Judgment on Seismic Safety 10: Recent Earthquake Disasters 11: Introduction of Seismic Retrofit 12: Observation of Retrofitted Buildings 13: Observation of Structural Testing 14: Explanation on Assignments Self Preparation and Review Related subjects Notes for textbook Standard for Seismic Evaluation of Existing Reinforced Concrete Buildings, 2001 Notes for reference	1: Introduction						
3: Seismic Index of Structure: IS 4: Irregularity and Time Indexes: SD and T 5: First Level Screening Procedure 6: Second Level Screening Procedure -Basic Seismic Index of Structure: E0- 7: Second Level Screening Procedure -Strength Index: C- 8: Second Level Screening Procedure -Ductility Index: F- 9: Judgment on Seismic Safety 10: Recent Earthquake Disasters 11: Introduction of Seismic Retrofit 12: Observation of Retrofitted Buildings 13: Observation of Structural Testing 14: Explanation on Assignments Self Preparation and Review Related subjects Notes for textbook Standard for Seismic Evaluation of Existing Reinforced Concrete Buildings, 2001 Standard for Seismic Evaluation of Existing Reinforced Concrete Buildings, 2001 Notes for reference	2: Procedure of Seismic Evaluation	on					
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Notes for reference	Standard for Seismic Evaluation of	of Existing Reinford	ed Concrete	Buildin	ıgs, 2001		
	Notes for reference						

Goals to be achieved

To understand nonlinear structural mechanics through learning the Japanese seismic evaluation method for existing buildings. To understand nonlinear structural mechanics through learning the Japanese seismic evaluation method for existing buildings.

Evaluation of achievement

Report Report

Examination

Details of examination

Other information

Room : D-807 E-mail : matsui@ace.tut.ac.jp Room : D-807 E-mail : matsui@ace.tut.ac.jp

Reference URL

http://rc.ace.tut.ac.jp/matsui/index.html http://rc.ace.tut.ac.jp/matsui/index.html

Office hours

Wednesday 14:00-17:00

Wednesday 14:00-17:00

Relations to attainment objectives of learning and education

(M45630090)Coastal Hydraulics[Coastal Hydraulics]

Subject name[English]	Coastal Hydraulic	cs[Coastal	Hvdraul	ics]					
Schedule number	M45630090	Subject	area	Adv	vanced	Required	or	Elective	
				Arc	hitecture	elective			
				and Civil					
				Eng	ineering				
Time of starting a course	Fall term	Day o	Day of the Tue.4~4		e.4~4	Credit(s)		2	
Faculty	Graduate Program	m for Mast	er's Des	ree		Subject grade $1 \sim 2$			
Department Offered				100		Beggining			
						grade			
Charge teacher name[Roman	加藤 茂 KATO S	加藤 茂 KATO Shigeru							
alphabet mark]									
Numbering									
Objectives of class									
To understand the basic concept	of coastal enginer	ering and th	ne advar	iced kr	nowledge of co	astal process	desi	n and protection	
including numerical calculation			io uuvui				, 00018		
To understand the basic concept	of coastal engined	ering and th	ne advar	iced kr	owledge of co	astal process	. desia	on and protection	
including numerical calculation.			io aara				,		
Contents of class									
 Introduction of Coastal Engineer 	ring								
water waves, wave theories, tide	es and water levels	s. wave bre	aking. e	c.					
Shore Processes			0,						
near-shore current, coastal mat	terial, beach proper	rty, sedime	nt trans	port, e	tc.				
•Coastal Design		•							
design process, model classifica	tion, physical & nu	merical mo	dels, et) .					
•Computation of Coastal Morpho	logy								
sediment transport rate, analyti	cal computation, ni	umerical so	lutions,	etc.					
 Introduction of Coastal Engineer 	ring								
water waves, wave theories, tide	es and water levels	. wave bre	aking, e	c.					
•Shore Processes		,	0,						
near-shore current, coastal mat	terial, beach proper	rty, sedime	nt trans	port, e	tc.				
•Coastal Design		-							
design process, model classifica	tion, physical & nu	merical mo	dels, et) .					
•Computation of Coastal Morpho	logy								
sediment transport rate, analyti	cal computation, n	umerical so	lutions,	etc.					
Self Preparation and Review									
-									
Related subjects									
Basic knowledge of coastal engin	eering is desirable								
Basic knowledge of coastal engine	eering is desirable.								
Notes for textbook									
No textbook is required for this c	lass Lecture hand	out is distr	ibuted						
			butou.						
(Deferrer)									
(Reference)	incore and Salanti	ata - Adva	nood S	orion o	n Oacan Engin	ooring - Vol	2″ ⊑	Johart G. Doon 8	
Pabart A	ineers and Science	sis - Auva	nceu 3	eries o	n Ocean Engir	ieering – voi	. 2 17	obert G. Deari &	
Dalaymple (World Scientific)									
"Introduction to Coastal Engine	aring and Manager	oent Ad	vanced	Sarias	on OceanEng	ineering \	/olum	e 16". I William	
Kamphuis (World Scientific)	and managen	Au	- anoou	56/165		and of mig	, orann	C C C. Minalli	
"Basic Coastal Engineering " Ro	bert M. Sorensen	(Kluwer Ac	ademic	Publick	ners)				
No textbook is required for this of	lass. Lecture hand	out is distri	ibuted						
(Poforonoo)									
(Reference)		ata _ A -I		ula -			o″ ⊏	about O Deere 9	
water wave wechanics for Eng	meers and Scientis	sis - Adva	ncea S	eries o	n Ocean Engir	ieering - Vol	. ∠ Ħ	obert G. Dean &	
Robert A.									
Dairymple (world Scientific)									

Introduction to Coastal Engineering and Management Advanced Series on OceanEngineering Volume 16 J. William
Kamphuis (World Scientific)
Basic Coastal Engineering Robert M. Sorensen (Kluwer Academic Publishers)
Notes for reference
Goals to be achieved
Understanding the concept and methodology for coastal engineering.
Understanding the concept and methodology for coastal engineering.
Evaluation of achievement
Reports & attendance
Reports & attendance
Examination
Details of examination
Other information
Room : D-812
E-mail : s-kato@ace.tut.ac.jp.
Room : D-812
E-mail : s-kato@ace.tut.ac.jp.
Reference URL
N/A
N/A
Office hours
Monday, 13:00–14:30
Monday, 13:00-14:30
Relations to attainment objectives of learning and education
N/A
N/A
Key words
Sediment transport, Current, Waves, Shore protection and management
Sediment transport, Current, Waves, Shore protection and management

(M45630150)Advanced Transportation and Traffic Engineering[Advanced Transportation and Traffic Engineering]

Subject name[English]	Advanced Transportation and Traffic Engineering Advanced Transportation							
	Engineering							
Schedule number	M45630150	Subject area Advanced		Required or	Elective			
			Architecture					
			and Civ	il				
			Engineering					
Time of starting a source	Fall tarm	Day of t		Credit(a)	2			
Time of starting a course	Fail term			Oredit(8/	2			
		week,period						
Faculty	Graduate Progra	am for Master's D	egree	Subject grade	1~2			
Department Offered				Beggining				
				grade				
Charge teacher name[Roman	廣畠 康裕 HIR	OBATA Yasuhiro						
alphabet mark]								
Numbering								
Objectives of class								
To gain advanced knowledge of t	heories and meth	ods for transporta	ition planning and tra	ffic engineering meas	sures especially in			
urban areas.								
To gain advanced knowledge of t	heories and meth	ods for transporta	ition planning and tra	ffic engineering meas	sures especially in			
urban areas.								
Contonto of close								
Contents of class	,							
1.Characteristics of transportatio	n systems/							
2. Characteristics of transportatio	n problems and p	olicy issues/ 3.Tr	ransportation planning	process and role of	modeling/			
4.Survey methods of travel dema	nd and traffic flov	vs/						
5 Methods of travel demand analy	sis and modeling	/						
6 Mothedo of triffic flow analyses	/							
0.Methods of triffic flow analyses/		c a (
/.Methods of evaluating transport	tation plan and tra	affic measures/						
8.Other topics : Traffic flow theor	ry, value of travel	time, and valuing	external effects of tr	ansportation				
1.Characteristics of transportatio	on systems/							
2.Characteristics of transportatio	on problems and p	olicv issues/ 3.Tr	ransportation planning	process and role of	modeling/			
4 Survey methods of travel dema	nd and traffic flow	us/		,				
F Mathada af turned damand anal		/						
5. Wethods of travel demand analy	/sis and modeling/	, ,						
6.Methods of trffic flow analyses/	/							
7.Methods of evaluating transport	tation plan and tra	affic measures/						
8.Other topics : Traffic flow theor	ry, value of travel	time, and valuing	external effects of tr	ansportation				
Self Preparation and Review								
Son Froparauon and Noview								
Related subjects								
Advanced Regional Planning and	Design I.II							
Advanced Regional Planning and	Design III							
	1,11 UCSIGIT 1,11							
Texts and papers will be decided	by the opening of	the class.						
Texts and papers will be decided	by the opening of	the class						
	,							

Notes for reference
Goals to be achieved
To understand the necessity had significance of transportation planning
2 To understand the concept of transportation planning
3 To gain the theories and methods in transportation planning
To understand the necessity nad significance of transportation planning
2. To understand the concept of transportation planning
3. To gain the theories and methods in transportation planning
Evaluation of achievement
Home work assignments will be required. Final reports or examination will be imposed.
Home work assignments will be required. Final reports or examination will be imposed.
Examination
Details of examination
Other information
room(D-705),hirobata@ace.tut.ac.jp
room(D-705),hirobata@ace.tut.ac.jp
Reference URL
Hirobata: http://www.tr.ace.tut.ac.jp
Hirobata: http://www.tr.ace.tut.ac.jp
Office hours
Hirobata: Mon,16:25–17:30; Tue,12:30–13:30
Hirobata: Mon,16:25-17:30; Tue,12:30-13:30
Relations to attainment objectives of learning and education
Key words
planning process, social & economic evaluation method, forecasting models
planning process, social & economic evaluation method, forecasting models

(M45630190)Advanced Structural System Planning and Design I[Advanced Structural System Planning and Design I]

			-				
Subject name[English]	Advanced Struct	tural System Planniı	ng and Design I[Adv	vanced Structural	System Planning		
	and Design I]						
Schedule number	M45630190	Subject area	Advanced	Required or	Elective		
	11110000100				LICOLIVE		
			Architecture	elective			
			and Civil				
			Engineering				
Time of starting a course	Fall term	Day of the	Intensive	Credit(e)	2		
			Incensive	UI BUIL(8/	2		
		week,period					
Faculty	Graduate Progra	m for Master's Degre	ee	Subject grade	1~2		
Department Offered				Beggining			
				made			
	이다北攻チ무ィ			giado			
Charge teacher name_Roman	55糸教務安員5	okei kyomu lin-S					
alphabet mark]							
Numbering							
Objectives of class							
It depends on the laboratory T	he resistered stu	dents are required	to attend all the s	eminars which is	arranged by the		
laboratory supervisor for the spe	cial study subject	s related to the curi	rent research activi	ty of the laborator	y. The scheduled		
program of the seminars is annou	nced by the super	visor at the guidance	e of the seminar.				
It depends on the laboratory. T	he resistered stu	dents are required	to attend all the s	eminars, which is	arranged by the		
laboratory supervisor for the	voial ctudy subject	c related to the sum	rent recearch act	ty of the lehereter			
aboratory supervisor for the spe	Cial Sludy SUDJECT	s related to the Curl	ent research activi	ly of the laborator	y. The scheduled		
program of the seminars is annou	inced by the super	visor at the guidance	e of the seminar.				
Contents of class							
Self Preparation and Review							
Related subjects							
Notes for textbook							
Notes for reference							
Goals to be achieved							
Evaluation of achievement							
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Examination							
Details of examination							
Other information							
Other Information							
Reference LIRI							
Office hours							
Relations to attainment objective	s of learning and e	education					
1							
1							
Key words							

(M45630210)Advanced Environmental System Planning and Design I[Advanced Environmental System Planning and Design I]

Subject name[English]	Advanced Environmental System Planning and Design I[Advanced Environmental Syste					
Schedule number	M45630210	sign Ij Subject area	Advanced	Required or	Flective	
	WI43030210	Subject area	Architecture	elective	LIECTIVE	
			and Civil			
			Engineering			
Time of starting a course	Fall term	Day of the week.period	e Intensive	Credit(s)	2	
Faculty	Graduate Program	n for Master's De	gree	Subject grade	1~2	
Department Offered				Beggining		
				grade		
Charge teacher name[Roman	S5糸教務委員5	ikei kyomu Iin−S				
alphabet mark						
Numbering						
Objectives of class						
It depends on the laboratory. I	he resistered stud	dents are require	ed to attend all the	seminars, which is	arranged by the	
laboratory supervisor for the spe	cial study subjects	s related to the o	current research activ	ity of the laborator	y. The scheduled	
It depends on the laboratory T	The resistered stur	dents are require	nce of the seminar.	seminars which is	arranged by the	
laboratory supervisor for the spe	cial study subjects	s related to the	current research activ	ity of the laborator	v. The scheduled	
program of the seminars is annou	nced by the superv	visor at the guida	nce of the seminar.		,	
Contents of class	· ·	<u>v</u>				
Self Preparation and Review						
Related subjects						
Notes for textbook						
Notes for reference						
Goals to be achieved						
Evaluation of achievement						
Examination						
Dataila of exemination						
Other information						
Reference URL						
Office hours						
Relations to attainment objective	s of learning and e	ducation				
-	-					
Kauwarda						
ney words						

(M45630230)Advanced Regional System Planning and Design I[Advanced Regional System Planning and Design I]

Subject name[English]	Advanced Regional System Planning and Design I[Advanced Regional System Planning and Design I]						
Schedule number	M45630230	Subject area	Advanced Architecture and Civil Engineering	Required or elective	Elective		
Time of starting a course	Fall term	Day of the week,period	Intensive	Credit(s)	2		
Faculty	Graduate Program	n for Master's Degre	ee	Subject grade	1~2		
Department Offered				Beggining			
				grade			
Charge teacher name[Roman	S5系教務委員 5	kei kyomu Iin−S					
alphabet mark]							
Numbering							
Objectives of class							
It depends on the laboratory. T laboratory supervisor for the spe program of the seminars is annou It depends on the laboratory. T laboratory supervisor for the spe program of the seminars is annou Contents of class	The resistered study acial study subjects inced by the superv The resistered study acial study subjects inced by the superv	dents are required s related to the curr visor at the guidance dents are required s related to the curr visor at the guidance	to attend all the s rent research activi e of the seminar. to attend all the s rent research activi e of the seminar.	eminars, which is ty of the laborator eminars, which is ty of the laborator	arranged by the y. The scheduled arranged by the y. The scheduled		
Self Preparation and Review							
Related subjects							
Notes for textbook							
Notes for reference							
Goals to be achieved							
Evaluation of achievement							
Examination							
Details of examination							
Other information							
Reference URL							
Office hours							
Relations to attainment objective	es of learning and e	ducation					
Key words							

(M45630290)Seismic Design of Structures[Seismic Design of Structures]

Subject name[English]	Seismic Design o	f Structures[S	Seismio	c Design of Structur	es]	
	M45630290	Subject are	a	Advanced	Required or	Elective
				Architecture	elective	
				and Civil		
				Engineering		
Time of starting a course	Fall term	Day of	the	Wed.2~2	Credit(s)	2
-		week,period				
Faculty	Graduate Program	n for Master's	Degre	e	Subject grade	1~2
Department Offered					Beggining	
-					grade	
Charge teacher name[Roman	齊藤 大樹 SAIT	OH Taiki				
alphabet mark]						
Numbering						
Objectives of class						
The objective of this class is the	learn the evaluat	tion method (of otri	ictural performance	of the building b	acad on dynamic
hebayior and ultimate strength an	d deformation can		JI SUL	ictural performance		aseu on uynanne
The objective of this class is to	learn the evaluat	tion method (of etri	ictural performance	of the building b	ased on dynamic
hebavior and ultimate strength ar	d deformation can	acity	7 300		of the building b	ased on dynamic
Contents of class						
1 Basic concept of seismic desig	n of building					
2 Force-deformation characterie	tics of building mat	erials				
3 Seismic evaluation method for	evicting buildings	CITAIS				
3-1 Screening method 1	shisting buildings					
3-2 Screening method 2						
4 Post-seismic quick risk assess	ment of damaged h	uilding				
		unung				
1	CL 11.11					
1. Basic concept of seismic desig	n of building					
2. Force-deformation characteris	tics of building mat	erials				
3. Seismic evaluation method for	existing buildings					
3-1. Screening method 1						
3-2. Screening method 2						
4. Post-seismic quick risk assess	ment of damaged b	ouliding				
Self Preparation and Review						
Related subjects						
None						
None						
Notes for textbook						
Notes for reference						
Goola to be achieved						
To understand structural desires	brough learning the	o colomia aval-	lation	method of structure	al member and built	ding
To understand structural design t	hrough learning the		lation	method of structure	a member and built	ding.
Evaluation of achievement	in ough learning the	S SCISITILG EVAIL	Jacion	method of Structura		uing.
Report						
Report						
Examination						
Details of examination						
Other information						
Professor Taiki Saito (D805), e−m	nail: tsaito@ace.tut.a	ac.jp (Room: D	-805)			
Professor Taiki Saito (D805), e-m	nail: tsaito@ace.tut.a	ac.jp (Room: D	-805)			
Reference URL						
http://www.rc.ace.tut.ac.jp/saito/	/index-e.html					

http://www.rc.ace.tut.ac.jp/saito/index-e.html Office hours

Relations to attainment objectives of learning and education